Wellbore Integrity SOLUTIONS | RED BARON®

WELL INTERVENTION

Product Catalog

TABLE OF CONTENTS

Interactive Navigation: *Click any line in the Table of Contents (TOC) to go directly to that page. To navigate back to the Table of Contents, click anywhere in the footer section at the bottom of each page or on the TOC icon.*

Fishing Tools

Bladed-Junk Mill 3
Boot Basket 4
Box Tap/Die Collar 5
Casing Scrapers 6
Casing Swage 7
Cement Mill 8
Conductor Taper Mill 9
Conebuster Mill 10
Core-Type Junk Basket 11
Debris Catcher 12
EFL Rotating and Releasing Spear 13
External Casing and Tubing Patches 14
Hex Bumper Sub 15
Impression Blocks 16
Itco-Type Releasing Spear 17
Jet Junk Basket 18
Junk Magnet 19
Mechanical Casing Cutter 20
Packer Milling and Retrieving Tools 21
Pilot Mill 22
Pin Tap 23
Rotating and Releasing Overshot 24
Safety Joints 25
Series 70-Type Releasing Overshot 26
Series 150-Type Releasing Overshot 27
String Mill 28
Taper Mill 29
Taper Tap 30
TMC Bumper Sub 31
TMC Single-Acting Fishing Accelerator (Up Only) 32
TMC Single-Acting Hydraulic Fishing Jar (Up Only) 34
Washover Shoes 36

TABLE OF CONTENTS *continued*

Well Abandonment Tools

Bridge Plugs 40
Casing Mill 41
Circulation Sub 42
Hydraulic Disconnect 43
Hydraulic Pipe Cutter 44
In-LINE Casing Spear 45
K-Master 46
Marine Swivel 48
Milling Inserts 49
Multi-Cycle Pipe Cutter 50
ProLATCH 51
ProMAXX Hydraulic Spear 52
ProMAXX Pipe Cutter 53
ProMILL 54
ProMILL Duo 55
ProMILL Underreamer 56
PullMaster 57

Wellbore Departure Tools

TrackMaster Accessories 60
TrackMaster Mill 61
TrackMaster Select Anchor 62
TrackMaster Select Retrieval Tools 63
TrackMaster Select Whipstock 64
Trackmaster TT Wellbore Departure System 65

Thru-Tubing Services

Continuous Tubing Overshot 68
CT Connectors 69
Dual Circulating Sub 70
Dual-Flapper Check Valve 71
Heavy-Duty Hydraulic Disconnect 72
Hydraulic Bowspring Centralizer 73
Hydraulic Indexing Tool 74

TABLE OF CONTENTS *continued*

Hydraulic Pulling Tool 75
Hydraulic Release GS 76
Hydraulic Release Overshot 77
Hydraulic Release Spear 78
i-MILL TT Intervention Mill 79
Locking Swivel Joint 80
Mechanical Bowspring Centralizer 81
Mechanical Pulling Tool 82
Mechanical Release GS 83
Motor Head Assembly 84
PowerMill TT Thru-Tubing Motor 85
Quick Connector 86
Series 10- and 20-Type Releasing Overshots 87
Series 70- and 150-Type Releasing Overshots 88
Stage Mill 89
T Series Mill 90
Thru-Tubing Double-Acting Accelerator 91
Thru-Tubing Double-Acting Hydraulic Jar 92
Thru-Tubing Hydraulic Pipe Cutter 93
Thru-Tubing Underreamer 94
TJ Hydraulic Disconnect 95
TT Turbomill 96
Venturi Jet Basket 98

FISHING TOOLS

Bladed-Junk Mill

OPTIMAL REMOVAL FOR TYPES OF GENERAL JUNK MILLING

Bladed-junk mills are dressed with high-quality tungsten carbide to ensure optimal performance in every application. Bladed-junk mills are suitable for all types of general junk milling, as well as the removal of packers, retainers and squeeze tools.

Bladed-junk mills are available in 3½ in. to 28 in. sizes with 2⅞ in. to 11¼ in. fishing necks.

Bladed-Junk Mill

BLADED-JUNK MILL SPECIFICATIONS

Dressed diameter, in.	Top connection, box	Fishing neck diameter, in.	Pin ID, in.	Yield torque, ft.lbf	Tensile yield, lbf
3½ – 4½	2⅜ PAC	2⅞	1⅜	3,200	158,950
3½ – 4½	2⅜ Reg	3⅛	1½	3,850	163,000
4½ – 5½	2⅞ PACDS	3⅛	1½	4,850	179,650
4½ – 5½	2⅞ Reg	3¾	1½	7,400	275,700
5½ – 7½	3½ Reg	4¾	1¾	10,500	402,300
7⅝ – 9½	4½ Reg	6¼	2¼	27,650	791,050
9½ – 12¼	6⅝ Reg	8	3	64,000	1,384,800
15 – 17½	7⅝ Reg	9½	3¼	106,250	2,005,500
18⅝ – 28	8⅝ Reg	11¼	3¼	184,550	2,840,000

Boot Basket

CATCH THE HEAVY DEBRIS AND JUNK THAT CANNOT CIRCULATE OUT OF THE HOLE

Boot baskets catch debris that is too heavy to circulate out of the hole during drilling and milling operations. As cuttings flow past the boot basket's larger OD, smaller OD, and its top connection, a sudden decrease in annular velocity is created, allowing the boot basket to trap junk. Boot baskets should be run as closely as possible to the mill, bit, or junk basket, and they can be run in tandem to increase junk-retrieval capacity. Boot baskets are available in a range of sizes to run with most BHAs.

BOOT BASKET SPECIFICATIONS

Tool series	Top connection, box	Fishing neck diameter, in.	Pin ID, in.	Yield torque, ft.lbf	Tensile yield, lbf
35	2⅜ Reg	3⅛	1½	5,800	244,500
35	2⅜ PAC	2⅞	1⅜	4,800	238,400
40	2⅞ Reg	3¾	1½	11,100	413,550
46	2⅞ PACDS	3⅛	1½	7,300	269,500
50, 52	3½ Reg	4⅜	1¾	15,750	603,450
70	4½ Reg	6¼	2¼	41,500	1,186,600
96	6⅝ Reg	8	3	96,000	2,077,200
133, 160	7⅝ Reg	9½	3¼	159,400	3,008,200

Boot Basket

Box Tap/Die Collar

RETRIEVAL FOR NON-ROTATING TUBULAR FISH

Box taps are designed to externally engage and retrieve tubular fish that can't be rotated. Available with a choice of special guides, box taps are well suited for threading facilitating engagement when threads are damaged.

BOX TAP/DIE COLLAR SPECIFICATIONS

Wicker size, in.	Top connection, box	Fishing neck diameter, in.	Pin ID, in.	Yield torque, ft.lbf	Tensile yield, lbf
1¼ – 2⅝	2⅜ Reg	3⅛	1½	5,800	244,500
1½ – 3¼	2⅞ Reg	3¾	1½	11,100	413,550
2½ – 4⅛	3½ IF	4¾	2¼	19,000	777,000
3¼ – 5½	4½ IF	6½	2 13/16	56,650	1,499,900
4½ – 7	6⅝ Reg	8	3	96,000	2,077,200
5¾ – 8¼	7⅝ Reg	9½	3¼	159,400	3,008,200
7 – 9¾	7⅝ Reg	11	3¼	159,400	3,008,200

Box Tap/Die Collar

Casing Scrapers

REMOVE IRREGULARITIES FROM THE INNER SURFACES OF A TUBULAR

Casing scrapers are used to remove paraffin, hardened mud, cement, or burrs resulting from tool runs or perforations from the inner surfaces of a tubular. Casing scrapers are particularly useful for cleaning the casing before setting a packer. A broad range of casing scraper types and sizes are available for a variety of applications.

Applications

- Removing undesirable irregularities from tubular IDs
- Cleaning casing prior to setting packers and bridge plugs

Benefits

- Ensures clean tubular contact for packers and bridge plugs

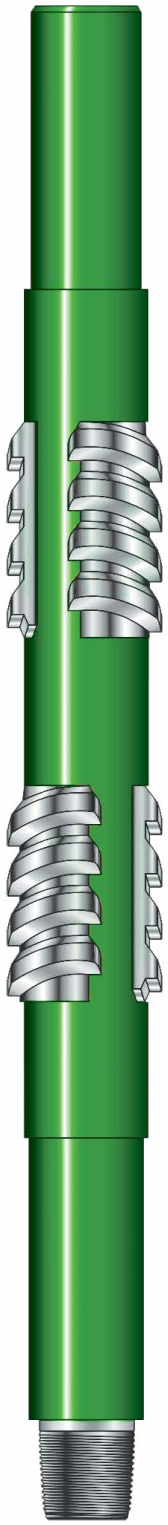
Features

- Pressure-compensated construction endures hydrostatic and circulation pressures
- Designed to operate with conventional or reverse circulation

Ordering instructions

Please specify:

- Tool OD
- Connection size and type



Casing Scrapers

Casing Swage

RESTORE CASING TO ORIGINAL SHAPE

The casing swage restores dented, buckled, or collapsed casing to near its original shape and diameter. The tapered anvil construction of the casing swage uses mechanical force supplied by downhole impact equipment such as bumper subs or drilling jars to open casing obstructions to near their original diameter.

Applications

Restoring dented, buckled, or collapsed casing to near its original shape

Benefits

- Uses force from downhole impact equipment: bumper subs or drilling jars

Features

- Simplified construction enhances tool durability
- Tapered anvil construction efficiently reforms casing
- Incremental sizes enable swaging various degrees of casing collapse

Casing Swage

Cement Mill

A FAST AND DURABLE WAY TO CUT STEEL

Cement mills are designed for light milling: float collars, plugs, bridge plugs, and retainers. An open pattern cuts quickly on tubular fish, and the mill resists clogging by cement or formation. Cement mills cut steel faster and are more durable than a steel-tooth bit. And, when compared with the steel-tooth bit, the cement mill is recommended as a better option.

Cement mills are available in 3½ in. to 17½ in. sizes with 3⅛ in. to 9½ in. fishing necks.

Cement Mill

CEMENT MILL SPECIFICATIONS

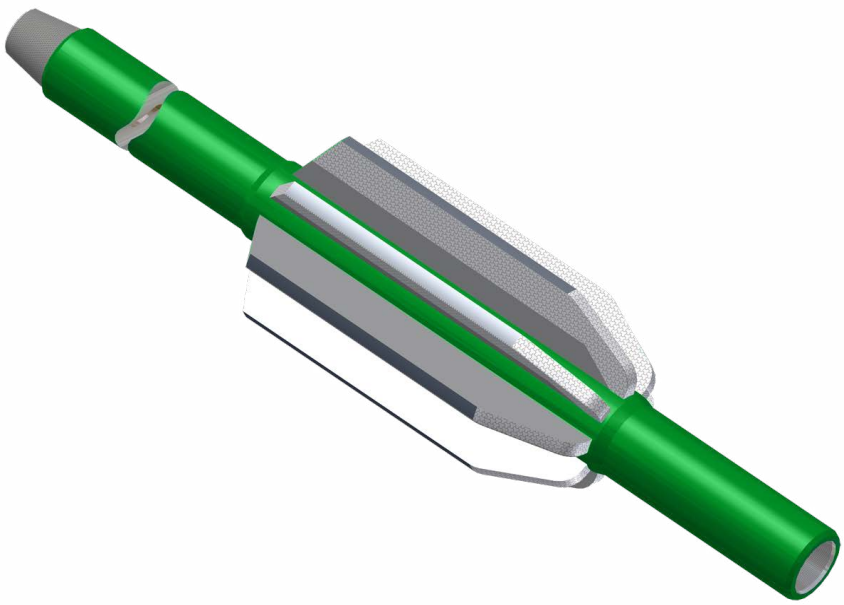
Dressed diameter, in.	Top connection, box	Fishing neck diameter, in.	Pin ID, in.	Yield torque, ft.lbf	Tensile yield, lbf
3½ – 4½	2⅜ PAC	2⅞	1⅜	3,200	158,950
3½ – 4½	2⅜ Reg	3⅛	1½	3,850	163,000
4½ – 5½	2⅞ PACDS	3⅛	1½	4,850	179,650
4½ – 5½	2⅞ Reg	3¾	1½	7,400	275,700
5½ – 7½	3½ Reg	4¾	1¾	10,500	402,300
7⅝ – 9½	4½ Reg	6¼	2¼	27,650	791,050
9½ – 12¼	6⅝ Reg	8	3	64,000	1,384,800
15 – 17½	7⅝ Reg	9½	3¼	106,250	2,005,500

Conductor Taper Mill

CLEAN OUT RESTRICTIONS WITHIN CASINGS

Conductor taper mills are used to clean out restrictions in platform or jackup conductor casings. Their design is similar to a normal taper mill, but with a box connection down. This connection is useful for installing a smaller diameter taper mill, junk mill, or other pilot assembly. Conductor taper mills can ream out considerable deformation in one pass. Their heavy, tungsten carbide dressing ensures long life and fast cutting.

Conductor taper mills are available in 15 in. to 28 in. sizes with 9½ in. fishing necks.



Conductor Taper Mill

CONDUCTOR TAPER MILL SPECIFICATIONS

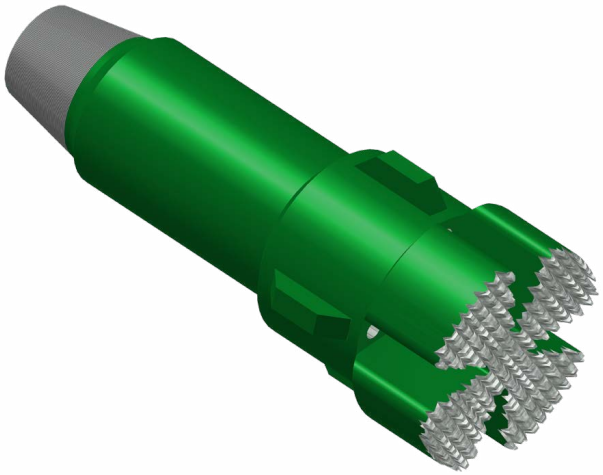
Dressed diameter, in.	Top connection, box	Fishing neck diameter, in.	Pin ID, in.	Yield torque, ft.lbf	Tensile yield, lbf
15 – 28	7⅝ Reg	9½	3¼	106,250	2,005,500

Conebuster Mill

USE FOR HEAVY MILLING OF BIT CONES, SLIPS AND OTHER DEBRIS

Conebuster mills are ideal for heavy milling: bit cones, slips, and pieces of downhole tools. A concave cutting face with a thick cutting structure ensures long service life and efficient milling. This mill type is **not** recommended for cement cleanout.

Conebuster mills are available in 3½ in. to 17½ in. sizes with 3⅛ in. to 9½ in. fishing necks.



Conebuster Mill

CONEBUSTER MILL SPECIFICATIONS

Dressed diameter, in.	Top connection, box	Fishing neck diameter, in.	Pin ID, in.	Yield torque, ft.lbf	Tensile yield, lbf
3½ – 4½	2⅜ Reg	3⅛	1½	3,850	163,000
4½ – 5½	2⅞ Reg	3¾	1½	7,400	275,700
5½ – 7½	3½ Reg	4¾	1¾	10,500	402,300
7⅝ – 9½	4½ Reg	6¼	2¼	27,650	791,050
9½ – 12¼	6⅝ Reg	8	3	64,000	1,384,800
15 – 17½	7⅝ Reg	9½	3¼	106,250	2,005,500

Core-Type Junk Basket

RETRIEVE SMALL, IRREGULAR-SHAPED DEBRIS FROM WELL BOTTOM

Core-type junk baskets are used to retrieve small, irregular-shaped debris from the well bottom by cutting a core from the formation and recovering the debris with the cut core. The basket is recommended for soft to medium-soft formations.

The core-type junk basket is available in most hole sizes and can be dressed with a variety of shoe types, depending on formation properties and fishing objectives.

CORE-TYPE JUNK BASKET SPECIFICATIONS

Tool OD, in.	Hole size, in.	Shoe OD, in.	Maximum fish diameter, in.
3 5/8	3 3/4 – 4 1/8	3 5/8	2 23/32
3 3/4	4 1/4 – 4 1/2	4 1/16	2 31/32
3 7/8	4 5/8 – 5	4 1/2	3 9/32
3 7/8	4 5/8 – 5	4 1/2	3 3/8
4 1/4	5 1/8 – 5 1/2	4 7/8	3 23/32
5 1/8	5 5/8 – 6	5 1/8	3 25/32
4 3/4	5 5/8 – 6	5 3/8	4 1/16
5 3/4	6 1/8 – 6 1/2	5 3/4	4 13/32
5 1/8	6 1/8 – 6 1/2	5 7/8	4 5/16
5 1/4	6 1/8 – 6 1/2	5 7/8	4 1/2
5 3/4	6 5/8 – 7	6 1/4	4 13/16
6 1/2	7 1/4 – 8	7 1/8	5 7/16
7 1/2	8 1/4 – 9	8 1/8	6 3/16
8 1/2	9 1/4 – 10 1/8	9 1/8	7 3/16
9 3/8	10 1/4 – 11 5/8	10 1/8	8 1/16
10 3/8	11 3/4 – 12 1/2	11 1/4	9 1/16
11 3/8	12 5/8 – 15	12 1/4	10 1/16
13 3/4	15 – 20	14 1/2	12 1/16

Core-Type Junk Basket

Debris Catcher

MODULAR SYSTEM TO REMOVE DEBRIS FROM THE WELLBORE

The Wellbore Integrity Solutions Debris Catcher is a modular system, which uses reverse circulation to remove debris from the wellbore. Pumping through the tool provides energy to lift debris and fish from the bottom of the hole, object, or obstruction point. The lower end of the tool can be configured in one of three ways depending on the application, while the same jet section is used for all three applications:

- One application is a vacuum setup for removing small debris from a wellbore. The lower end of the tool uses a chamber for debris storage. When the job is completed, the tool's trash cap can be removed and the debris chamber emptied without disassembling the tool.
- A second application is for fishing large debris from the wellbore. The tool's debris chamber, on its lower end, is replaced with a rotary shoe which has an internal finger basket to capture fish.
- An additional application is for packer, plug, and milling operations. A washover shoe is attached to the bottom end of the tool and milling debris is collected inside the tool. When the job is completed, the trash cap can be removed to empty debris from the tool.

Applications

- Vacuum setup for removing small wellbore debris prior to completions
- Debris removal caused by milling bridge plugs, packers, or both
- Large fish recovery setup for bit cones and other large debris

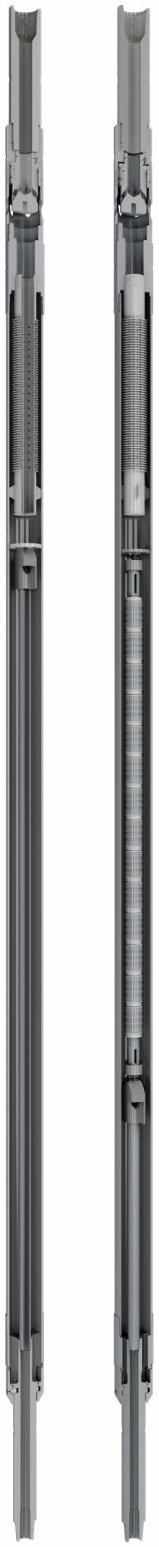
Benefits

- Tool retains all collected debris
- Milled cuttings never reach surface
- Tool eliminates need for expensive milling fluid
- Wellbore debris can be removed despite poor lifting capacity of fluid, high equivalent circulating density not possible with open perforations, or insufficient pump capacity to provide adequate annular velocities for hole cleaning

Features

- Interchangeable jets for hydraulic optimization downhole
- Removable trash cap to empty debris at surface
- High-volume suction flow
- Large debris capacity

DEBRIS CATCHER SPECIFICATIONS		
Tool size OD, in.	**5 ½**	**7 ⅞**
Top connection	3½ IF Box	4½ IF Box
Bottom connection	3½ IF Pin	4½ IF Pin
Maximum torque, ft.lbf	8,900	22,700
Maxium tensile yield strength, lbf	204,000	340,000
Tool Length		
Vacuum setup, in.	368	310
Vacuum setup — one extension, in.	676	531
Vacuum setup — two extensions, in.	984	841
Milling setup, in.	368	310
Fishing setup, in.	64	83
Tool Capacities		
Vacuum, in.^{3} [galUS]	2,995 [13]	5,100 [22]
Vacuum — one extension, in.^{3} [galUS]	6,570 [28.4]	12,390 [53.6]
Vacuum — two extensions, in.^{3} [galUS]	11,560 [50]	19,420 [84]



Debris Catcher

EFL Rotating and Releasing Spear

CONDUCT FISHING OPERATIONS WHEN EXTERNAL CATCH TOOLS ARE NOT FEASIBLE

The EFL rotating and releasing spear ensures fishing operation success by engaging the fish ID in situations where external catch tools are not feasible, such as when fishing drillpipe, casing, or tubing. The spear features a full bore to facilitate the use of wireline equipment the during fishing operation.

Applications

- Fishing of drillpipe, casing, tubing, and downhole equipment that cannot be engaged with external catch tools

Benefits

- Reduces maintenance costs by using less expensive disposable wear slips

Features

- Disassembles into five separate components for onsite service
- Resets to catch position downhole with one full left-hand rotation
- Maintains full bore in all sizes to accommodate wireline equipment
- Transmits torque to free fish when necessary

EFL Rotating and Releasing Spear

EFL ROTATING AND RELEASING SPEAR SPECIFICATIONS

Tool OD, in.	**1 29/32**	**2 15/16**	**2 11/16**	**3 1/8**	**4 1/8**	**5 11/16**	**7 1/4**	**11 3/4**
Tool ID, in.	3/8	3/8	1/2	1	1 1/4	2 1/4	3	3 1/2
Spear length, in.	30	30	38	40	47	50	55	60
Assembly number	14272	14273	14274	14275	14276	14277	14278	14279
For casing size, in.	2 3/8 Tubing	2 7/8 Tubing	3 1/2 Tubing	4 – 4 1/2 Casing	5 – 5 1/2 Casing	6 5/8 – 7 7/8 Casing	8 5/8 – 11 3/4 Casing	13 3/8 – 20 Casing
Catch range min. – max., in.	1.862 – 2.546	2.409 – 3.062	2.733 – 3.549	3.157 – 4.106	4.150 – 5.691	5.703 – 7.251	7.432 – 11.115	11.655 – 19.127
Tensile yield, lbf	98,200	145,000	244,000	187,444	360,000	934,000	1,400,000	4,800,000
Torsional yield, lbf.ft	2,030	3,630	6,530	7,430	17,900	70,600	133,000	600,000
Tool weight, lbm	25	35	50	65	150	250	460	1,560

External Casing and Tubing Patches

REPAIR CASING IN REGULAR OR SLIMHOLE WELLBORES

External casing and tubing patches are designed to repair damaged casing or tubing strings quickly and economically, without reducing the ID. The casing or tubing string must be removed to a point below the damaged section. The top of the casing or tubing stub is then dressed with a milling tool, and the patch is run over the casing or tubing to a depth sufficient to engage the slip. The external casing patch is available in standard and slimhole types. The slimhole version is ideal for small, restricted wellbores or for use below a restriction.

Applications

- Restoring integrity to damaged tubulars in regular or slimhole sections

Benefits

- Simple, economical installation
- Minimal impact on further drilling because it does not restrict casing ID

Features

- Lead or packer-type sealing mechanisms available
- Extensions available for packer-type patches
- Corrosion-resistant alloys (CRA) and low-yield alloys available for sour service wells by special order
- Regular or slimhole versions available

Ordering instructions

Please specify:

- Casing or tubing size and top connection
- Actual casing OD
- Pressure requirements
- Regular or slim (order regular series where clearances permit)

External Casing and Tubing Patches

Hex Bumper Sub

BUMP UP OR BUMP DOWN WITH FULL TORQUE TRANSMISSION AND CIRCULATION DURING FISHING OPERATIONS

The Hex bumper sub provides durable and efficient upward or downward bumping action for fishing operations. Full torque transmission and circulation can be maintained through the tool at all times, in any stroke position. The Hex bumper sub's robust design, materials quality and comprehensive quality requirements ensure reliable performance in the harshest downhole environments.

Applications

- Openhole and cased-hole fishing operations when the sub is placed above fishing tools or safety joints to deliver forceful blows
- Backoff operations when the sub releases spears or overshots, shear pins, dislodges a stuck string, and acts as a feedoff tool
- Plug and abandonment (P&A) operations when low-level jarring may be required or strings of casing are being cut

Benefits

- Reliable performance
- Economical maintenance
- Effective in the harshest downhole conditions

Features

- Hexagonal mandrel to ensure continuous torque transmission up to 36 in. stroke for solid bumping action upward or downward
- Full-bore design to minimize pressure losses and provide wireline tool compatibility
- Simple design, with only five major components for low maintenance

Ordering instructions

Please specify:

- Hole size
- Drillstring component OD where the tool will be utilized
- Connection size and type
- Required stroke length

Hex Bumper Sub

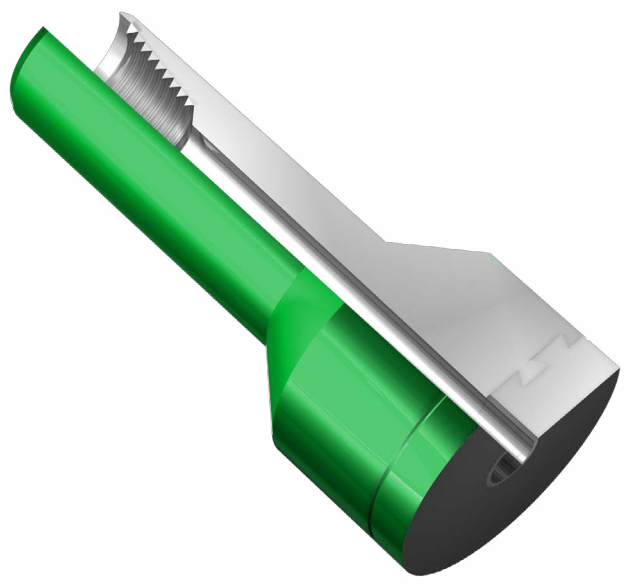
HEX BUMPER SUB SPECIFICATIONS

Tool OD, in.	1 13/16	3½	3¾	3¾	4¼	4¾	6¼	6¼	6½	6¾	7¾	8
Tool ID, in.	⅜	1	1½	1¼	1 15/16	2	2	2¼	2¼	2¾	3½	3½
Tool Joint Connection	1 13/16 WFJ	2⅜ API Reg	2⅜ API IF	2⅞ API Reg	2⅞ API IF	3½ API IF	4½ API IF	4½ API IF	4½ API IF	5½ API Reg	6⅝ API Reg	6⅝ API Reg
Assemby Number	16734	16608	16541	16645	16240	16407	16431	16406	16955	16899	16606	16954
Stroke, in.	20	20	20	20	20	20	20	20	20	20	20	20
Tensile Yield, lbf	99,000	193,000	214,000	233,500	352,000	341,400	813,900	705,400	760,000	790,000	900,000	1,200,000
Torsional Yield, lbf.ft	1,150	5,200	7,000	7,000	12,800	14,800	33,000	33,000	34,000	38,000	40,000	40,000
Total Closed Length, in.	41¾	62½	61½	61½	59⅛	62½	64½	64½	64⅝	67¼	71⅛	71¼
Tool Weight, lbm	25	95	140	150	140	198	390	375	415	455	655	717

Impression Blocks

FIND THE POSITION AND CONDITION OF THE OBSTRUCTION OF THE BOREHOLE

Impression blocks are used to determine the position and condition of the top part of fish or junk obstructing the borehole. Impression blocks feature a steel body that's lower end is fitted with a block of soft material, typically lead. The tool is made up on the running string and lowered without rotation to make contact with the obstruction. The resulting contact with the obstruction leaves an impression on the block's soft material that can be identified at surface. With this information, the appropriate fishing equipment can be deployed.



Impression Blocks

IMPRESSION BLOCKS SPECIFICATIONS (Connection only)

Tool OD, in.	Top connection, box	Fishing neck diameter, in.	Pin ID, in.	Yield torque, ft.lbf	Tensile yield, lbf
4	2⅜ Reg	3⅛	1½	5,800	244,500
5	2⅞ Reg	3¾	1½	11,100	413,550
6	3½ Reg	4¾	1¾	15,750	603,450
8½	4½ Reg	6¼	2¼	41,500	1,186,600
12¼	6⅝ Reg	8	3	96,000	2,077,200
17½	7⅝ Reg	9½	3¼	159,400	3,008,200
22	7⅝ Reg	9½	3¼	159,400	3,008,200
26	7⅝ Reg	9½	3¼	159,400	3,008,200

Itco-Type Releasing Spear

ENGAGES FISH WITH IDS UP TO 20 IN

The Itco-Type releasing spear is a superior fishing spear ensures positive engagement with fish. The Itco-Type releasing spear internally engages and retrieves drillpipe, casing, tubing, or any other obstruction with IDs up to 20 in. It is built to withstand severe jarring and pulling strains. Heavy-duty versions of the spear can be used with pulling tools to increase performance. It engages the fish over a large area to minimize damage or distortion of fish.

Applications

- Internally engage and retrieve drillpipe, casing, tubing or any obstruction with a known ID

Benefits

- Reliable recovery with minimal distortion of fish
- Engages fish with IDs up to 20 in.

Features

- Grapple and wicker design to ensure nearly 360° engagement
- Releases with right-hand rotation if necessary
- Sub-type nut available to make up tools below the spear
- Compatible with jarring assemblies, backoff, and pulling tools

Itco-Type Releasing Spear

Jet Junk Basket

RETRIEVE STUBBORN DEBRIS FROM THE HOLE BOTTOM

The Jet junk basket produces a circulating force capable of scavenging the most stubborn items from hole bottoms, including bit cones, slips, tail chains, shot remnants, and other small debris. The Jet junk basket can easily be converted to a conventional core basket by removing jet components and attaching the junk retaining assembly directly to the top sub.

Applications

- Cased or openhole operations that require removal of small debris from wellbore
- Vertical and horizontal applications
- Most formations when running as jet basket or as a core basket in soft formations

Benefits

- Removes even the most stubborn small wellbore debris efficiently
- Converts to conventional core basket for operational flexibility

Features

- Jet nozzles produce a Venturi effect to force junk from the hole bottom
- Versatile dual configuration provides additional options without extra equipment
- Open jets enable workstring to be pulled dry, improving rig floor efficiency and working conditions
- Extended junk sleeves available for retrieving longer items

Jet Junk Basket

Junk Magnet

RETRIEVE SMALL JUNK AND DEBRIS FROM THE BOTTOM OF THE HOLE

Junk magnets are used to retrieve small, irregular-shaped, magnetic debris. Junk magnets are frequently run in advance of diamond tools to remove debris that could adversely affect the tool's performance. The Junk magnet's internal pole plate is highly magnetized, but the rest of the tool remains nonmagnetic. Junk magnets are available in most hole sizes.

Junk Magnet

JUNK MAGNET SPECIFICATIONS

Tool OD, in.	Top connection, box	Fishing neck diameter, in.	Pin ID, in.	Yield torque, ft.lbf	Tensile yield, lbf
4	2⅜ Reg	3⅛	1½	5,800	244,500
5	2⅞ Reg	3¾	1½	11,100	413,550
6	3½ Reg	4¾	1¾	15,750	603,450
8½	4½ Reg	6¼	2¼	41,500	1,186,600
12¼	6⅝ Reg	8	3	96,000	2,077,200
17½	7⅝ Reg	9½	3¼	159,400	3,008,200
22	7⅝ Reg	9½	3¼	159,400	3,008,200
26	7⅝ Reg	9½	3¼	159,400	3,008,200

Mechanical Casing Cutter

EASILY CONVERT TO ALTERNATE CUTTING DIAMETERS FOR FLEXIBILITY IN CASING AND DRILLPIPE CUTTING

The mechanical casing cutter quickly converts to alternate inside cutting diameters, increasing flexibility while reducing rig time. The tool, used for casing sizes of 4½ in. to 13⅜ in., consists of a friction assembly to assist setting the tool in the pipe, a slip assembly to anchor the tool, and a retractable cutting assembly. Frequently, no conversion of the tool is needed for cutting different diameters of pipe; often, only the slips and friction blocks need to be changed. The tool also features an automatic nut, which permits repeated resetting and disengaging of the tool without returning it to the surface.

Applications

- Cutting casing and drillpipe in multiple locations
- Cutting casing where circulation problems are encountered

Benefits

- Reduced rig time by easy conversion to alternate inside cutting diameters
- Greater efficiency with downhole resetting and disengaging capability

Features

- Adjusts to cut multiple casing sizes, often without tool conversion
- Disengages and resets to run-in position automatically when casing is cut

Ordering instructions

Please specify:

- Required tool series
- Size and weight of casing to be cut
- Number of sets of cutting knives required
- Top connection

MECHANICAL CASING CUTTER SPECIFICATIONS

Tool Series	Tool OD, in.	Casing Size, in.	Top Connection	Fishing Neck OD, in.	Tool Weight Approx., lbm
31	3	4 – 4½	2⅜ PAC	2⅞	45
36	3⅝	4½ – 5½	2⅜ IF	3⅝	66
37	3¾	4½ – 7	2⅜ IF	3¾	100
42	4¼	5 – 7⅝	2⅞ Reg	4¼	180
55	5 9/16	6⅝ – 9⅝	3½ IF	5 9/16	205
57	5¾	6⅝ – 13⅜	3½ Reg	4¾	260
77	7¾	9⅝ – 13⅜	4½ IF	6½	950
82	8¼	9⅝ – 13⅜	4½ IF	6½	990
117	11¾	13⅜ – 36	6⅝ Reg	8	2,750
160	16	18⅝ – 36	7⅝ Reg	9½	7,000

NOTE: *Other connections are available to order, and pipe cutters can be built to cut other casing and tubing sizes. We only show the sizes of casings that we recommend cutting with each size of pipe cutter. Larger sizes can be cut, but because the long cutting arms required are fragile, great care must be exercised.*

Internal Cutter Drag Spring

Internal Cutter Wiper Block

Packer Milling and Retrieving Tools

MILL AND RETRIEVE PACKERS AND BRIDGE PLUGS IN A SINGLE RUN

The packer milling and retrieving tools mill and retrieve production packers and bridge plugs in a single run.

The washover-type system mills over the slip section to disengage the packer. The spear section extends through the packer to catch and retrieve the element once the slips have been removed. The packer mill consists of a mill body and a replaceable mill or long rotary shoe dressed with crushed carbide.

The fixed-blade-type system features four blades dressed with crushed carbide for packer milling. Circulation ports between the blades allow cuttings to be flushed out of the wellbore. The catch assembly is equipped with a milling head dressed with crushed carbide and functions as a guide to remove any obstructions in the packer bore.

Extensions can be added between the spear and the packer mill in both types to provide sufficient length for the spear to pass through the bore of the packer before the mill engages the element. Both washover- and blade-type packer milling and retrieving tools can be released from the packer should it fail to mill up or disengage.

Applications

- Removing packers and bridge plugs

Benefits

- Effective hole cleaning
- Reliable, heavy duty milling performance
- Adaptable to various packer IDs

Features

- Ported mill body
- Spears that can be dressed for various packer IDs
- Washover-type rotary shoes
- Blade-type tools

Ordering instructions

Please specify:

- Connection size and type
- Casing ID
- Packer make, model and ID length

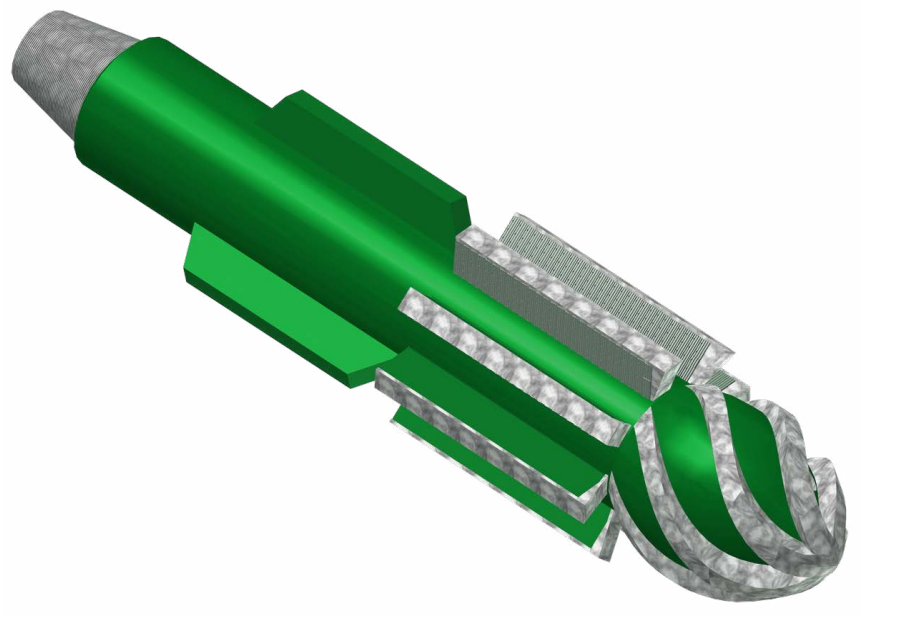
Fixed Blade-Type *Washover-Type*

Pilot Mill

USE FOR MILLING SECTIONS OF TUBULAR JUNK

Pilot mills are suitable for milling sections of tubular junk and can be used as dress mills for the installation of a casing patch. They can be used for milling liner hangers and other downhole tools with a through bore.

Pilot mills are available in 3¼ in. to 17 in. sizes with 3⅛ in. to 8 in. fishing necks.



Pilot Mill

PILOT MILL SPECIFICATIONS

Dressed diameter, in.	Top connection, box	Fishing neck diameter, in.	Pin ID, in.	Yield torque, ft.lbf	Tensile yield, lbf
3¼ – 4¼	2⅜ Reg	3⅛	1½	3,850	163,000
4 – 5⅜	2⅞ Reg	3¾	1½	7,400	275,700
5½ – 7⅞	3½ Reg	4¾	1¾	10,500	402,300
7 – 10¾	4½ Reg	6¼	2¼	27,650	791,050
9½ – 17	6⅝ Reg	8	3	64,000	1,384,800
9½ – 17	7⅝ Reg	9½	3¼	106,250	2,005,500

Pin Tap

RETRIEVAL FOR TUBULAR FISH RESTRAINED FROM ROTATING

Pin taps provide an economical means to retrieve a tubular fish that is restrained from rotation. Pin taps are designed to mate with a box-up tool joint and include an open bore, allowing wireline tools to be run through the tap.

Note: Pin taps should be run in conjunction with a safety joint.

Pin Tap

Rotating and Releasing Overshot

EXTERNALLY ENGAGE FISH UNDER HIGH TORSIONAL AND TENSILE LOADS

The rotating and releasing overshot set the industry standard for reliability and flexibility for externally engaging fish under high-torsion and high-tensile loads. Its unique segmented slip design was developed to surpass the durability of conventional grapples. Lugs located between each of the overshot's slips provide a high-torque lock which provides unmatched gripping strength and reliability.

Wellbore Integrity Solutions' standard rotating and releasing overshot assembly consists of a top coupling, body, standard guide, spring, slip carrier, one set of slips, and a blanking ring; all of which are constructed of high-strength steel.

Applications

- Externally engages of drillpipe, casing, tubing and downhole tools with right- or left-hand torque
- Functions as a left-hand high-torque overshot for use below the AJ reversing tool

Benefits

- Reliable performance for efficient recovery
- Durable design reduces fishing costs

Features

- Slips designed in segments to endure high-torsion and high-tensile load operations
- Lugs located between each slip provide high-torque lock
- Segmented slips more durable than grapples

Ordering instructions

Please specify:

- Tool OD
- Connection size and type
- OD of fish (slip catch size)
- Short catch or standard catch overshot body
- Lip guide or mill guide
- Packoff rubbers, carrier bushing, or special carriers (if required)

Rotating and Releasing Overshot

Safety Joints

ENSURE PARTING ABILITY IF WORKSTRING BECOMES STUCK

Safety joints provide an additional level of protection against stuck fish by securing the entire fishing string in the wellbore and provides a positive releasing mechanism if the catch tool cannot be released. Safety joints are available for washover, drilling, and fishing applications.

Safety joints are equipped with O-rings to ensure hydraulic integrity when used with high-circulation washpipe. Safety joints are designed to withstand high torsional, axial, and impact loadings.

Safety joints are available for a broad range of applications. Contact a Wellbore Integrity Solutions representative for more information.

Applications

- Openhole and cased hole fishing
- Washover operations
- Pipe recovery and well abandonment operations

Benefits

- Provides an additional level of protection against stuck fish
- Ensures parting ability if workstring becomes stuck during fishing operations

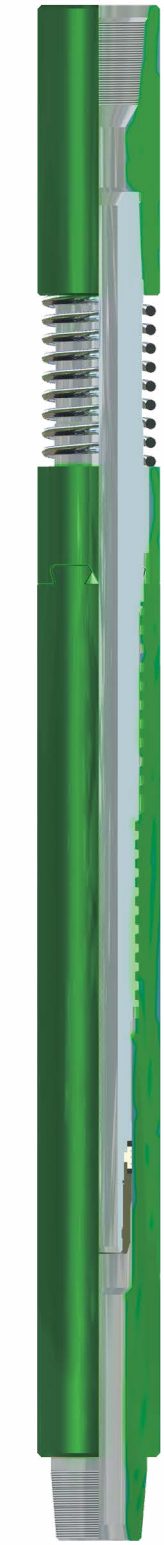
Features

- Positive releasing mechanism to free catching tool from wellbore
- Internal seals eliminate leak paths, enabling high circulating pressure
- Canfield thread form available for washpipe applications

Ordering instructions

Please specify:

- Tool OD
- Type
- Connection size and type
- Optional Canfield thread form (for washpipe only)



Safety Joints

Series 70-Type Releasing Overshot

RETRIEVE TUBULAR FISH WITH SHORT NECKS

The Series 70-Type releasing overshot is designed to engage, pack off, and retrieve tubular fish and is specifically designed to use when the top of the fish is too short to be engaged with a Series 150-Type overshot. With the grapple positioned at the bottom of the tool, the overshot is able to successfully engage fish with short necks.

The tool's unique tapered helix internal construction provides 360° wall contact while distributing loads evenly on the tool and fish. The Series 70-Type releasing overshot is equipped with expandable cylinder basket grapples to be used when fish ODs are less than one-half inch of the tool's maximum catch size. The Series 70-Type overshot is available in full-strength and slimhole configurations to cover a range of external catch fishing requirements:

- **FS** — Engineered to withstand all pulling, torsional, and jarring strains
- **SH** — Engineered to withstand heavy pulling strains only

Applications

- Engaging and retrieving tubular fish
- Baiting damaged external fishing profiles
- Fishing operations requiring wireline compatibility

Benefits

- Successfully retrieves of fish with short necks

Features

- Full 360° grapples to evenly distribute gripping force
- Expandable cylinder basket grapples for smaller diameter fish

Series 70-Type Releasing Overshot

Series 150-Type Releasing Overshot

SUCCESSFULLY RETRIEVE TUBULAR FISH, INCLUDING PARTED DRILLPIPE AND DRILL COLLARS

The Series 150-Type releasing overshot engages, packs off, and retrieves tubular fish, and is especially suited to retrieve parted drillpipe and drill collars. The Series 150-Type overshot features a large bore for use with wireline tools and is available in a range of strength categories for jarring and backoff operations.

The tool's unique tapered helix internal construction provides 360° wall contact while distributing loads evenly on the tool and fish. Spiral grapples or basket grapples are available. Spiral grapples are used when maximum catch size of the overshot is necessary, and expandable cylinder basket grapples are used when fish ODs are less than one-half inch of the tool's maximum catch size.

The Series 150-Type releasing overshot is available in full strength (FS), semi-full strength (SFS), slimhole (SH), and extra slimhole (XSH), to cover a range of external catch fishing requirements:

- **FS** — Engineered to withstand all pulling, torsional, and jarring strains
- **SFS** — Engineered for special hole conditions where maximum strength is required
- **SH** — Engineered to withstand heavy pulling strains only
- **XSH** — Engineered for pick-up jobs only

Applications

- Engaging, packing off, and retrieving tubular fish especially drillpipe and drill collars
- Baiting damaged external fishing profiles
- Fishing operations requiring wireline compatibility

Benefits

- Range of strength categories provides flexibility
- Reliable fish recovery

Features

- Large open bore for use with wireline equipment
- Full 360° grapples evenly distribute gripping force

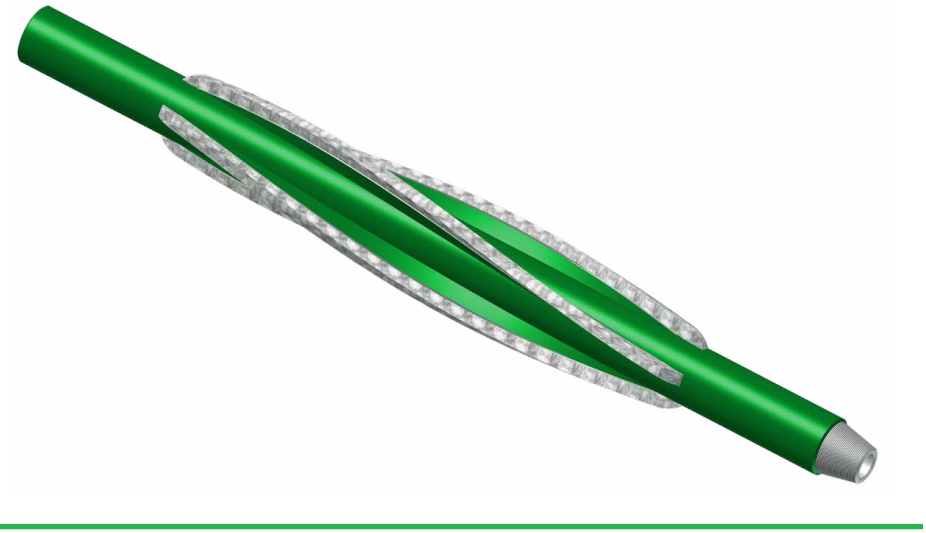
Series 150-Type Releasing Overshot

String Mill

CLEAN OUT DAMAGED CASINGS, LINERS OR TUBING

String mills are ideal for cleaning out damaged casing, liners, or tubing, and are also recommended for removing keyseats in open holes. The mill is tapered at the top and bottom, allowing reaming operations from both directions. Pin-down and box-up connections allow the mill to be run in a drill collar string or combined with a smaller pilot assembly to avoid sidetracking when removing obstructions from casing.

String mills are available in 3½ in. to 17½ in. sizes and with 3½ in. to 9½ in. fishing necks.



String Mill

STRING MILL SPECIFICATIONS

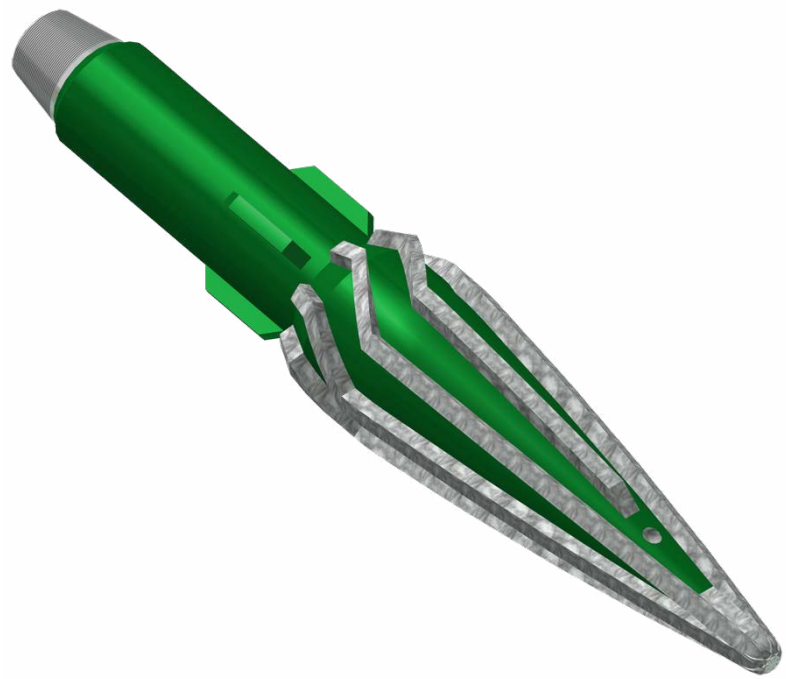
Dressed diameter, in.	Top connection, box	Fishing neck diameter, in.	Pin ID, in.	Yield torque, ft.lbf	Tensile yield, lbf
3½ – 4½	2⅜ Reg	3⅛	1½	3,850	163,000
4½ – 5½	2⅞ Reg	3¾	1½	7,400	275,700
5½ – 7½	3½ Reg	4¾	1¾	10,500	402,300
7⅝ – 9½	4½ Reg	6¼	2¼	27,650	791,050
9½ – 12¼	6⅝ Reg	8	3	64,000	1,384,800
14¾ – 17½	7⅝ Reg	9½	3¼	106,250	2,005,500

Taper Mill

A CLEANOUT SOLUTION FOR TUBULARS

Taper mills are designed specifically for milling through tight spots in tubulars. Heavy crushed carbide dressing increases on-bottom time, while ground OD and stabilizer pads eliminate the risk of cutting through the casing. Taper mills are recommended for cleaning out liners, tubing, and other collapsed or deformed tubulars. They can also be run ahead of other milling tools to clean out "bird nests."

Taper mills are available in 3½ in. to 17½ in. sizes with 3⅛ in. to 9½ in. fishing necks.



Taper Mill

TAPER MILL SPECIFICATIONS

Dressed diameter, in.	Top connection, box	Fishing neck diameter, in.	Pin ID, in.	Yield torque, ft.lbf	Tensile yield, lbf
3½ – 4½	2⅜ PAC	2⅞	1⅜	3,200	158,950
3½ – 4½	2⅜ Reg	3⅛	1½	3,850	163,000
4½ – 5½	2⅞ PACDS	3⅛	1½	4,850	179,650
4½ – 5½	2⅞ Reg	3¾	1½	7,400	275,700
5½ – 7½	3½ Reg	4¾	1¾	10,500	402,300
7⅝ – 9½	4½ Reg	6¼	2¼	27,650	791,050
9½ – 12¼	6⅝ Reg	8	3	64,000	1,384,800
15 – 17½	7⅝ Reg	9½	3¼	106,250	2,005,500

Taper Tap

RETRIEVAL OF TUBULAR FISH PREVENTED FROM ROTATING

Taper taps provide an economical means to retrieve a tubular fish that is prevented from rotating. One-piece taper taps are constructed with a fine thread form that enables the tap to work as a threading tool.

Note: Taper taps should be run in conjunction with a safety joint.

TAPER TAP SPECIFICATIONS

Wicker size, in.	Top connection, box	Fishing neck diameter, in.	Pin ID, in.	Yield torque, ft.lbf	Tensile yield, lbf
¾ – 3⅙	2⅜ Reg	3⅛	1½	5,800	244,500
1 – 3½	2⅞ Reg	3¾	1½	11,100	413,550
1½ – 4½	3½ IF	4¾	2¼	19,000	777,000
2 – 6¼	4½ IF	6½	2 13/16	56,650	1,499,900
2¼ – 7¾	6⅝ Reg	8	3	96,000	2,077,200
2½ – 9¼	7⅝ Reg	9½	3¼	159,400	3,008,200

Taper Tap

TMC Bumper Sub

BUMP UP OR DOWN TO MEET FISHING OBJECTIVES, EVEN IN HARSH ENVIRONMENTS

The TMC bumper sub incorporates maximum stroke length and high torque transmission capacity, enabling the operator to bump up or down until fishing objectives are met. The TMC bumper sub's robust design, materials quality, and comprehensive quality requirements ensure reliable performance in the harshest downhole environments.

Applications

- Fishing operations, including stuck pipe, packer retrieving, tubing removal, milling, and debris recovery
- Plug and abandonment (P&A) operations, including pipe recovery and wellhead removal
- Backoff operations where the sub releases spears or overshots, shear pins, dislodges a stuck string, and acts as a feedoff tool

Benefits

- Enables operator to bump up or down until recovery is completed

Features

- Temperature rated to 500 degF
- Seals rated to 20,000 psi differential
- Circulation pressure rated to 10,000 psi
- Closed drive system prevents ingress of wellbore fluid into drive section, improving reliability

Ordering instructions

Please specify:

- Hole size
- Connection size, type and left- or right-hand threads
- Tool diameter

TMC Bumper Sub

TMC BUMPER FISHING BUMPER SUB SPECIFICATIONS

Tool OD, in.	Tool ID, in.	Tool Joint Connection	Assembly Number	Overall Length, ft. in.	Total Stroke, in.	Tensile Yield, lbf.	Torsional Yield†, lbf.ft.	Tool Weight, lbm.
1 13/16	3/8	1 13/16 WFJ	16435	4.8	9 3/4	56,000	800	48
1 13/16	9/16	1 AM MT	N/A	N/A	7 1/4	69,000	750	54
2 1/4	1/2	1 1/4 Reg	16471	6	12	95,800	1,900	75
3 1/8	1	2 3/8 Reg	16215	7.1	16	192,000	4,100	125
3 1/8	1 1/2	2 3/8 EUE	16461	6.11	14	185,000	4,200	100
3 3/4	1 1/2	2 3/8 IF	16212	8.2	16	257,000	6,600	142
3 3/4	2	2 3/8 EUE	16385	6.9	16	233,000	7,400	120
4 1/4∞	2	2 7/8 IF	16208	8.3	16	348,000	11,000	232
4 1/4	2 7/16	2 7/8 EUE	16377	9.5	16	320,000	10,000	260
4 3/4	2	3 1/2 API FH	16202	8.8	16	422,000	14,000	337
4 3/4∞	2 1/4	3 1/2 API IF	16415	9.6	16	422,000	14,000	314
6 1/4	2 1/4	3 1/2 API IF	16373	9.8	18	900,000	50,000	794
6 1/2∞	2 1/4	4 1/2 API IF	16374	9.8	18	928,000	50,000	890
7 3/4	3 1/2	6 5/8 API Reg	16375	10.4	18	1,304,000	118,000	955
8∞	3 1/2	6 5/8 API Reg	16376	10.4	18	1,304,000	118,000	1,110

NOTE: *∞Also available with left-hand connections.*
†Torsional yield is based on the tool joint connection.

TMC Single-Acting Fishing Accelerator (Up Only)

IMPROVE JAR IMPACT REGARDLESS OF DEPTH

The TMC fishing accelerator tool improves jar impact and provides a supercharged blow directly above the fish. Used in conjunction with the TMC fishing jar, the TMC accelerator tool maximizes jar impact regardless of depth because it can either replace pipe stretch as the energy source in shallow holes, or supplement the pipe stretch energy in deeper wells. The TMC accelerator tool's robust design, materials quality, and comprehensive QA requirements ensure reliable performance in the harshest of fishing conditions.

Note: The Jar-Pact fishing program should be utilized to optimize performance of accelerator tools and TMC jars. Wellbore Integrity Solutions recommends that the TMC fishing accelerator tool be used in conjunction with this tool. Contact Wellbore Integrity Solutions for more information.

Applications

- Any fishing operation, including stuck pipe, packer retrieval, tubing removal, milling and debris recovery
- Plug and abandonment (P&A) operations, including pipe recovery and wellhead removal

Benefits

- Endures harsh downhole environments
- Works with parts from the TMC fishing jar

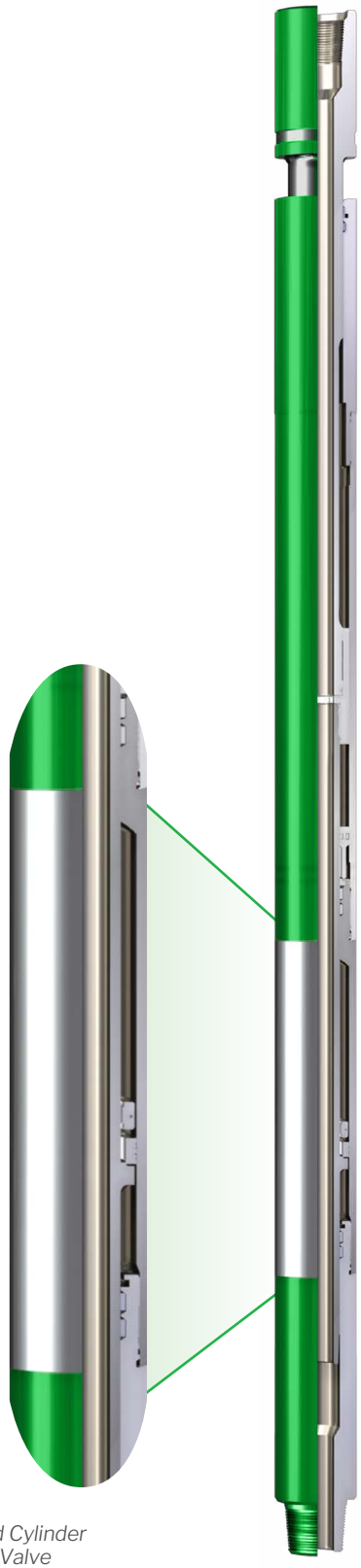
Features

- Absorbs shock waves that propagate up the workstring and damage tool joints, top drives, and other surface components
- Temperature rated to 500 degF
- Seals rated to 20,000 psi differential
- Circulation pressure rated to 10,000 psi
- Closed drive system to prevent ingress of wellbore fluid into the drive section, improving reliability
- Interchangeable parts to allow conversion between accelerator tools and hydraulic jars, reducing parts inventories and increasing flexibility

Ordering instructions

Please specify:

- Hole size
- Connection size, type, and left- or right-hand threads
- Tool diameter
- Hole temperature
- Desired operating load



Fluid Cylinder and Valve

TMC single-acting fishing accelerator (up only)

TMC Single-Acting Fishing Accelerator (Up Only)

TMC ACCELERATOR, SINGLE-ACTING FISHING ACCELERATOR (UP ONLY) SPECIFICATIONS					
Tool OD, in.	1 13/16	1 13/16	2 1/4	3 1/8	3 1/8
Tool ID, in.	3/8	9/16	1/2	1	1 1/2
Tool Joint Connection	1 13/16 WFJ	1 AM MT	1 1/4 Reg	2 3/8 Reg	2 3/8 EUE
Overall Length, ft.in.	5.10	4.6	8	10	9
Tensile Yield, lbf	56,000	69,000	95,800	192,000	185,000
Torsional Yield, lbf.ft	800	750	1,900	4,100	4,200
Total Travel with Stop Sleeve†, in.	8	7 1/4	10	12	10 1/2
Rack Test‡, in @lbf	6 3/4 @ 6,000	4 1/4 @ 5,000	7 1/2 @ 6,000	11 @ 29,000	10 @ 13,200
Oil Fluid, fl oz US	2	2	2	3	2
Minimum overpull at 240 degF with jar and accelerator combination, lbf††	7,500	6,000	5,200	19,000	8,400
Maximum overpull at 240 degF with jar and accelerator combination, lbf	19,000	17,000	20,000	50,000	32,400
Tool Weight, lbm	60	46	100	160	130

TMC ACCELERATOR, SINGLE-ACTING FISHING ACCELERATOR (UP ONLY) SPECIFICATIONS					
Tool OD, in.	3 3/4	3 3/4	4 1/4∞	4 1/4	4 3/4
Tool ID, in.	1 1/2	2	2	2 7/16	2
Tool Joint Connection	2 3/8 IF	2 3/8 EUE	2 7/8 IF	2 7/8 EUE	3 1/2 FH
Overall Length, ft.in.	10.4	9	10.8	11.8	11
Tensile Yield, lbf	257,000	233,000	348,000	320,000	422,000
Torsional Yield, lbf.ft	6,600	7,400	11,000	10,000	14,000
Total Travel with Stop Sleeve†, in.	11 3/8	12	11 1/4	12	10 3/8
Rack Test‡, in @lbf	10 @ 31,000	10 1/8 @ 16,000	9 5/8 @ 32,000	10 7/8 @ 19,000	8 @ 36,000
Oil Fluid, fl oz US	3	3	4	3	8
Minimum overpull at 240 degF with jar and accelerator combination, lbf††	22,000	16,000	32,000	15,000	54,000
Maximum overpull at 240 degF with jar and accelerator combination, lbf	59,000	38,000	73,000	39,000	90,000
Tool Weight, lbm	180	160	300	268	350

TMC ACCELERATOR, SINGLE-ACTING FISHING ACCELERATOR (UP ONLY) SPECIFICATIONS					
Tool OD, in.	4 3/4∞	6 1/4	6 1/2	7 3/4	8∞
Tool ID, in.	2 1/4	2 1/4	2 1/4	3 1/2	3 1/2
Tool Joint Connection	3 1/2 IF	4 1/2 IF	4 1/2 IF	6 5/8 Reg	6 5/8 Reg
Overall Length, ft.in.	11.10	12	12	13	13
Tensile Yield, lbf	422,000	900,000	928,000	1,304,000	1,304,000
Torsional Yield, lbf.ft	14,000	50,000	50,000	118,000	118,000
Total Travel with Stop Sleeve†, in.	10 3/8	12	12	12	12
Rack Test‡, in @lbf	8 @ 37,800	8 3/4 @ 46,700	8 3/4 @ 46,700	10 @ 72,000	10 @ 72,000
Oil Fluid, fl oz US	8	12	12	12	12
Minimum overpull at 240 degF with jar and accelerator combination, lbf††	47,400	66,600	66,600	84,000	84,000
Maximum overpull at 240 degF with jar and accelerator combination, lbf	95,000	107,000†††	107,000†††	150,000†††	150,000†††
Tool Weight, lbm	325	800	900	1,200	1,350

∞Also available with left-hand connections.

† Check stroke before loading the TMC Accelerator tool, if stroke varies, stop sleeves must be modified to obtain stroke as listed.

‡ Shop test at 70 degF for a nominal BHT of 240 degF, settings for other expected bottom hole temperatures are available upon request.

†† Minimum overpull requirement for a jar-accelerator tool combination to obtain an efficient impact.

††† Maximum overpull can be increased in the shop, as the maximum increases, the minimum increases.

Ordering instructions, please specify:
- *Hole size*
- *Connection size, type, and left- or right-hand threads*
- *Tool diameter*
- *Hole temperature*
- *Desired operating load*

TMC Single-Acting Hydraulic Fishing Jar (Up Only)

RELIABLE FISHING PERFORMANCE IN HARSH ENVIRONMENTS

The TMC single-acting hydraulic fishing jar combines optimal impact characteristics with high-endurance construction to provide reliable fishing performance in harsh downhole environments. Tool seals are temperature rated to 500 degF and pressure rated to 20,000 psi, and the temperature compensation system in the detent permits prolonged jarring without loss of impact force. The closed drive system prevents wellbore fluid from entering into the drive section, improving tool performance and reliability.

Note: The Jar-Pact fishing program should be utilized to optimize performance of accelerator tools and TMC jars. Wellbore Integrity Solutions recommends that the TMC fishing accelerator tool be used in conjunction with this tool. Contact Wellbore Integrity Solutions for more information.

Applications

- Fishing operations including stuck pipe, packer retrieval, tubing removal, milling, and debris recovery
- Plug and abandonment (P&A) operations, including pipe recovery and wellhead removal
- Operations that include harsh downhole conditions

Benefits

- Advanced impact characteristics
- Capable of prolonged jarring

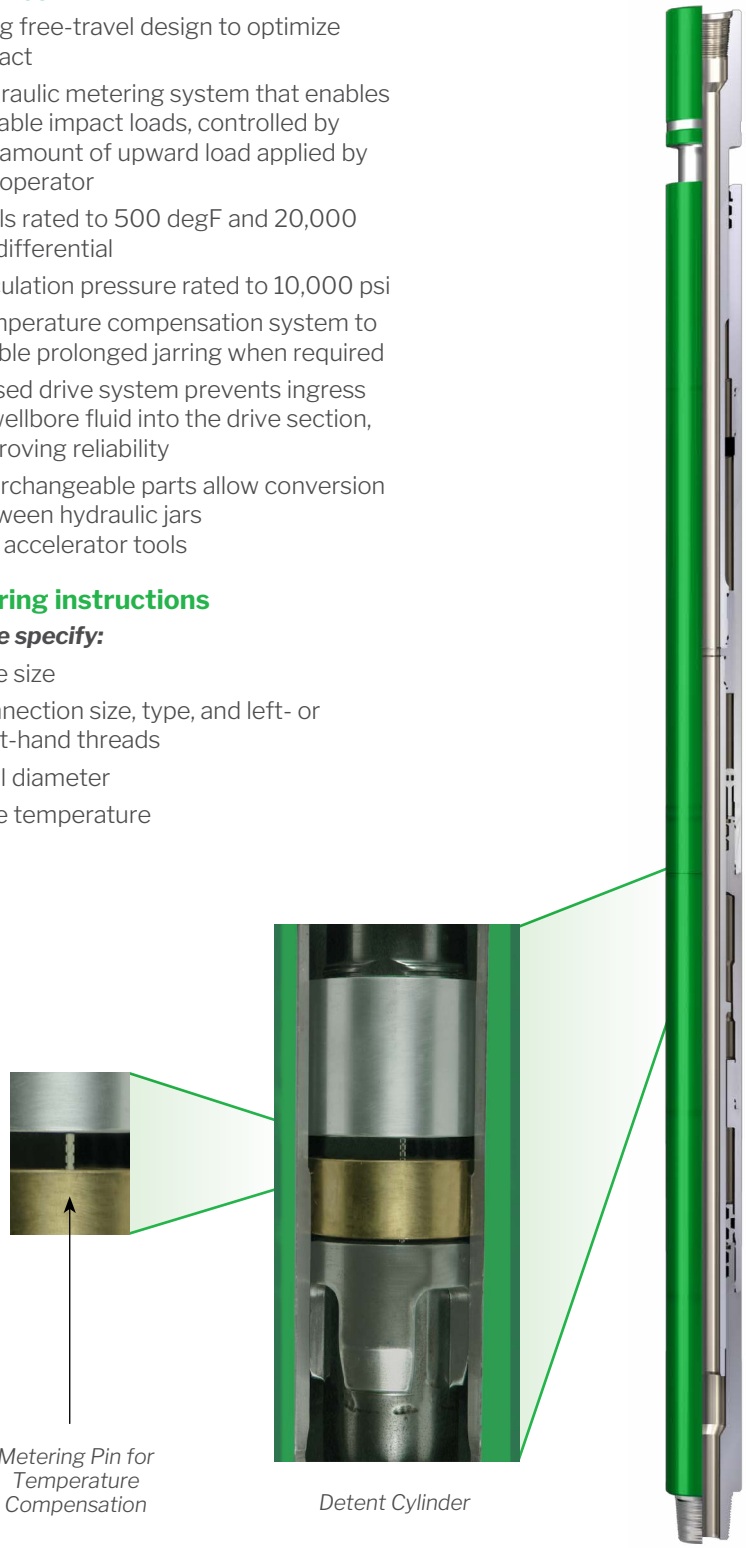
Features

- Long free-travel design to optimize impact
- Hydraulic metering system that enables variable impact loads, controlled by the amount of upward load applied by the operator
- Seals rated to 500 degF and 20,000 psi differential
- Circulation pressure rated to 10,000 psi
- Temperature compensation system to enable prolonged jarring when required
- Closed drive system prevents ingress of wellbore fluid into the drive section, improving reliability
- Interchangeable parts allow conversion between hydraulic jars and accelerator tools

Ordering instructions

Please specify:

- Hole size
- Connection size, type, and left- or right-hand threads
- Tool diameter
- Hole temperature



TMC single-acting hydraulic fishing jar (up only)

TMC Single-Acting Hydraulic Fishing Jar (Up Only)

TMC SINGLE-ACTING HYDRAULIC FISHING JAR SPECIFICATIONS								
Tool OD, in.	**1 13/16**	**1 13/16**	**2¼**	**3⅛**	**3⅛**	**3¾**	**3¾**	**4¼∞**
Tool ID, in.	⅜	9/16	½	1	1½	1½	2	2
Tool Joint Connection	1 13/16 WFJ	1 AM MT	1¼ API Reg	2⅜ API Reg	2⅜ EUE	2⅜ API IF	2 ⅜ EUE	2⅞ API IF
Assembly Number	16420	16853	16421	16213	16457	16210	16349	16204
Overall Length, ft	7	5	10	12	11	12.17	11	12.83
Recomm. Max. Overpull Working Load During Restricted Travel, lbf	19,000	17,000	20,000	51,000	32,400	59,000	38,000	73,000
Total Stroke, in.	9¾	7¼	12	16	14	16	16	16
Tensile Yield, lbf	56,000	69,000	95,800	192,000	185,000	257,000	233,000	348,000
Torsional Yield, lbf.ft	800	750	1,900	4,100	4,200	6,600	7,400	11,000
Tool Wt., lbm	75	54	125	200	225	240	325	375

SPECIFICATIONS (CONTINUED)							
Tool OD, in.	**4¼**	**4¾**	**4¾**	**6¼**	**6½∞**	**7¾**	**8∞**
Tool ID, in.	2⅞	2	2¼	2¼	2¼	3½	3½
Tool Joint Connection	2⅞ EUE	3½ API FH	3½ API IF	4½ API IF	4½ API IF	6⅝ API Reg	6⅝ API Reg
Assembly Number	16348	16155	16143	16318	16363	16320	16366
Overall Length, ft	11	13	13.5	15	15	16	16
Recomm. Max. Overpull Working Load During Restricted Travel, lbf	39,000	90,000	95,000	180,000	195,000	300,000	300,000
Total Stroke, in.	16	16	16	18	18	18	18
Tensile Yield, lbf	320,000	422,000	422,000	900,000	928,000	1,304,000	1,304,000
Torsional Yield, lbf.ft	10,000	14,000	14,000	50,000	50,000	118,000	118,000
Tool Wt., lbm	400	425	375	950	1,078	1,400	1,570

NOTE: *∞Also available with left-hand connections.*

Washover Shoes

FREES STUCK PIPE IN THE WELLBORE

Washing over frees stuck pipe in the wellbore by cutting away and circulating out the obstructions blocking the pipe's movement. Wellbore Integrity Solutions offers an array of washover shoes in various configurations for a range of downhole conditions. Washover shoes and associated equipment can also be specially fabricated for any job.

Applications

- Releasing stuck pipe lodged in the wellbore as a result of debris or obstructions

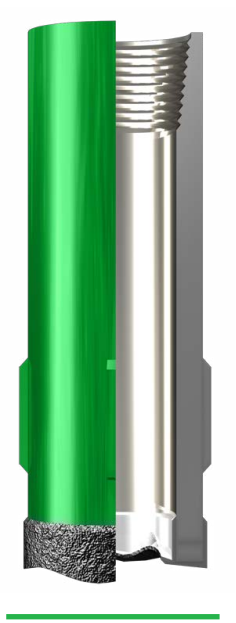
Benefits

- Reliably frees stuck pipe

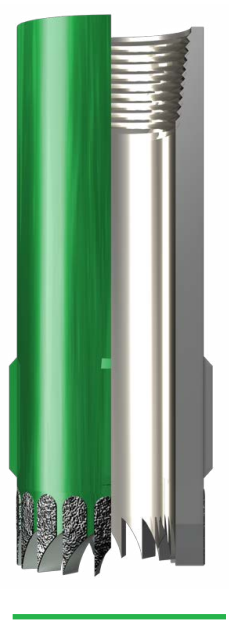
Features

- Rugged N-80 grade or greater casing or tubing construction; higher specification materials available by special order
- Integral joints for job design flexibility
- Available in sizes 2¼ inch to 24 inch
- Other designs fabricated by special order

I Type



Wavy Bottom



T Type

WASHOVER SHOES SPECIFICATIONS

Washpipe Size, in.	Washpipe Max. OD, in.	Max. Fish OD, in.	Drift ID, in.	Nominal ID, in.	Makeup Torque, ft.lbf
5½	5½	4⅝	4.767	4.892	2,370
5¾	5¾	5	5.001	5.124	2,700
6⅝	6⅝	5¾	5.796	5.921	4,000
7⅝	8⅛	6½	6.640	6.765	4,340
7⅝	8⅛	6 11/16	6.750	6.843	4,340
7⅝	7⅝	6 11/16	6.750	6.875	6,120
8⅛	8⅛	7 1/16	7.125	7.250	8,370
9⅝	9⅝	8⅝	8.679	8.835	10,000
10¾	10¾	9½	9.604	9.760	16,000
10¾	10¾	9⅝	9.694	9.850	14,250
11¾	11¾	10⅝	10.724	10.880	16,250
13⅜	13⅜	12⅛	12.259	12.415	15,000
16	16	14½	14.683	14.870	47,000

NOTE: *Additional sizes are available. For a complete listing, contact a Wellbore Integrity Solutions representative.*

Highly Productive Tools.
Time Saving Efficiencies.

With our cleanout tools, we deliver significant operational benefits and reduce risks.

WELL ABANDONMENT TOOLS

Bridge Plugs

PROVIDES A SOLID BASE FOR A CEMENT PLUG

WIS offers variety of Bridge Plugs that can be set mechanically or hydraulically.

The Bridge Plug provides a solid base for a cement plug which delivers improved efficiency and reliability for plug and abandonment operations.

Trip saver for P&A operations

The Bridge Plugs can be part of the integral system enabling a trip saver for various operations such as section milling and casing cutting operation.

Applications

- Plug and abandonment (P&A) operations
- Cementing operations
- Cut and pull operations
- Section milling

Features

- Reliable and simple construction
- One piece slips combine to resist premature setting due to well debris
- Combine with section milling and casing cutting BHAs

Bridge Plug

Casing Mill

EFFICIENT AND RELIABLE REMOVAL OF DOWNHOLE CASING STRINGS

Casing mill

The casing mill is a tool that has been solely designed for the efficient removal of downhole casing strings. The blade is manufactured from high-grade alloy steel and positions the cutting edge at the precise angle for maximum cutting and milling efficiency. Extended blade length provides maximum footage per mill.

The cutting structure consists of optimized milling inserts technology specially developed for downhole application that prevents premature wear and breakage. The inserts are engineered based on extensive lab analyses and field history to provide good cutter durability and wear resistance.

The cutting structure ensures maximum ROP, ideal cutting size, and extended milling duration.

7 inches and smaller

Casing mills in this size range have a round body dressed with wear-resistant tungsten carbide, stabilizing the mill inside the casing. The continuous chip breaker design generates steel cuttings that can easily be circulated out of the hole with a minimum of specialized mud conditioning required.

9⅝ inches and larger

The 9⅝ inch and larger casing mills use welded blade stabilizer pads to ensure the mill tracks straight down the casing stub. These larger diameter mills are best suited to high RPM with moderate weight-on-bit, and in ideal conditions are capable of milling long sections of casing.

Applications

- Plug and abandonment (P&A) operations
- Removing long sections of cemented casing, tubing or liner

Benefits

- Carbide inserts with continuous chip breaker technology
- Variable blade length for different applications
- Stabilized body for optimum performance
- Larger size with lower pilot mill to stabilize and remove obstructions in the casing ID

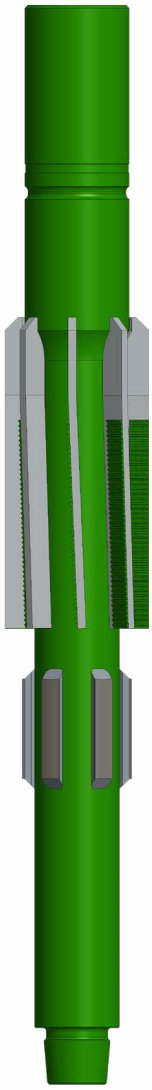
Milling insert options

- **Millmaster (P5):** Standard grade offering for all milling applications
- **WavEdge®:** High-quality inserts with improved ROP
- **TruEdge™:** Premium grade with improved ROP, high durability, and wear resistance

Ordering instructions

Please specify:

- Variable mill dressed diameter
- Top and bottom connection
- Size and weight of casing to be milled
- Size and weight of outer casing, if applicable



Casing Mill

CASING MILL SPECIFICATIONS

Casing Size in.	Blade Diameter in. [mm]	Top Connection in.	Fishing Neck OD in. [mm]	Overall Length in. [cm]
4½	5.25 [133.35]	3½ REG	4.25 [107.95]	41 [104.14]
5½	6 .125 [155.57]	3½ API	4.75 [120.65]	43 [109.22]
6⅝	7.515 [190.88]	4½ API	6.50 [165.10]	65 [165.10]
7	7.75 [196.85]	4½ API	6.50 [165.10]	82 [208.25]
7⅝	8.80 [223.52]	4½ API	6.50 [165.10]	82 [208.25]
9⅝	10.80 [274.32]	6⅝ REG	8.00 [203.20]	79 [200.66]
10¾	12.0 [304.80]	6⅝ REG	8.00 [203.20]	73 [185.42]
13⅜	14.50 [368.30]	7⅝	9.52 [241.81]	79 [200.66]
13⅝	14.50 [368.30]	7⅝	9.52 [241.81]	73 [185.42]
14	14.50 [368.30]	7⅝	9.50 [241.30]	73 [185.42]
16	17.25 [438.15]	7⅝	9.50 [241.30]	86 [218.44]
18⅝	20.50 [520.70]	7⅝	9.50 [241.30]	89 [226.06]
20	21.25 [539.75]	7⅝	9.50 [241.30]	81 [205.74]

Circulation Sub

SINGLE DROP CLEAN AND CIRCULATION SYSTEM

The Circulation Sub is designed to be run in a string where it is desirable to stop circulating pressure from reaching specific BHAs. The Sub is typically used with motors or assemblies that restrict the allowable fluid-circulation rates. When operated, the circulation sub allows a higher circulation rate to be established by opening a path to the annulus in the top section of the tool string.

This is especially useful in applications such as drilling or fishing, where a higher circulation rate may be necessary to effect good cuttings transport and hole cleaning before the string is retrieved.

Activation

The tool is run in the open position. A ball is dropped to the ball seat and pressure is applied to close the ports. This will completely isolate the string below from circulation and pressure and allow for a higher fluid circulation through the annulus.

Applications

- Drilling
- Fishing
- Plug and abandonment (P&A) operations

Benefits

- Ball-activated
- Boosts annular velocity
- Available in multiple sizes

Circulation Sub

CIRCULATION SUB SPECIFICATIONS							
Tool OD, in.	4.125	4.25	4.75	5.625	6.25	6.50	8.00
Tool length, in.	33.5	33.5	37.3	33.9	30.1	30.3	36.0
Connections, in.	2⅞ API IF Box X Pin	2⅞ API IF Box X Pin	3½ API IF Box X Pin	3½ API IF Box X Pin	4 API IF Box X Pin	4½ API IF Box X Pin	6⅝ API IF Box X Pin
Ball Size, in.	1.75	1.75	1.88	1.88	2.125	2.125	2.125
Shear pressure, psi	800	800	800	800	600	600	600

Hydraulic Disconnect

DESIGNED TO DISCONNECT A TUBING STRING OR DRILL STRING

The Hydraulic Disconnect is designed to disconnect a tubing string or drill string which allows the upper section to be pulled out of hole.

The Hydraulic Disconnect is designed to run within the bottom hole assembly (BHA) above the turbine or motor in case there is a problem. It is also useful for cementing operations required to plug and abandon side tracks in exploration and appraisal wells. The tool can be separated to retrieve the drill string above the disconnect, if there is a problem during the drilling sequence

Activation

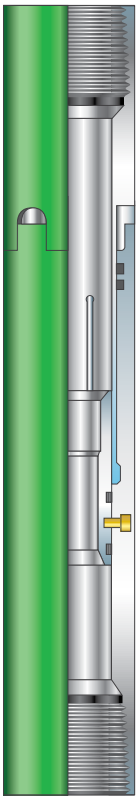
The tool is activated from surface by dropping a dart or ball into the tubing or drill string. The dart or ball is pumped down to the disconnect and when seated, shears the screws retaining the sleeve and the collet mechanism. The tool is designed to have minimal strength limitations as compared to the other components of the BHA assembly.

Applications

- Plug and abandonment (P&A) operations
- Drilling applications
- Cementing operation

Benefits

- Disconnect tubing string or drill string
- Retrieve section above the hydraulic disconnect tool
- Ball or dart pumped down for activation
- Minimal strength limitations compared to other BHA components



Hydraulic Disconnect Sub

HYDRAULIC DISCONNECT SPECIFICATIONS					
Tool Size, in.	**2⅞**	**3½**	**4½**	**5¼**	**6⅞**
Tool length, in.	24	26	32	42	48
Tool thread, in.	2⅞ New Vam Box	3½ Top Vam Box	4½ Top Vam Box	NC40 VAM EIS Box	4½ API IF Box
Bottom thread, in.	2⅞ New Vam Pin	3½ Top Vam Pin	4½ Top Vam Pin	NC40 VAM EIS Pin	4½API IF Pin
Body OD, in.	3.445	4.221	5.000	5.2500	6.875
Body ID, in.	2.167	2.730	2.730	2.528	2.730
Shear pressure, psi	2,500	2,500	2,500	2,500	1,750

Hydraulic Pipe Cutter

RELIABLE SEVERING OF SINGLE OR MULTIPLE CASING STRINGS

The Hydraulic Pipe Cutter reliably severs single or multiple strings of casing for well abandonment. Three heavy-duty cutter arms, dressed with a combination of milling structure and crushed carbide, are capable of completing an interval cutout in a variety of casing weights and grades, conductor pipes, and marine risers.

The hydraulic pipe cutter is available in a range of sizes that cut 5-inch to 63-inch diameter pipe and is not dependent on the following pipe conditions:

- Concentric
- Eccentric
- Cemented
- Non-cemented

The Flo-Tel downhole mechanical position indicator displays a standpipe pressure indicator at the surface when the knives are opened to their preset diameter. Knowing the tool's disposition downhole eliminates the risk of accidentally pulling the tool before the string has been completely severed.

Applications

- Internal cutting of single or multiple strings of casing
- Well abandonment
- Drillpipe cutting operations

Benefits

- More efficient operations by reliably severing single or multiple strings of casing in well abandonment operations
- Eliminates risk of NPT from pulling tool before string is completely severed

Milling insert options

- Optimized milling inserts technology provides cost-effective performance
- Customized knives can be matched to a range of pipe diameters
- Hydraulically actuated cutter arms ensure cutter opening
- Flo-Tel downhole mechanical position indication device to indicate cutter arm position

Hydraulic Pipe Cutter

HYDRAULIC PIPE CUTTER SPECIFICATIONS

Pipe Cutter Size, in.	Casing Size Range, in.	Top Connection,in.	Fishing Neck OD, in.	Weight, lb
3⅝	5 to 6⅝	2⅞ PAC	3⅛	123
5 9/16	6 to 9⅝	3½ REG	4¾	283
8¼	9⅝ to 13⅜	4½ REG	6½	832
11¾	13⅜ to 36	6⅝ REG	8	2680
16	20 to 36	6⅝ REG	8	4853

In-LINE Casing Spear

THE IN-LINE CASING SPEAR IS A SPECIAL PURPOSE SPEAR FOR MOTORIZED SINGLE TRIP CUT AND PULL OPERATIONS

The In-LINE casing spear is a robust tool designed for cutting and pulling of casing in a single trip. It is ideal for plug and abandonment and slot recovery operations. The spear can be engaged and disengaged multiple times, allowing multiple cut-and-pull operations in a single trip for reduced non-productive time.

There is no requirement to run a stop ring with the spear, which allows the spear to be run close to the cut depth ensuring maximum force can be applied at the cut point.

Operation

The spear allows to enter and slide to a pre-established depth without dragging the slips within the cased hole.

Once at depth, the In-LINE casing spear can be set by using left-hand rotation (low torque) and slowly pick up to enter into the engagement slot to engage the casing. Once engaged the casing be pulled into tension by applying overpull and either make cut with motor/cutter combination or retrieve fish if no cutting is required.

Applications

- Deepwater
- Land operations
- Plug and abandonment (P&A) operations
- Slot recovery operations
- Single trip cut and pull operations

Benefits

- Maximizes reliability of cutting operations by working together with the ProCISE system
- Saves rig time by retrieving casing in one trip
- Cut is performed faster because the casing is held in tension
- Increase safety of surface handling by engaging the cut casing segment from the top

Features

- The spear can be mechanically engaged and disengaged multiple times
- Allow multiple operations to be performed in a single trip

In-LINE Casing Spear

IN-LINE CASING SPEAR SPECIFICATIONS	
Casing Catch Range, in.	9⅝ to 13⅜
Fishing Neck OD in.	8.13
Fishing Neck Length in.	18.00
Overall Length, in.	129.6
Weight, lb	1,286
Connection (Top x Bottom)	API NC 50 Box X API NC 50 Pin
Torque Yield, ft-lbf	9,200
Tensile Yield, lbf	1,200,000

K-Master™

ECONOMICAL MILLING, SIDETRACKING, AND SINGLE-STRING PIPE CUTTING

The K-Master section mill is a hydraulic downhole tool ideal for milling casing to set rock-to-rock well abandonment cement plugs. All cutter arms are dressed with tungsten carbide inserts that, along with the multiblade design, provide maximum footage and high ROP. When combined with the high-ratio underreamer, the K-Master mill provides a single-trip milling system to ensure that rock-to-rock isolation is attainable.

Multiple cutter arms for optimal milling performance

As pump pressure is applied, three cutter arms expand and begin the cutout. When the cutout arms are fully open, three additional cutter arms automatically expand into the milling position using a cam and ramp interface. All six cutting surfaces are then squarely sealed on top of the casing for optimum milling performance.

The optimized milling inserts technology covers a wide range of milling and cutting applications. The inserts are engineered based on extensive lab analyses and field history to provide good cutter durability and wear resistance.

Each cutter knife incorporates chip-breaker ridges, and the continuous chip-breaker design generates steel cuttings with a size and shape that will not accumulate and block flow. These cuttings can easily be circulated out of hole, requiring a minimum of specialized mud conditioning. The milled casing shavings are engineered to minimize the size for optimal hydraulics without sacrificing milling speed.

A database of casing material catalogs the cutter performance and casing metallurgy to provide a clearer understanding of optimal milling performance and parameters.

Applications

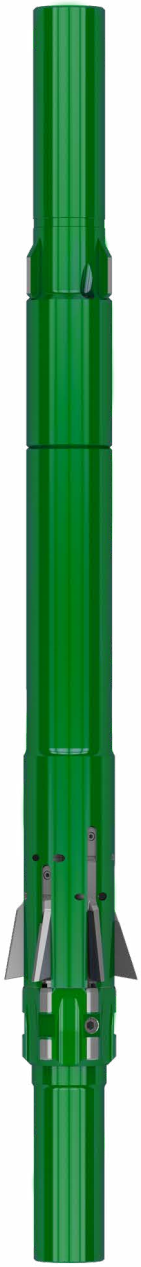
- Plug and abandonment (P&A) operations requiring rock-to-rock isolation
- Milling poorly cemented or corroded casing

Benefits

- Single-trip milling when combined with high-ratio underreamer
- High-performance ROP and hole cleaning during milling operations
- Integration with Wellbore Integrity Solutions underreamer systems for virgin formation exposure
- Engineered milling technology based on lab analyses comparing cutter performance with casing metallurgy
- Optional titanium-based blade treatment for section milling of chrome alloy tubulars

Milling insert options

- **Millmaster (P5):** Standard grade offering for all milling applications
- **WavEdge™:** High-quality inserts with improved ROP
- **TruEdge™:** Premium grade with improved ROP, high durability, and wear resistance



K-Master Section Mill

Cutter position indicator

The K-Master mill is equipped with Flo-Tel downhole mechanical position indicator that provides a surface signal to notify the operator when the cutout is completed. The signal indicates that the cutting arms have extended to full sweep to ensure that the mill in not skimming the pipe. Section milling can then begin for the required interval.

Integrated components

Section mills require a guide mill that is run below the tool. An integral bladed stabilizer is also run below the mill to further enhance stabilization. The guide mill and stabilizer are usually sized at the nearest ⅛ in. under the drift diameter of the casing.

A float valve is recommended to run above the section mill. The float valve prevents cuttings from entering the section mill and blocking the piston orifice while making a connection or when the pumps have to be shut down.

Shock tools, which are recommended for longer section milling intervals, help prolong the life of the section mill knife.

An optimized milling fluid provides maximum hole-cleaning performance.

K-MASTER SPECIFICATIONS

Mill Series	3600	4500	5500	7200	8200	11700
Body OD, in.	3.50	4.50	5.49	7.25	8.25	11.75
Fishing Neck OD, in.	3.12	4.12	5.50	7.25	6.50 or 7.25	8.00
Fishing Neck Length, in.	11.00	18.00	18.00	16.00	26.00	20.00
Top Connection Size, in.	2⅜ REG Pin	2⅞ REG Pin	3½ IF Box	4½ IF Box	4½ IF Box or 6⅝ REG Pin	6⅝ REG Pin
Weight, lb	133	275	420	833	1,050	1,847
Overall Length, in.	53.2	70.5	90.8	109.9	114	112.6
Body Yield Torque, ft-lbf	5,800	11,100	19,000	47,945	55,000	96,000
Body Yield Tensile, lbf	244,500	413,550	777,000	1,180,000	1,583,000	2,077,000

Marine Swivel

ALLOWS FREE AND FULL ROTATION OF CUTTING TOOLS WHEN OPERATING FROM FLOATING VESSELS

A marine swivel allows free and full rotation of tools while preventing vertical movement and allows for full circulation downhole. It is the best way to vertically position downhole cutting tools when operating from floating vessels.

The bearing design of the marine swivel is designed to withstand the most severe thrust and radial loads encountered during pipe cutting operations.

Pipe cutting operation from semi-submersible and drill ships

To compensate for the vertical movement of floaters, the marine support swivel can be run above the pipe cutter assembly.

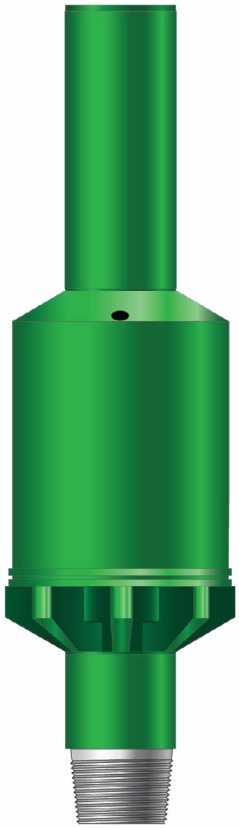
It is a landing device that permits the operator to vertically position downhole cutting tools and maintain a fixed vertical position when cutting pipe from floating vessels. The Marine Swivel lands in the wellhead and supports tools below it. Motion compensators or bumper subs above the Marine Swivel eliminate the effect of floater's vertical motion.

Applications

- Plug and abandonment (P&A)
- Cut and pull operations
- Subsea well head retrieval

Features

- Combines with pipe cutter assembly to aid in cutting operation from floaters
- Reliable and simple construction
- Reliable design to withstand severe thrust and radial loading



Marine Swivel

MARINE SWIVEL SPECIFICATIONS		
Tool Series	**6200-6**	**7700-2**
Bearing House OD, in.	12¼	13 15/16
Std Seating Plate OD, in.	13⅝ to 14⅜	14⅜, 24, 30
Fishing Neck OD, in.	6¼	7¾ or 8
Fishing Neck Length, in.	36	36
Body Connections, in. Box Up x Pin Down	4½ IF	6⅝ REG
Overall Length, in.	78	78
Weight, lbs	850	1,300

Milling Inserts

OPTIMIZED MILLING INSERT TECHNOLOGY FOR CUTTER DURABILITY AND WEAR RESISTANCE

Optimized milling inserts technology are offered to cover a wide range of milling and cutting applications. All the inserts are engineered based on extensive lab analyses and field history to provide good cutter durability and wear resistance while milling or cutting.

The following inserts are available as our standard and premium offering depending on the application.

- **Millmaster (P5):** Standard grade offering for all milling applications
- **WavEdge®:** High-quality inserts with improved ROP
- **TruEdge™:** Premium grade with improved ROP, high durability, and wear resistance

Applications

- Plug and abandonment (P&A) operations
- Section milling
- Casing and liner milling
- Pipe cutting

Features

- An optimized geometry has been engineered to ensure both milling efficiency and longevity
- Greater cutting structure durability
- An improved rate of penetration while milling
- Predictable swarf control to aid in effective wellbore cleaning

Millmaster (P5) – Standard grade offering for all milling applications

WavEdge® – High quality inserts with improved ROP

TruEdge™ – Premium grade with improved ROP, high durability, and wear resistance

Multi-Cycle Pipe Cutter

HYDRAULIC MULTI-CYCLE PIPE CUTTER FOR WELL ABANDONMENT AND SLOT RECOVERY

The Multi-Cycle Pipe Cutter is a hydraulic pipe cutter, with the integration of an indexing mechanism accompanied with a knife return function. The tool is designed to allow multiple cycles of three sets of cutter arms to complete multiple casing cuts.

Save rig time by reducing trips

In well abandonment and slot recovery operations, the hydraulic Multi-Cycle Pipe Cutter provides the capacity for multiple cuts during a single trip. The Multi-Cycle Pipe Cutter with tungsten carbide inserts has three sets of blades that can make up to 12 cuts in a single trip, saving valuable rig time and surface exposure.

Reduce HSE exposure by reducing swarf at surface

In well abandonment and slot recovery operations, large volumes of swarf waste can be generated during casing milling activities, requiring disposal at the surface. One of the features of the Multi-Cycle Pipe Cutter is the ability to cut casing into smaller, manageable lengths that can be pulled and jarred to surface individually, reducing swarf waste at surface that is generated by pilot milling. In comparison, mud plant and pressure control equipment remain contaminant free, and the rig crew has less exposure to contaminants.

Increase cutting knowledge and capacity

The Multi-Cycle Pipe Cutter's continuously indexing piston enables it to switch to a different set of cutting blades with each flow cycle. This ability provides triple the cutting capacity of conventional pipe cutters. The Flo-Tel position indicator provides a pressure indication at the surface of successful cuts at each cutter position. This information eliminates the risk of pulling out of hole before the cutting operation is complete.

Applications

- Deepwater plug and abandonment (P&A) operations
- Well abandonment and slot recovery
- Pipe recovery operations where multiple casing cuts are required

Benefits

- Saves rig time tripping in and out of the hole for multiple cuts
- Reduces HSE exposure to rig crew with less handling at the surface

Features

- Uses three sets of blades to perform up to 12 cuts in a single trip
- Provides positive indication of cutout success using an integral Flo-Tel downhole mechanical position indicator
- Provides contingency cutting capacity for standard P&A cutting operations
- Has a continuous indexing piston that allows the pipe cutter to switch cutting blades with each flow cycle
- Offers flexibility for planning of multiple cuts during a single trip with surface confirmation
- Is fully integrated with the Shortcut deep water plug and abandonment system spear and a PDM

Multi-Cycle Pipe Cutter

MULTI-CYCLE PIPE CUTTER SPECIFICATIONS	
Tool Series	8250
Part Number	80005795
Tool Max. OD, in. [mm]	8¼ [209.55]
Overall Length, ft [m]	10.80 [3.29]
Casting Cutting Range, in. [mm]	9⅝ – 10¾ [244.47 – 273.05]
Knife Sets	3

ProLATCH™

WELLHEAD RETRIEVAL SYSTEM TO RECOVER CASING AND SUBSEA WELLHEADS

The ProLATCH wellhead retrieval system combines a high-performance wellhead spear, hydraulic pipe cutter, and nonrotating stabilizers to recover surface casing and subsea wellheads for plug and abandonment operations.

Simplify mechanical abandonment operations

The ProLATCH wellhead retrieval system is designed to simplify mechanical abandonment operations by eliminating the need for a marine swivel and a long drill collar string and reducing workstring handling time. Once engaged, the system can retrieve both the surface casing and the subsea wellhead.

Reliable recover of surface casing and wellhead

To begin a casing retrieval operation, the wellhead spear is engaged and overpull is applied in order to assist with tension cutting. The hydraulic pipe cutter severs the casing, and a pressure indication confirms that the cut has been successful. This feature eliminates the possibility that the cutter is pulled out of the hole before the cutting operation is complete. Once the casing is severed, the ProLATCH system wellhead spear remains engaged in order to recover the surface casing, wellhead and guide base to surface.

A customized range of wellhead segment grapples are available to ensure effective engagement during wellhead recovery.

The system can be operated using a topdrive for rotary cutting operations or deployed with a positive displacement motor (PDM).

Applications

- Recovery of surface casing and subsea wellheads for plug and abandonment (P&A) operations
- Deepwater P&A operations
- Rotary or positive displacement motor driven (PDM) casing cutting operations

Benefits

- Eliminates the need for marine swivel or long drill collar string
- Can cut and retrieve both the casing string and the subsea wellhead in one run
- Robust design reduces bowing effect in the workstring, as weight does not have to be slacked off onto a marine swivel
- Minimizes possible drillstring failure because the drillstring is not rotated in open water.

Features

- Custom wellhead recovery grapples
- Integral collet assembly engages wellhead
- Robust and stabilized system
- Motor or rotary driven system

PRO-LATCH SPECIFICATIONS	
Wellhead Size, in.	18¾
Static Pull Capacity, lbs	1,100,000
Pipe Cutter Sweep, in.	44½, 54½

ProLATCH

ProMAXX® Hydraulic Spear

HYDRAULICALLY ACTIVATED EXTENDED REACH SPEAR

Save rig time by reducing trips

The ProMAXX Hydraulic Spear is designed to maximize efficiency and reduce trips in cut and pull operations. The spear is activated hydraulically and can be set within various casings sizes in a single trip. It engages the casing while allowing through rotation to enable cutting in tension. No mud motor is required below the spear. If the casing is not free the ERS can be easily disengaged and re-engaged numerous times as needed.

When combined with the ProMAXX Pipe Cutter, the system provides a one-trip solution for cutting, anchoring, and retrieving the casing without pulling to the surface to change tools. Further trips can also be avoided by utilizing the multi-cycle pipe cutter which has the capacity to perform twelve individual cuts without tripping out of the hole.

Through-bore access for multiple operations

With flow-through bore access and a ball-drop activation mechanism, other operations, such as cementing, cement plug dressing, or bridge plug setting of a plug, can all be carried out before activating the ProMAXX Hydraulic Spear.

Applications

- Conventional well abandonment operations
- Slot recovery operations
- Deepwater plug and abandonment (P&A) operations
- Carbon capture utilization and storage (CCUS) operations

Benefits

- Allows placement directly behind the pipe cutter
- Holds casing in tension while cutting
- Eliminates requirement for a positive displacement motor (PDM)
- Enhanced safety for on-site personnel by minimizing interventions
- Significant reduction in non-productive time associated with tool changes

Features

- On-demand hydraulic activation with unlimited activation and deactivation cycles
- Ball-drop activation mechanism
- Easy release mechanism—stop pumps and slack off
- Thru-rotation capability
- Wide catch range: 9⅝ in. x 53.5# to 10¾ in. x 32.75#
- Six slips provides a large contact surface area on engagement

Compatibility

- ProMAXX pipe cutter
- Standard pipe cutter
- Multi-cycle pipe cutter
- Bridge plug and packer
- Circulating subs (large ID for drop ball or dart pass through)

ProMAXX Hydraulic Spear

PROMAXX HYDRAULIC SPEAR SPECIFICATIONS

	9⅝	13⅜
Tensile Yield, lbf	1,200,000	1,700,000
Torsional Yield, ft.lbf	60,000	60,000
Working Overpull, lbf	150,000	250,000
Static Overpull, lbf	750,000	1,000,000
Max. DLS	3 deg/100ft	3 deg/100ft
Max. Flow Rate, gpm	400	400
Max. Operating Temperature	400°F [205°C]	400°F [205°C]
Max. Pressure, psi	4,000	4,000
Tool OD (Collapsed), in.	8.375	11.75
Inner Diameter, in.	1.50	2.50
Catch Range, in.	8.535 – 10.192	11.906 – 13.50
Casing Range	9⅝ in. x 53.5# – 10¾ in. x 32.75#	13.375 – 14.00
Connections	6⅝ Reg Box (up) x 6⅝ Reg Pin (down)	6⅝ Reg Box (up) x 6⅝ Reg Pin (down)
Weight, lbs	1,345	2,700
Overall Length, in.	105.5	164
Fish Neck, in.	23.44	27
Fish Neck OD, in.	7.50	10.50

ProMAXX® Pipe Cutter

RELIABLE SEVERING OF SINGLE OR MULTIPLE CASING STRINGS

Through-bore access and a ball-drop activation mechanism

The ProMAXX Pipe Cutter is designed to cut both single and multiple strings of pipe. It operates hydraulically, using a ball drop and pump pressure to actuate the knife arms, and is designed to allow full flow through the bore of the tool to the string below.

The flow-through feature enables other operations, such as cementing, cement plug dressing, or bridge plug setting, before activating the pipe cutter.

The knives of the ProMAXX Pipe Cutter are assembled with WIS propriety TruEdge™ insert-only knives, and multiple cuts can be made in the same trip without needing a trip to recover to the surface.

The ProMAXX Pipe Cutter chassis is mounted with a full-gauge stabilizer, which helps improve cutting efficiency by providing stabilization very close to the cutter knives.

CO_2 Emission Reduction by saving rig time

When combined with the ProMAXX Hydraulic Spear, the system provides a one-trip solution for cutting, anchoring, and retrieving the casing without pulling to the surface to change tools.

By combining multiple operations in a single trip, rig time and cost is reduced significantly. Operational time savings also result in considerable emissions reduction.

Applications

- Well abandonment
- Single trip cut and pull operations
- Slot Recovery
- Carbon capture utilization and storage (CCUS) operations
- Internal cutting of single or multiple strings of casing

Benefits

- Ball drop activation and flow through-bore
- Enhanced operational efficiency, reducing overall project timelines
- Substantial cost savings by eliminating the need for multiple interventions
- Through-bore allows flow to facilitate cementing, setting of a hydraulic bridge plug, and cement plug dressing operations, prior to activation

Features

- Rapid and precise casing-cutting technology using TruEdge cutting structure
- Hydraulically actuated cutter arms ensure cutter opening
- Unique annular flotel design providing a clear pressure indication of cut completion
- Designed to cut a range of casing size of 9⅝ inch and 13⅜ inch
- Built in full gauge stabilizer to improve the cutting efficiency

ProMAXX Pipe Cutter

PROMAXX PIPE CUTTER SPECIFICATIONS	
Pipe Cutter Size, in.	8.25
Casing Size Range, in.	9⅝ – 13⅜
Top Connection, in.	NC50 Box
Fishing Neck OD, in.	6.5
Weight, lb	900

ProMILL®

TRIP-SAVING MILLING AND UNDERREAMING SYSTEM

The ProMILL trip-saving milling and underreaming system combines a bridge plug assembly, section mill, and high-ratio underreamer in one single-trip solution, achieving rock-to- rock zonal isolation and preparing the foundation for an abandonment cement barrier. Performing operations in the same trip not only saves rig time but ensures a more predictable performance.

Compared with perf-and-squeeze methods, the ProMILL system eradicates all potential leak paths including channeling, microannuli, and mudcake from the abandonment barrier, enhancing annular remediation.

Efficient section milling with rock-to-rock isolation

Because a bridge plug assembly is integrated into the ProMILL system, a bridge plug can be set to isolate the lower part of the wellbore prior to the milling operation.

The ProMILL system section mill is ideal for milling casing to set rock-to-rock well abandonment cement plugs. All cutter arms are dressed with high- performance ridged milling elements which enables high-quality milling performance. The unique insert geometry, improves durability and stabilization, resulting in superior hole cleaning and swarf quality.

Effective borehole enlargement fully controlled from surface

The ProMILL system high-ratio underreamer is specially designed to provide well abandonment integrity. The high-ratio underreamer features ball-drop activation, which ensures that the underreamer remains closed during the entire milling operation.

Applications

- Plug and abandonment (P&A) operations requiring rock-to-rock isolation
- Remediation of annulus cement to remove microannuli, channeling, and other potential barrier failure modes
- Extended-length section mill window
- High-ratio opening underreaming

Benefits

- Saves rig time by setting a bridge plug, milling, and underreaming in one trip
- Ensures full-gauge boreholes per P&A program requirements
- Enhances operational efficiency and safety by eliminating barrier failure modes
- Provides better swarf quality, cleaning the hole faster and enabling higher ROP

Features

- Integral bridge plug assembly enables setting a mechanical plug
- Section mill dressed with high-performance milling inserts with unique ridged profile provides better swarf quality
- Ball-drop activation system ensures that the high-ratio underreamer remains closed at all times during milling operations

ProMILL System

PROMILL SPECIFICATIONS

Tool Series	5500	8000	11700
Casing sizes, in.	8⅝, 7, 6⅝	10¾, 9⅝	16, 14, 13⅜
Underreaming opening sizes, in.	13½, 9¾, 9	20, 17½, 15, 13½	22, 20
Underreamer casing scraper arm sizes, in.	12⅛, 8½	18⅝, 17½, 12¼	N/A

ProMILL Duo™

DUAL CASING, TRIP-SAVING MILLING AND UNDERREAMING SYSTEM

Effective solution for dual casing abandonment cement barriers

The ProMILL Duo system provides an innovative, cost-saving solution for well abandonment applications, where the integrity of the abandonment zone requires the creation of a milled section in two casing sizes. Significant rig time savings are realized when using the ProMILL Duo in comparison to conventional solutions that require a long, inner string casing to be milled.

High ratio expansion

The high expansion ratio of the ProMILL Duo Section Mill allows it to drift through the inner casing in the retracted state and upon actuation, open up to a larger diameter to mill the outer casing and the coupling.

The ProMILL Duo expansion mechanism is based on a proven spline-based actuation platform with a long history of durability and performance. Similarly, the cutting structure on the arms is dressed with WavEdge® ridged milling elements that have demonstrated performance in the ProMILL system.

The system also includes an active stabilization module that optimizes the dynamic behavior and reduces the vibration of the BHA during operation.

Applications

- Plug and abandonment (P&A) operations requiring rock-to-rock isolation
- Remediation of annulus cement to remove microannuli, channeling, and other potential barrier failure modes
- Extended-length section mill window

Benefits

- The ProMILL Duo greatly improves efficiency and reduces cost in a dual string application by eliminating the need to mill up the inner string from the surface or top of cement, when a section needs to be milled in the outer casing for setting a cement plug
- Multiple trips to mill up the inner casing are eliminated, due to the small drift of this tool and the high expansion ratio
- Enhances operational efficiency and safety by eliminating barrier failure modes
- A High Ratio Underreamer can be run in the same trip as ProMILL Duo

PROMILL DUO SPECIFICATIONS		
Tool Series	**8000**	**6000**
Opening Diameter, in.	15.7	11.37
Activation System	Ball Drop Activation available	N/A
Body OD, in.	8.44	6.00
Fishing Neck OD, in.	7.75	5.25
Fishing Neck Length, in.	16	12.9
Body Connections, in.	6⅝ Reg Box x 6⅝ Reg Box	4½ Reg Box x 4½ Reg Box
Top Sub Connections, in.	6⅝ Reg Pin x 6⅝ Reg Pin (NC50 Box Up also available)	3½ IF Box x 4½ Reg Pin
Weight, lb (section mill only)	891	340
Weight, lb (Mill BHA, w/stabilizer)	2,311	800
Overall Length, in. (section mill)	81	65
Overall Length, in. (w/stabilizer)	210	154
Tool Tensile Yield Limit, lbf	1,000,000	500,000
Inner Casing, in.	9⅝ (47 – 53.5 lbs/ft)	7 (20 – 29 lbs/ft)
Outer Casing, in.	13⅜ (68 – 72 lbs/ft)	9⅝ (43 – 53.5 lbs/ft)

ProMILL Duo System

ProMILL® Underreamer

HIGH RATIO UNDERREAMER (HRU) CAPABLE OF UNDERREAMING CEMENT

The ProMILL Underreamer (PMUR) is designed to enlarged wellbore sections up to 100% of the pilot diameter. This is primarily required for well abandonment and gas permeability work. The PMUR has extended reach arms relative to the tool body diameter. This allows it to easily drift through the narrow casing restriction and then open the hole to a larger diameter than the original hole size.

The PMUR is designed with PDC cutters that are capable of underreaming cement or variable formations in different sizes. A simple change of arms is required to achieve this underreaming.

The underreamer is also designed with casing scraper arms to clean any debris or cement before placing a cement plug.

Activation

The PMUR can be activated downhole by dropping a ball or using flow. As the tool activates, three cutter arms expand and begin underreaming. The tool remains open as long as a minimum press drop across the tools is maintained.

Applications

- Plug and abandonment (P&A) operations requiring rock-to-rock isolation
- Casing scrapper
- Remove excess cement, filter cake and open hole to expose virgin formation

Benefits

- Enlarges wellbore sections beyond the original drilled hole size
- Remains dormant during section milling operations with ball-drop activation
- PDC cutter arms capable of Underreaming variable formations

Features

- Single trip BHA that simultaneously mill a section and Underream in a single run
- As part of the ProMILL system, the High Ratio Underreamer reduces rig time by eliminating additional trips to underream after completing a section milled window

ProMILL Underreamer

PROMILL UNDERREAMER SPECIFICATIONS			
Tool Series	**5500**	**8000**	**11625**
Body OD, in.	5.50	8.0	11.625
Arms Opening Sizes, in.	8.50 to 13.5	12.25 to 20	20 and 22
Top Sub Connection, in.	3½ IF Box	6⅝ REG Box	6⅝ REG Box
Fishing Neck OD, in.	4.75	7.25	11.0
Weight, lb	319	722	2732

PullMaster®

HYDRAULIC PULLING TOOL FOR OBJECTS STUCK IN THE WELLBORE

Time reducing pulling capability

The PullMaster hydraulic pulling tool is designed to pull liners, packers, tubing, casing, drillpipe, and other objects stuck in the wellbore on rigs with limited pulling or jarring capacity.

The tool is also used in slot recovery and well redevelopment applications in which a specific TD for whipstock setting or pulling casing below a casing shoe is required and when the casing cannot be retrieved using conventional fishing techniques due to settled solids or partial cement.

Applications

- Recovery of casing that cannot be retrieved using conventional fishing techniques
- Recovery of stuck liners, washpipe, and other tubulars
- Recovery from rigs with limited pulling or jarring capacity

Benefits

- Improves operational flexibility by offering an alternative to pilot milling casing in slot recovery or redrill operations
- Enhances environmental and HSE quality by eliminating swarf generation
- Reduces rig time compared with casing milling operations.

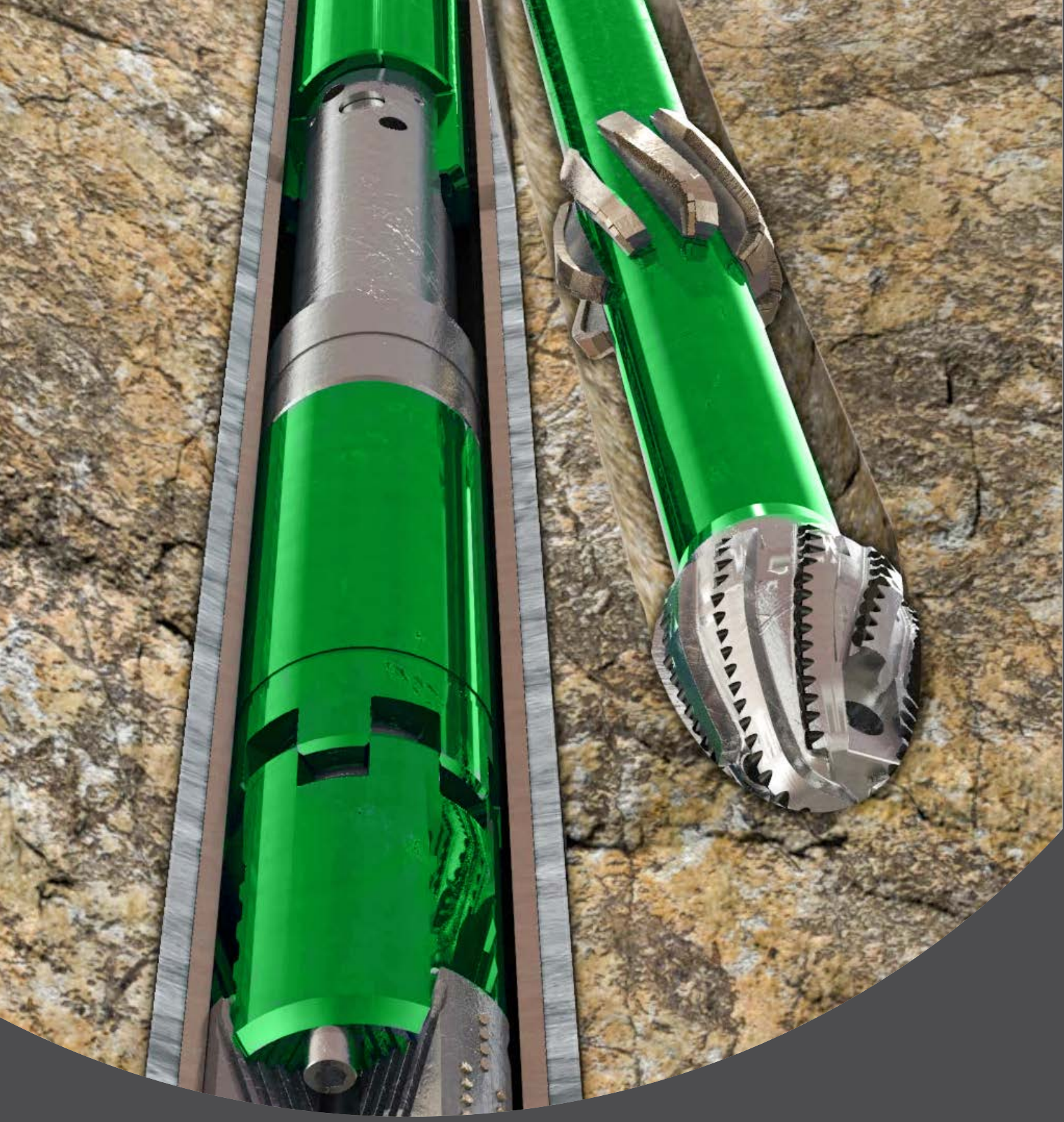
Features

- Anchoring of section sets inside 13⅜ in. casing
- Hydraulically actuated pulling section
- Hydraulic set-and-release anchor section
- 1,200,000 lbf pulling capacity
- Not limited to workstring limitations
- Used with conventional fishing jarring BHAs
- Compatible with any mechanical engagement tool for engaging the fish for pulling
- Additional pumps activating the hydraulic pulling section not required

PullMaster Tool

PULLMASTER SPECIFICATIONS	
Tool size, in. [cm]	11⅞ [30.16]
Casing size, in. [cm]	13⅜ [33.97]
Casing weight, lbm/ft [kg/m]	48–98 [71–146]
Tensile yield, lbf [N]	2,000,000 [8,896,443]
Max. operating pressure, psi [MPa]	4,700 [32.4]
Max. force generated, lbf [N]	1,200,000 [6,227,510]
Pull ratio, psi:lbf [MPa:N]	1:298.5 [1:192,612.1]
Stroke length, in. [cm]	36 [91.44]
Makeup torque, ft.lbf [N.m]	67,789 [91,910]

WELLBORE DEPARTURE TOOLS



TrackMaster Select™

- A HISTORY OF INNOVATION
- UNRIVALED EXPERIENCE
- GLOBAL PRESENCE

TrackMaster® Accessories

In order to run a TrackMaster whipstock in hole, some additional tools are required to enable setting the equipment.

Running tool

The running tool is made up above the mill system for hydraulic setting anchor. This component contains a floating piston which serves as a barrier between the clean hydraulic fluid within the running tool and the drilling fluid that is in the drill string above. The running tool is used in the placement or setting of downhole equipment such as anchors or permanent packers.

RUNNING TOOL SPECIFICATIONS		
Tool OD, in. [cm]	**Tool Length, ft [m]**	**Connections, up/down**
9.5 [24.13]	10 [3.05]	7⅝ REG Box × 7⅝ Reg Box
10.5 [26.67]	9.167 [2.79]	6⅝ FH Box × 8⅝ REG Box
9 [22.86]	8.917 [2.72]	6⅝ REG Box × 6⅝ FH Box
8 [20.32]	7.458 [2.27]	6⅝ FH Box × 6⅝ REG Box
6.5 [16.51]	6.333 [1.93]	4½ IF Box × 4½ IF Box
5.88 [14.94]	6.292 [1.92]	4 IF Box × 4 IF Box
5 [12.70]	6.292 [1.92]	3½ IF Box × 3½ IF Box
3.5 [8.89]	6.25 [1.91]	2⅜ IF Box × 2⅜ IF Box
3.125 [7.94]	5.42 [1.65]	NC23 Box × NC23 Box

Running Tool

High-flow bypass valve

The high-flow bypass valve allows to fill the string through side ports, when tripping into hole as the anchor or packer seals off the bottom of the string. Applying a high flow rate activates the valve. Once the valve is activated, it will allow the internal string to be sealed off so that the rig pump can statically pressure up the anchor or packer to set the whipstock in the casing for milling of a window.

HIGH-FLOW BYPASS VALVE SPECIFICATIONS		
Tool OD, in. [cm]	**Tool Length, ft [m]**	**Connections, up/down**
6.5 [16.5]	4 [1.2]	4½ IF Box × 4½ IF Pin
4.75 [12.07]	4 [1.2]	3½ IF Box × 3½ IF Pin

High-Flow Bypass Valve

Non advance multicycle bypass valve

The non advance multicycle bypass valve (NAMCBV) allows fluid to be pumped downhole without setting the anchor. Once the valve has completed all of its six cycles, pressure is administered to set the anchor. If it was unable to orient the whipstock by the sixth cycle, the tool has to be pulled out of the hole and reset.

NAMCBV SPECIFICATIONS		
Tool OD, in. [cm]	**Tool Length, ft [m]**	**Connections, up/down**
9 [23]	5.724 [1.7447]	7⅝ REG Box × 7⅝ REG Pin
8 [20]	5.703 [1.7383]	6⅝ FH Box × 6⅝ FH Pin
6.75 [17.15]	5.667 [1.7273]	4½ IF Box × 4½ IF Pin
5 [13]	4.848 [1.4777]	3½ IF Box × 3½ IF Pin
3.75 [9.53]	4.014 [1.2235]	2⅜ IF Box × 2⅜ IF Pin
3.125 [7.938]	2.083 [0.6349]	NC23 Box × NC23 Box

Non-Advancing Multicycle Bypass Valve

TrackMaster® Mill

A variety of mill cutting structures deliver efficient and cost–effective performance in any sidetracking operation. The TrackMaster mill is designed to offer two-or three-mill configurations, providing advanced window milling capabilities. The bi-mill design includes both the lead mill and the follow mill. The tri-mill design includes the lead mill, the follow mill, and the dress mill.

TrackMaster tri-mill

- Ideal for both conventional and extended ratholes
- Lead mill, follow mill, and dress mill design
- Delivers consistent, fast, and reliable milling performance
- Offers increased durability with PDC cutters resistance

TRI-MILL SPECIFICATIONS

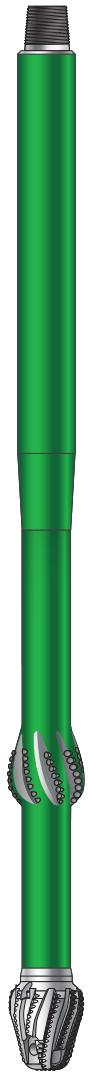
Casing Size, in. [cm]	Casing Weight Range, lb/ft [kg/m]	Mill Size Range, in. [cm]	Mill Length, ft [m]	Upper Connection	Fish Neck OD, in. [cm]
16 [41]	84.0–109.0 [125–162]	14.50–14.75 [36.8–37.47]	23.267 [7.0918]	8⅝ REG Pin	10.5 [26.67]
13.375 [33.973]	68.0–72.0 [101–107]	12.125–12.25 [30.798–31.12]	19.941 [6.078]	6⅝ FH Pin	9 [22.86]
11.75 [29.85]	42.0–65.0 [63–97]	10.5–10.75 [26.7–27.31]	19.592 [5.9716]	6⅝ REG Pin	7.5 [19.05]
10.75 [27.31]	40.5–60.7 [60.3–90.3]	9.50–9.875 [24.1–25.083]	15.8 [4.82]	4½ IF Pin	6.5 [16.51]
9.625 [24.448]	32.3–53.5 [48.1–79.6]	8.375–8.75 [21.273–22.23]	14.158 [4.3154]	4½ IF Pin	6.5 [16.51]
8.625 [21.908]	24.0–44.0 [36–65]	7.50–7.875 [19.1–20.003]	11.975 [3.65]	4 IF Pin	5.88 [14.94]
7.625 [19.37]	24.2–39.0 [36.01–58]	6.50–6.875 [16.5–17.46]	13.264 [4.0429]	3½ IF Pin	5 [12.70]
7 [18]	20.0–38.0 [30–57]	5.75–6.25 [14.61–15.88]	11.783 [3.5915]	3½ IF Pin	4.75 [12.07]
5.5 [14]	14.0–23.0 [21–34]	4.50–4.875 [11.4–58]	8.083 [2.4637]	2⅜ IF Pin	3.5 [8.89]
4.5 [11.4]	9.5–13.5 [14.1–20.1]	3.75–3.875 [9.53–9.843]	6.467 [1.9711]	NC23 Pin	3 [7.62]

TrackMaster Bi-mill

- Offers higher flexibility
- Lead mill and follow mill design
- Suggested for some double casing exits
- Delivers consistent, fast, and reliable milling performance
- Offers increased durability with PDC cutters resistance

BI-MILL SPECIFICATIONS

Casing Size, in. [cm]	Casing Weight Range, lb/ft [kg/m]	Mill Size Range, in. [cm]	Mill Length, ft [m]	Upper Connection	Fish Neck OD, in. [cm]
20 [51]	94.0–169.0 [140–251]	17.50–18.50 [44.5–47]	12.5 [3.81]	7⅝ REG Pin	9.5 [24.13]
18.625 [47.308]	87.5–117.5 [130–174.9]	17.25–17.50 [43.82–44.5]	12.5 [3.81]	7⅝ REG Pin	9.5 [24.13]
9.625 [24.448]	32.3–53.5 [48.1–79.6]	8.375–8.75 [23.813–22.23]	8.95 [2.728]	4½ IF Pin	6.5 [16.51]
7.625 [19.368]	24.2–39.0 [36–58]	6.50–6.875 [16.5–17.463]	6.883 [2.0979]	3½ IF Pin	5 [12.70]
7 [18]	20.0–38.0 [30–57]	5.75–6.25 [14.61–15.88]	6.383 [2.0979]	3½ IF Pin	4.75 [12.07]



TrackMaster Bi-Mill

TrackMaster Tri-Mill

TrackMaster Select™ Anchor

The TrackMaster anchor maintains a firm grip on the hole wall to hold the whipstock in place. Once the whipstock setting depth has been reached, the anchor can be deployed. Four types of anchors are available to secure the TrackMaster whipstock during sidetracking operations:

Expandable anchor

- Multiple casing sizes and weights
- Accommodates a range of casing sizes when a packing element is not required in the borehole
- Hydraulic actuation
- Retrievability
- Anti-rotation, high-axial-load slip design

EXPANDABLE ANCHOR SPECIFICATIONS

Casing Weight Range	Tool OD, in. [cm]	Tool Length, ft [m]	Connection
13.375 in. (at 84.5 lb/ft) to 20 in. (at 108.5 lb/ft)	11.94 [30.33]	9.203 [2.81]	8⅝ AZ IF Box × 6⅝ IF Pin
9.625 in. (at 59.4 lb/ft) to 13.375 in. (at 48.0 lb/ft)	8.19 [20.80]	7.136 [2.18]	5½ IF Box
7.0 in. (at 29 lb/ft) to 9.625 in. (at 32.0 lb/ft)	5.76 [14.63]	5.4375 [1.66]	3½ IF Box
4.5 in. (at 13.5 lb/ft) to 7.0 in. (at 29.0 lb/ft)	3.62 [9.19]	5.077 [1.55]	3.0-10-2G-SA Box

Retrievable packer anchor

- Retrievability
- Anti-rotation, high-axial-load slip design

RETRIEVABLE PACKER ANCHOR SPECIFICATIONS

Casing Size, in. [cm]	Casing Weight Range, lb/ft [kg/m]	Tool OD, in. [cm]	Tool Length, ft [m]	Connection
9.625 [24.448]	32.3–53.5 [48.1–79.6]	7.98 [20.27]	7.618 [2.322]	5½ IF Box
7 [18]	20.0–38.0 [30–57]	5.47 [13.89]	7.625 [2.3241]	3½ IF Box × 3½ IF Pin

Permanent packer anchor

- Hydraulic actuation
- 5,000-psi packer element
- Anti-rotation, high-axial-load slip design

PERMANENT PACKER ANCHOR SPECIFICATIONS

Casing Size, in. [cm]	Casing Weight Range, lb/ft [kg/m]	Tool OD, in. [cm]	Tool Length, ft [m]	Connection
13.375 [33.973]	48.0–92.5 [122–235]	11.85 [30.1]	7.208 [2.197]	8⅝ AZ IF Box
9.625 [24.448]	32.0–53.5 [81.3–135.9]	8.1 [20.6]	6.953 [2.1193]	5½ IF Box
7.625 [19.368]	24.2–47.1 [61.5–119.6]	6.04 [15.34]	6.953 [2.1193]	4 IF Box
7 [18]	20.0–38.0 [50.8–96.52]	5.48 [13.92]	6.953 [2.1193]	3½ IF Box
5.5 [14]	15.5–23.0 [39.4–58]	4.29 [10.9]	6.318 [1.9257]	2⅞ IF Box

Mechanical anchor

- Weight-set actuation
- Retrievability
- Anti-rotational slip design

MECHANICAL ANCHOR SPECIFICATIONS

Casing Size, in. [cm]	Casing Weight Range, lb/ft [kg/m]	Tool OD, in. [cm]	Tool Length, ft [m]	Connection
9.625 [24.448]	40.0–53.5 [60–79.6]	8 [20]	7.25 [2.21]	Hinge
9.625 [24.448]	32.3–36.0 [48.1–54]	8.384 [21.295]	7.25 [2.21]	Hinge
7.625 [19.368]	29.7–47.1 [44.2–70.1]	6 [15]	7.167 [2.1845]	Hinge
7.625 [19.368]	24.2–26.4 [36–39.3]	6.45 [16.38]	7.167 [2.1845]	Hinge
7 [18]	23.0–38.0 [34–57]	5.375 [13.653]	7.167 [2.1845]	Hinge
7 [18]	17.0–20.0 [25–30]	5.82 [14.78]	7.167 [2.1845]	Hinge
5.5 [14]	14.0–23.0 [21–34]	4.25 [10.8]	6.617 [2.0169]	Hinge

Expandable Anchor

Retrievable Packer Anchor

Permanent Packer Anchor

Mechanical Anchor

TrackMaster Select™ Retrieval Tools

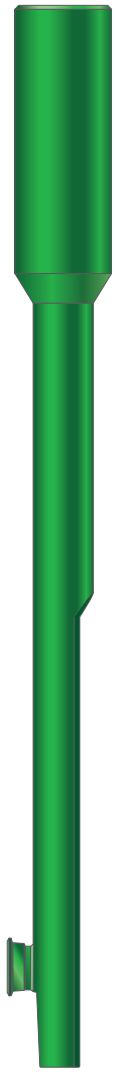
There are two types of whipstock retrieval tools: the hook retrieval tool and the die collar assembly retrieval tool.

Hook retrieval tool

- Designed to retrieve whipstocks through a tab that fits into the hook retrieval slot of the whipstock.
- Most common method of whipstock retrieval used.

Die collar assembly retrieval tool

- Retrieve the whipstock by fitting over the end of the whipstock and threading onto it.
- Most commonly used with a whipstock assembly that uses a permanent packer for an anchor.



Hook Retrieval Tool

Die Collar

TrackMaster Select™ Whipstock

The TrackMaster Select whipstock is recommended for exiting standard steel casing ranging from 4.5 in. to 20 in. OD in low-to hard-strength formation. It incorporates a multi-ramp design to enhance critical milling processes. The TrackMaster Select whipstock hookup attachments allows flexibility between the milling assembly and the whipstock. A one-way kickover hinge provides an additional flex point during orientation and when running in hole. It also ensures that the whipstock ramp is positioned to direct the mill to the initial cutout point in the casing. The TrackMaster Select whipstock designs has a hydraulic set mechanism.

Standard whipstock

- Rathole is 3 to 15 ft
- High-quality, full-gauge window
- Low dogleg severity across the exit
- Compatible with bi-mills and tri-mills

STANDARD WHIPSTOCK SPECIFICATIONS

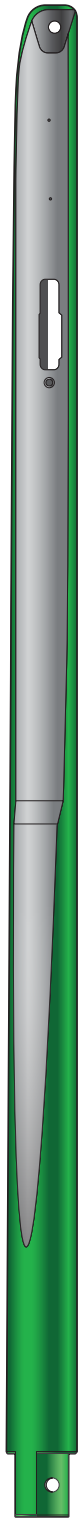
Casing Size, in. [cm]	Casing Weight Range, lb/ft [kg/m]	Whipstock OD, in. [cm]	Whipstock OAL, ft [m]	Whipstock Ramp Length, ft [m]	Break Bolt Load Rating, lbf [N]	Lower Connection
20 [51]	94.0–169.0 [140–251]	16 [40.64]	27.45 [0.8367]	23.5583 [7.18057]	75,000 [333,617]	8⅝ AZ IF Pin
18.625 [47.31]	87.5–117.5 [130.2–174.9]	16 [40.64]	27.45 [8.367]	23.5583 [7.18057]	75,000 [333,617]	8⅝ AZ IF Pin
16 [41]	84.0–109.0 [125–162]	14.2 [36.07]	29.77083 [9.074149]	24.283 [7.4015]	100,000 [444,823]	8⅝ AZ IF Pin
13.375 [33.97]	68.0–72.0 [101–107]	11.5 [29.21]	27.89583 [8.50265]	22.05 [6.721]	75,000 [333,617]	8⅝ AZ IF Pin
11.75 [29.84]	42.0–65.0 [63–97]	10.13 [25.73]	22.4375 [6.83895]	18.333 [5.5879]	75,000 [333,617]	5½ IF Pin
10.75 [27.3]	40.5–60.7 [60.3–90.3]	9.125 [23.18]	20.44 [6.23]	15.925 [4.8539]	75,000 [333,617]	5½ IF Pin
9.625 [24.45]	32.3–53.5 [48.1–79.6]	8 [20.32]	18.187 [5.5434]	14.025 [4.2748]	55,000 [244,652]	5½ IF Pin
8.625 [21.91]	24.0–44.0 [36–65]	6.98 [17.73]	16.729 [5.099]	12.525 [3.8176]	40,000 [177,929]	4½ IF Pin
7.625 [19.37]	24.2–39.0 [36–58]	6 [15.24]	15.25 [4.649]	11.375 [3.4671]	40,000 [177,929]	4 IF Pin
7 [18]	20.0–38.0 [30–57]	5.38 [13.67]	14.391 [4.3864]	10.575 [3.2233]	35,000 [155,688]	3½ IF Pin
5.5 [14]	14.0–23.0 [21–34]	4.19 [10.64]	10.063 [3.0672]	7.367 [2.24546]	20,000 [88,964]	2⅞ IF Pin
4.5 [11.4]	9.5–13.5 [14.1–20.1]	3.31 [8.41]	8.803 [2.6832]	5.475 [1.66878]	15,000 [66,723]	2⅜ IF Pin

Hard-formation whipstock

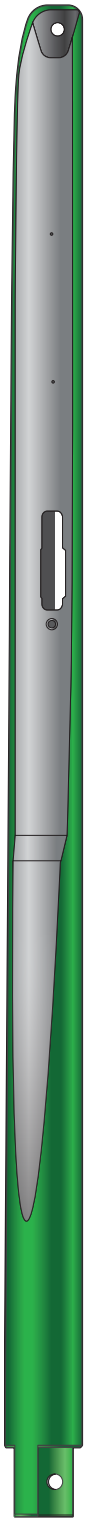
- Shortened full gauge section for quick departure
- Short slide, which is best for open hole sidetracking
- Compatible with bi-mills only

HARD FORMATION SPECIFICATIONS

Casing Size, in. [cm]	Casing Weight Range, lb/ft [kg/m]	Whipstock OD, in. [cm]	Whipstock OAL, ft [m]	Whipstock Ramp Length, ft [m]	Break Bolt Load Rating, lbf [N]	Lower Connection
9.625 [24.448]	32.3–53.5 [48.1–79.6]	8 [20.32]	15.896 [4.8451]	11.65 [3.551]	55,000 [244,652]	5½ in. IF Pin
7.625 [19.368]	24.2–39.0 [36–58]	6 [15.24]	12.333 [3.759]	8.75 [2.667]	40,000 [177,929]	4 in. IF Pin
7 [17.8]	20.0–38.0 [30–57]	5.38 [13.67]	11.225 [3.4214]	7.883 [2.4027]	35,000 [155,688]	3½ in. IF Pin



Standard Whipstock



Hard Formation Whipstock

TrackMaster® TT Wellbore Departure System

INTEGRATED SYSTEM FOR CASING EXITS: CONVENTIONAL OR EXTENDED RATHOLES

The non-retrievable Trackmaster TT thru-tubing whipstock system integrates separate components to enable exits from standard steel casing below the production tubing and other exits that require 3-ft to 15-ft of rathole.

System applications

- Casing exits below production tubing
- Casing exits that require extended ratholes

FasTrack bi-mill advantages

- Ideal for operations requiring conventional or extended ratholes
- Lead-and-follow mill design
- Consistent, fast, and reliable performance
- Optional PDC cutters for enhanced wear resistance

Thru-tubing whipstock advantages

- Accomodates relative size difference between whipstock and casing diameters
- Hydraulic kick-over hinge for positioning and stabilization

Expandable anchor advantages

- Spans multiple casing sizes and weights
- Hydraulically actuated
- Designed to prevent rotation and high-axial load slip

Running tools and accessories advantages

- Works with all hydraulically actuated anchor systems
- Provides clean hydraulic oil for to set anchors and packers
- Actuated with pump pressure

Multicycle bypass valve advantages

- Facilitates flow rates sufficient to operate MWD and other telemetry tools
- Provides multiple open cycles

Debris barrier advantages

- Prevents debris from settling around anchors and packers

TRACKMASTER TT SPECIFICATIONS

Tool Size	4½ in. × 7 in.	7 in. × 9⅝ in.	9⅝ in. × 13⅜ in.
System OD, in.	3.62	5.625	7.813
Mill OD, in.	3.625 – 3.875	5.750 – 6.250	8.250 – 8.750
Setting pressure: whip, psi	939	955	510
Setting pressure: anchor, psi	3,000	3,000	3,000
Release load: whip, lbf	14,400	32,000	40,000
Release load: anchor, lbf	32,400	64,800	94,800
Torque, ft.lbf	6,000	30,000	50,000

Trackmaster TT Wellbore Departure System

THRU-TUBING SERVICES

Continuous Tubing Overshot

MAXIMUM GRAPPLE CONTACT FOR RETRIEVING SLICK-WALL FISH

The continuous tubing overshot is conveyed on CT or jointed pipe. After engaging the fish, it provides circulation through the fish to the workstring below it. The 340° contact grapple system, combined with the ability to swallow the fish, makes this tool ideal for retrieving CT and other slick-wall fish. Addition of a high-pressure packoff above the overshot enables circulation to the fish to be restored.

Applications

- Retrieving parted CT and slick-wall fish
- Restoring circulation to parted CT in the well

Benefits

- High-pressure packoff assembly provides high-pressure circulation seal
- Compatible with CT or jointed pipe
- Accommodates extensions below the tool

CONTINUOUS TUBING OVERSHOT SPECIFICATIONS

Tool OD, in.	Tool ID, in.	Tool length, in.	Catch range, in.
1.858	1.300	24.5	1 to 1¼
2.063	1.313	23.5	1 to 1¼
2.295	1.563	24.5	1¼ to 1½
2.700	1.813	29.6	1½ to 1¾
3.375	2.125	34.8	1¾ to 2⅜

Continuous Tubing Overshot

CT Connectors

EASY CT-BHA ASSEMBLY WITH INTERNAL OR EXTERNAL CONNECTIONS

External CT connectors, with their high tensile strength and high resistance to pressure and torque, are ideal for attaching the CT to a BHA for applications that involve motors and fishing assemblies. They are available in standard and slimline versions for CT sizes 1 to 2⅞ in.

Internal CT connectors are available in slip, roller, and dimple configurations.

Applications

- Attaching the BHA to CT

Benefits

- Slip section sealed from wellbore to prevent fluid damage
- Double O-ring seals
- Set screws to prevent rotation
- High tensile strength
- High resistance to pressure and torque
- Easy to assemble

External Coiled Tubing Connector

Dual Circulating Sub

RUPTURE DISC FOR ACTIVATION REDUNDANCY

The dual circulating sub extends the life of downhole mud motors and other downhole tools by diverting mud circulation away from them. Activated by dropping a ball, the dual circulating sub prevents actuation of circulation-driven equipment during extended periods of pumping. A rupture disc offers activation redundancy; if a downhole restriction prevents drop ball actuation, applying pressure to burst the disc will restart circulation to the annulus.

Applications

- Prevents wear on tools during periods of extended circulation
- Allows higher annular velocities following cleanouts
- Enables pumping of higher fluid volumes into annulus during cleanout
- Facilitates pumping of nitrogen into wellbore for fluid evacuation

Benefits

- Prevents damage to circulation-driven tools by diverting mud circulation
- Activation by ball drop or rupture disc
- Multiple preset options for rupture disc: 20,650, 34,400 or 41,300 kPa [3,000, 5,000 or 6,000 psi]

Dual Circulating Sub

Dual-Flapper Check Valve

LARGE INTERNAL BORE FOR RELIABLE PRESSURE SEAL

The dual-flapper check valve ensures workstring integrity by using high-pressure cartridges to prevent wellbore fluids or pressure from entering the string during workover operations. The large internal bore minimizes friction at high flow rates and provides a reliable seal against the unwanted pressure and fluids typically encountered in these operations. The valve is spring activated for positive closure during inactivity and has redundant seals.

Applications

- Workover operations

Benefits

- Prevents wellbore fluids from entering the workstring
- Spring activated for positive closure during inactivity
- Redundant seals for enhanced safety
- Large bore pressure capacity for use with drop balls

Dual-Flapper Check Valve

Heavy-Duty Hydraulic Disconnect

INTERNAL AND EXTERNAL FISHING PROFILES FOR EASIER RETRIEVAL

The heavy-duty hydraulic disconnect provides a predetermined release point in a BHA. Its ability to withstand the extreme torsional and tensile loads exerted during jarring and underreaming make it a key component in demanding applications. A hydraulically balanced position prevents accidental disconnects.

Actuated at a preset pressure that is created by dropping a ball, an internal piston allows the disconnect assembly to separate, leaving the lower section downhole. Circulation ports open upon the separation, and the resulting pressure drop is seen at surface as confirmation of the disconnect. The lower section has an internal and external fishing profile to make future retrievals easier.

Applications

- Recovery of toolstring from below a jar
- Operations benefitting from predetermined release points

Benefits

- Internal and external fishing profiles for easier retrieval
- Compatibility with torque-generating tools
- Brass or steel shear screws available
- Flow ports that open when screws are sheared
- Circulation ports that open upon disconnect
- Hydraulically balanced piston to prevent accidental disconnect

Heavy-Duty Hydraulic Disconnect

Hydraulic Bowspring Centralizer

COLLAPSIBLE SPRINGS FOR EASIER RETRIEVAL OF TOOLSTRING

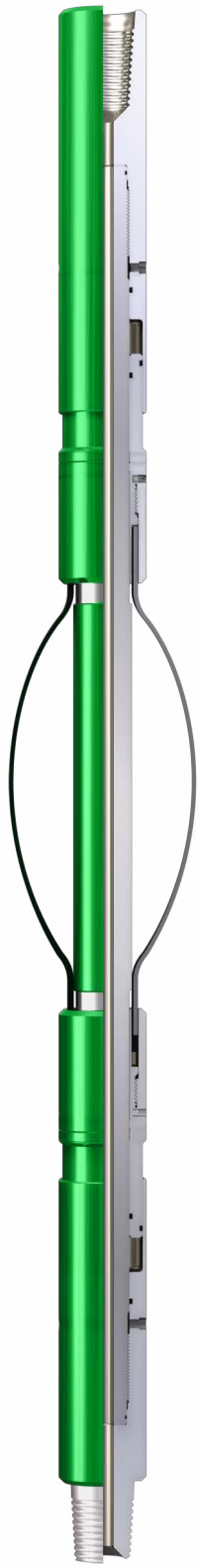
The hydraulic bowspring centralizer's springs are activated by hydraulic pressure. This enables selective toolstring centralization below wellbore restrictions or to facilitate passage through production tubing for centralization inside the casing below the tubing.

Applications

- Stabilization of toolstring for fishing, cutting, milling, underreaming, and washover operations
- Centralization of toolstring in deviated wellbores

Benefits

- Springs that expand and lock at preset diameter
- Springs that collapse with pressure interruption
- Adjustable sleeve for expansion of spring to accommodate various casing sizes



Hydraulic Bowspring Centralizer

Hydraulic Indexing Tool

FULL 360° ROTATION FOR OPTIMAL MANEUVERABILITY

The hydraulic indexing tool facilitates axial orientation of a toolstring to maneuver past obstructions such as a fish or ledge. Its hydraulic actuation improves BHA compatibility and permits 360° rotation in 12 staged increments.

Applications

- Fishing and washover operations on CT
- Sidetracking operations on CT

Benefits

- Hydraulic actuation for optimal performance
- 360° rotation in 30° increments

HYDRAULIC INDEXING TOOL SPECIFICATIONS

Tool size, in.	Torque at 1,500 psi, ft.lbf	Tool length, in.	Maximum tensile load, kips	Minimum actuating pressure, psi
1 11/16	100	45	65	200
2¼	125	45	70	200
3	510	56	135	200

Hydraulic Indexing Tool

Hydraulic Pulling Tool

MULTIPLE LATCH-AND-RELEASE OPERATIONS

The hydraulic pulling tool retrieves downhole tools and other fish that have standard wireline profiles. The pulling tool's collet mechanism latches the external neck of the fish with weight down; the tool is released from the fish by applying set-down weight and differential pressure. Circulation through an insert in the core provides the differential pressure for activation. Fluid pumped through the tool before the operation washes debris or fill material from the top of the fish, ensuring a secure catch.

Although the tool retrieves equipment with standard wireline profiles, it cannot be used in wireline applications.

Applications

- Retrieval of downhole tools with standard wireline profiles

Benefits

- Fluid activated
- Multiple latch-and-releases
- Latches external neck of fish
- No requirement for redress after each latch

Hydraulic Pulling Tool

Hydraulic Release GS

LOAD TRANSFER PRODUCES RELIABLE JARRING

The hydraulic release GS retrieves CT tools that have conventional, internal fishing necks. The release latches the tool with set-down weight and is released by a combination of set-down weight and increased hydraulic pressure. The collet system transfers load force to the central mandrel to enable jarring operations.

Applications

- Retrieval of CT tools with internal fishing profiles

Benefits

- Hydraulic operation
- Safety shear function guards fishing string from becoming stuck

Hydraulic Release GS

Hydraulic Release Overshot

TWO-COMPONENT ACTIVATION FOR HORIZONTAL FISHING

The hydraulic release overshot engages the external neck of the fish without disrupting circulation to the fish and tools below it. Fluid pumped through the tool before the latch operation washes debris and fill from the top of the fish, ensuring a secure catch. The tool is activated mechanically by applying set-down weight; it is released by applying a combination of set-down weight and differential pressure, making it ideal for horizontal fishing applications.

Applications

- Fishing in horizontal and highly deviated wells where sufficient set-down weight cannot be delivered to shear pins alone
- Recovery of CT and CT tools

Benefits

- Variable slip sizes expand retrieval options
- Externally engages fish necks that have smooth or slick walls
- Forms a pressure seal on fish
- Activates with combination of set-down weight and differential pressure
- Internal hammer action assists with release

Hydraulic Release Overshot

Hydraulic Release Spear

ENGAGES FISH INTERNALLY

The hydraulic release spear retrieves fish with damaged internal profiles and also catches fish with known diameters. The spear engages fish with slips actuated by set-down weight and is released with a combination of set-down weight and increased hydraulic pressure.

When used with CT, the tool should be run with the heavy-duty hydraulic disconnect to provide a controlled parting point in the toolstring.

Applications

- Engages fish with damaged internal profiles
- Catches fish with a known internal diameter

Benefits

- Catch range of ¾ in. to 3⅛ in.
- Engages with set-down weight; releases with set-down weight and increased pressure

Hydraulic Release Spear

i-MILL TT Intervention Mill

BALANCED MILLING FOR CLEARING CEMENT AND SCALE FROM TUBING OR LINERS

The i-MILL TT thru-tubing insert intervention mill was developed using propiority design techniques to ensure a balanced and consistent milling profile capable of efficiently clearing cement and scale from tubing or liners. For application flexibility, the mill can be fitted with the type of insert that will best mill the restricting material.

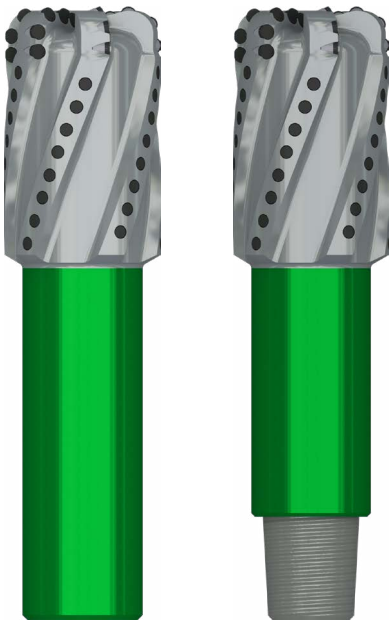
The diameter of the mill can also be honed to meet specific gauge requirements. It operates at low-torque and provides extended gauge protection for completions, while producing small and uniform cuttings. The i-MILL TT intervention mill on a PowerMill TT positive displacement motor is the most effective mill for clearing cement or scale from tubing or liners to advance production or return flow to acceptable levels.

Applications

- Cleaning out scale, cement, barium, steel, bridge and frac plugs in thru-tubing
- Thru-tubing underreaming
- Milling gauges that must be customized to desired drift of tubing or liner

Benefits

- Protects completions with extended gauge
- Comes dressed with TCI inserts
- Can be upgraded with PDC inserts for better performance
- Removes manual welding of crushed carbide
- Produces small uniform cuttings
- Requires less torque
- Comes with pin or box connection to match PowerMill TT thru-tubing milling positive displacement motors



i-MILL TT intervention mill with box connection (left) and pin connection (right).

Locking Swivel Joint

TOOLSTRING MAKEUP IN TWO STAGES FOR EASIER DEPLOYMENT

The locking swivel joint is designed for easier deployment of long toolstrings. When used with a deployment sub, this joint enables the lower toolstring to be hung off on the BOP slip rams. The locking swivel joint can then be made up to the toolstring. Pulling the coupling back, tightening the set screw, and disengaging the clutch readies the upper toolstring for makeup.

Applications

- Facilitating deployment of long toolstrings

Benefits

- Enables makeup of upper and lower toolstrings in two stages for easier deployment

Locking Swivel Joint

Mechanical Bowspring Centralizer

ACTUATION WITHOUT DIVERTING HYDRAULIC CIRCULATION

The mechanical bowspring centralizer's springs retract to enable toolstring centralization below wellbore restrictions or to facilitate passage through production tubing for centralization inside the casing below the tubing. With automatic mechanical actuation of the centralizer springs, there is no diversion of hydraulic circulation from the equipment below the centralizer.

Applications

- Stabilization of toolstring for fishing, cutting, milling, underreaming, and washover operations
- Centralization of assemblies that require unrestricted hydraulic circulation
- Centralization of toolstring in deviated wellbores

Benefits

- Retractable springs
- Large through-bore for maintaining circulation to tools below the centralizer

Mechanical Bowspring Centralizer

Mechanical Pulling Tool

TWO ACTIVATION MODES FOR ADDED FLEXIBILITY

The mechanical pulling tool retrieves downhole tools and other fish that have standard wireline profiles. The catching mechanism actuates with either jar-up or jar-down shear and release force. The tool converts easily from jar-up to jar-down actuation by replacement of the top sub, core, and retainer screw.

Applications

- Fishing with CT or jointed pipe
- Wireline operations

Benefits

- Catching mechanism actuates with either jar-up or jar-down force
- Tool easily converts to jar-up or jar-down mode

Mechanical Pulling Tool

Mechanical Release GS

EASY CONVERSION TO JAR-UP MODE FOR ADDED FLEXIBILITY

The mechanical release GS catches standard internal fishing necks with a down shear and release mechanism . Applications include running or pulling X and XN locks and G-stops, and retrieving disconnects. A GU adapter easily converts the mechanical release GS to a jar-up tool.

Applications

- Wireline fishing operations
- CT fishing operations where hydraulic pulling tools are not recommended
- Running and pulling X and XN locks and G-stops
- Retrieving disconnects

Benefits

- Simple redress for job design flexibility
- Easy-change shear pins

Mechanical Release GS

Motor Head Assembly

INTEGRATED COMPONENTS TO REDUCE ASSEMBLY LENGTH

The motor head assembly combines a dual-flapper check valve, hydraulic disconnect, dual circulating sub, and emergency rupture disc into one compact, heavy-duty component. The assembly has a large bore for high flow rates and is designed to withstand vibration and torsional stress over extended periods of operation.

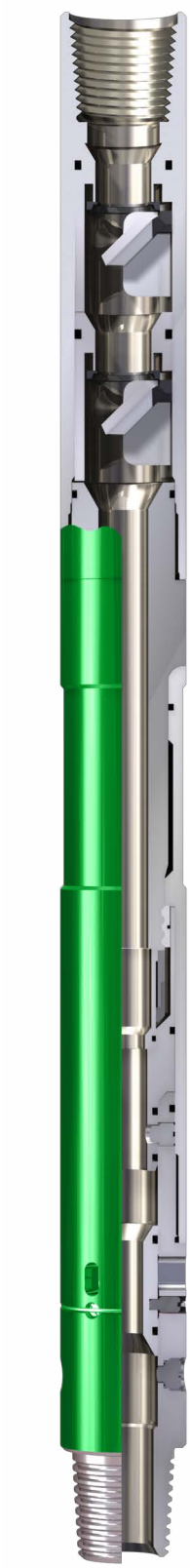
Internal and external fishing necks promote ease of retrieval. Assembly design isolates shear pins from treatment and wellbore fluids and protects them from jarring and bending moments.

Applications

- CT applications with downhole motors

Benefits

- 30% shorter than individual components
- High torque and vibration capacity
- Multiple options for tubing connectors
- Flapper cartridges tested to 68,900 kPa and 204°C [10,000 psi at 400°F]
- Large bore to permit high circulation rates
- Easy assembly and disassembly to reduce wellsite tool inventory



Motor Head Assembly

PowerMill TT Thru-Tubing Motor

TAILORED POWER FOR DEMANDING THRU-TUBING APPLICATIONS

Applications

- Milling scale, cement, barium, steel, bridge and frac plugs
- Cleanout operations with venturi jet baskets
- Thru-tubing undereaming and sidetracking
- Coiled tubing operations with specific torque and RPM requirements for downhole tools

Benefits

- Motors available in a range of sizes and performance classes
- Rotor-stator components are rated for harsh fluids and HPHT conditions
- Mud-lubricated bearings with mechanical seal assembly promote reliable actuation of high-pressure downhole tools
- Rugged bearing assembly endures side loading and overpulls

PowerMill TT thru-tubing motors are designed for the demands of thru-tubing operations.

POWERMILL TT THRU-TUBING MOTOR SPECIFICATIONS									
Available in the the following sizes. Contact your WIS Representative for Performance Specifications.									
Outside diameter, in. [mm]	1.688 [43]	1.688 [43]	2.125 [54]	2.375 [60]	2.875 [73]	2.875 [73]	2.875 [73]	3.375 [86]	3.375 [86]

Quick Connector

LOCKING TAPER DESIGN FOR EASY STAB-IN CONNECTIONS

The quick connector enables easy makeup of long toolstrings. Its locking taper allows each section to stab into the next and a safety collar prevents backoff of the first section, greatly increasing makeup efficiency. It is especially well suited for applications where rotating the toolstring to engage threads is difficult or for those that require long BHAs.

Applications

- Perforating assemblies
- Memory production logging strings
- Fishing assemblies
- Long toolstrings and BHAs

Benefits

- Efficient toolstring makeup
- Safety locking collar to prevent first section from backing off
- High torque capacity

Quick Connector

Series 10- and 20-Type Releasing Overshots

360° GRAPPLES FOR MAXIMUM CONTACT

The Series 10-Type releasing overshot engages, packs off, and retrieves tubular fish. It is available in sizes to engage an OD of up to 2 in. inside 2⅞ in. tubing and an OD of up to 1⅝ in. inside 2⅜ in. tubing.

The Series 20-Type releasing overshot is designed specifically to retrieve a fish whose top is too short to be engaged with the Series 10-Type releasing overshot. The operation is accomplished by positioning the grapples at the bottom of the tool

Both tools have unique tapered helix internal construction that provides 360° wall contact and distributes loads evenly on the tool and fish.

Both spiral grapples and basket grapples are available. Helical spring spiral grapples are used when employing the overshot's maximum catch size, and expansible cylinder basket grapples are used when the fish OD is more than ½ in. smaller than the tool's maximum catch size.

Both releasing overshots are available in three configurations: full strength (FS), semifull strength (SFS), and slim hole (SH).

Applications

- Engaging, packing off, and retrieving tubular fish
- Baiting fish with damaged external profiles
- Fishing operations requiring wireline compatibility

Benefits

- 360° grapples to evenly distribute gripping force and maximize wall contact

Series 10-Type Releasing Overshot

Series 70- and 150-Type Releasing Overshots

LARGE OPEN BORE FOR WIRELINE COMPATIBILITY

The Series 70-Type releasing overshot is specifically designed to retrieve a fish whose top is too short to be engaged with a Series 150-Type releasing overshot. The operation is accomplished by positioning the grapple at the bottom of the tool.

The Series 150-Type releasing overshot engages, pack offs, retrieves tubular fish, and is especially suited for retrieval of parted drillpipe and drill collars. Its large bore enables use with wireline tools. Four strength categories are available for jarring and backoff operations: full strength (FS), semifull strength (SFS), slim hole (SH), and extra slim hole (XSH).

Both tools have a unique tapered helix, internal construction that provides 360° wall contact while distributing loads evenly on the tool and fish. Cylinder basket grapples are used when the fish OD is more than ½ in. smaller than the tool's maximum catch size.

Applications

- Engaging, packing off, and retrieving tubular fish (Series 150-Type only)
- Baiting fish with damaged external profiles
- Fishing operations requiring wireline compatibility

Benefits

- Large open bore allows operation of wireline equipment
- 360° grapples for maximum wall contact and even distribution of gripping force

Series 70- and 150-Type Releasing Overshots

Stage Mill

COST-EFFECTIVE ENLARGEMENT

Stage mills are specifically designed for profile enlargement, mechanical removal of scale, and opening or removing other restrictions. The mills offer a cost-effective way to increase flow control equipment IDs such as seating nipples and no-gos. Stage mills are available in 1¾ in. to 4¾ in. sizes.

Applications

- Enlarging equipment profiles
- Opening or removing restrictions in tubing and liner
- Removing scale

Benefits

- Cost-effective means of increasing flow control equipment IDs
- Optional of Millmaster carbide inserts or PDC dressing

Stage Mill

T Series Mill

SUPERIOR PERFORMANCE WITH LOW WEIGHT AND TORQUE

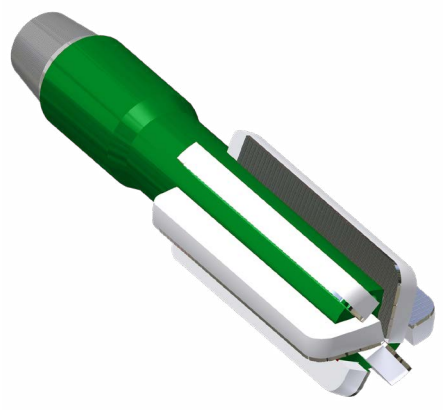
The T Series mill combines low requirements for weight and torque with rugged Millmaster carbide inserts to deliver superior performance. Used with a thru-tubing positive displacement mud motor, the T Series mill removes plugs, scale, and debris with cutting matrices that can be designed for each application. T Series mills are available in 1¾ in. to 4¾ in. sizes.

Applications

- Milling of cement, scale, and plugs
- Retrieving milling debris

Benefits

- Millmaster carbide inserts for optimal performance
- Strategically placed fluid port



T Series Mill

Thru-Tubing Double-Acting Accelerator

ABSORBS IMPACT SHOCK TO PREVENT BHA DAMAGE

The double-acting accelerator is a slimhole tool that multiplies the impact of a double-acting jar by providing or maximizing a stored energy source. A nitrogen compression chamber stores the tool energy while reducing its length, and the tool's large bore accommodates drop balls and flow release equipment below it.

This tool is ideal for operations requiring small-diameter accelerators, and its ability to transmit torque enables the use of downhole motors. It also functions as a shock absorber to prevent impact damage to BHA components such as CT connectors and backpressure valves.

Applications

- Operations in which a jar is run in the workstring
- Small-diameter milling, rotary drilling, workover, and completion operations
- Small-diameter CT, snubbing, and fishing operations

Benefits

- Compression chamber stores tool energy and reduces tool length
- Large bore accommodates drop balls and equipment below the tool
- Temperature rating: 260°C [500°F]
- Seal rating: 137,000 kPa [20,000] psi
- Circulation system rating: 68,900 kPa [10,000 psi]

Ordering instructions

Please specify:

- Hole size
- Drillstring component OD where the tool will be utilized
- Connection size and type
- Hole temperature
- Desired working loads

THRU-TUBING DOUBLE-ACTING ACCELERATOR SPECIFICATIONS			
Tool OD, in.	1 11/16	2 1/16	2 7/8
Tool ID, in.	9/16	11/16	31/32
Tool joint connections, in.	1 AMMT	1 1/2 AMMT	2 3/8 PAC
Overall extended length	8 ft 6 in.	8 ft 9 in.	9 ft 1 in.
Maximum detent working load, lbf	8,000	11,000	20,000
Tensile yield strength, lbf	56,000	86,000	200,000
Torsional yield strength, lbf.ft	850	1,600	5,300
Free stroke up, in.	6	6	6
Free stroke down, in.	6	6	6
Tool weight, lbm	43	66	156

NOTE: *Jar-Pact fishing program should be utilized to optimize performance of accelerator and jarring tools. Contact Wellbore Integrity Solutions for more information.*

Thru-Tubing Double-Acting Accelerator

Thru-Tubing Double-Acting Hydraulic Jar

DELIVERS HIGH-IMPACT JARRING FORCE

The thru-tubing double-acting hydraulic jar is a slimhole impact tool that delivers jarring force on both up- and downstrokes to free equipment stuck downhole. The tool's small diameter makes it ideal for use in CT operations, snubbing, and slimhole rotary drilling and fishing applications. Its ability to transmit torque enables the use of a downhole motor.

The standard tool has premium seals for use in high-temperature or high-pressure wells. Its robust design and high-quality materials ensure reliable performance in the harshest of downhole conditions.

Applications

- Small-diameter milling, rotary drilling, workover, remedial, and completion operations
- Vertical, deviated, ultradeep, and ultrahot wellbores
- CT, snubbing, and concentric tubing workstrings

Benefits

- Jarring force delivered on up- and downstrokes
- Temperature-compensated detent system for extended operation
- Large bore for accommodation of drop balls and equipment below tool
- Maximum stroke length increases impact to optimize effectiveness
- Temperature rating: 260°C [500°F]
- Seal rating: 137,000 kPa [20,000 psi] differential
- Circulation system rating: 68,900 kPa [10,000 psi]

Ordering instructions

Please specify:

- Hole size
- Drillstring component OD where the tool will be utilized
- Connection size and type

THRU-TUBING DOUBLE-ACTING HYDRAULIC JAR SPECIFICATIONS			
Tool OD, in.	1 13/16	2 1/16	2 7/8
Tool ID, in.	9/16	11/16	31/32
Tool joint connections, in.	1 AMMT	1 1/2 AMMT	2 3/8 PAC
Overall extended length	7 ft 10 in.	7 ft 9 in.	8 ft 3 in.
Maximum detent working load, lbf	8,000	11,000	20,000
Tensile yield strength, lbf	56,000	86,000	200,000
Torsional yield strength, lbf.ft	850	1,600	5,300
Free stroke up, in.	4	4	4
Free stroke down, in.	4	4	4
Total stroke, in.	12	12	12
Tool weight, lbm	38	56	140

NOTE: *Jar-Pact fishing program should be utilized to optimize performance of Accelerator and jarring tools. Contact Wellbore Integrity Solutions for more information.*

Thru-Tubing Double-Acting Hydraulic Jar

Thru-Tubing Hydraulic Pipe Cutter

LOW POINT LOAD FOR ONE TRIP PIPE CUTTING

The TT hydraulic pipe cutter's knives produce low point-loading across the cutting surface for the durability to complete cutting in one trip. The pipe cutter can be run on CT or jointed pipe. When deployed on CT, an anchoring system, stabilizer, and PDM can be incorporated to ensure the most efficient operation.

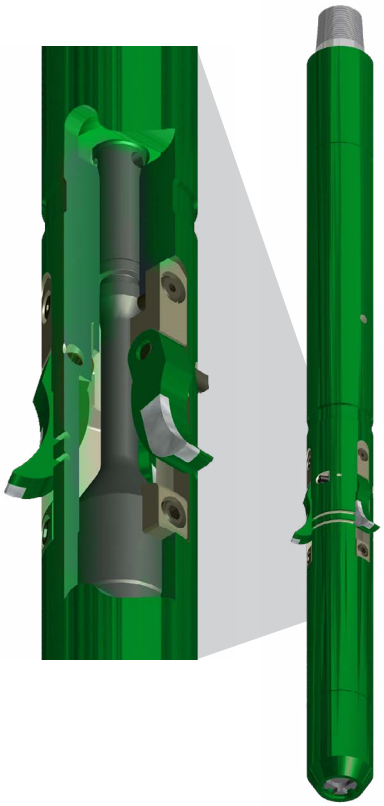
To engage and quickly sever tubing or drillpipe, the TT hydraulic pipe cutter features three knives dressed with Millmaster carbide inserts. A variety of cutting structures is available, and the amount of hydraulic pressure required to open the knives can be reset at the rig site in minutes. Knife blades can also be changed at the rig site, enabling multiple cuts and increased efficiency when cutting tubulars of different diameters.

Applications

- Recovering tubing
- Severing tubing or drillpipe above stuck point
- Severing packer mandrels and tail pipes

Benefits

- Low-point loading across cutting surface to enable one trip pipe cutting
- Profiled cutters to provide greater cutting efficiency
- Millmaster carbide inserts to increase knife cutting durability
- Rigsite blade changes for efficiency in cutting tubulars of various diameters
- Field-changeable jet nozzles to optimize performance



Thru-Tubing Hydraulic Pipe Cutter

THRU-TUBING HYDRAULIC PIPE CUTTER SPECIFICATIONS

Tool size, in.	Tubing OD, in.									
	2 3/8	2 7/8	3 1/2	4	4 1/2	5	5 1/2	6	6 5/8	7
1 11/16	■	▪	▪							
2 1/4		■	▪	▪						
2 1/2			■	■	▪	▪	▪			
2 7/8					■	▪	▪			
3 3/8						■	■	■	▪	▪

■ *Recommended pipe cutter range for maximum performance*
▪ *Extended pipe cutter range for special cases*

Thru-Tubing Underreamer

VERSATILE CONFIGURATIONS TO MATCH UNDERREAMING APPLICATIONS

The underreamer passes through borehole restrictions and then opens by hydraulic activation to a preset diameter. It effectively removes cement, scale, and hard debris from the liner below the production string. The underreamer blades and mills are available with tungsten carbide dressing for scale or cement removal, PDC dressing for scale or cement removal where protection of gauges and tubulars is essential, and Millmaster carbide inserts for various applications, including those with high ROP.

Applications

- Cement cleanout
- Scale removal

Benefits

- Mechanically assisted knife retraction
- Self-stabilizing knife configuration
- Durable construction for downhole reliability
- Available with various dressings and carbide inserts
- Configurable as an anchor for pipe-cutting applications
- Field-changeable jet nozzles to meet application demands

THRU-TUBING UNDERREAMER SPECIFICATIONS

Size, in. [mm]	Opening Diameter (1), in. [mm]	Min flow Area (2), in.^{2}	Connections Pin × Box
1.750 [44.5]	4 [101.6]	0.237	1 in. AMMT
2.125 [54.0]	6.25 [158.8]	0.181	1½ in. AMMT or 1¼ in. API REG
3.125 [79.4]	8.50 [215.9]	0.110	2⅜ in. API REG or 2⅜ in. PAC DS

(1) Opening diameter represents current blade designs.
(2) This minimum flow area is the minimum by-pass area through the tool and in each case is the communication channels along the tool OD.

Thru-Tubing Underreamer

TJ Hydraulic Disconnect

SURFACE CONFIRMATION OF COMPLETED OPERATION

The TJ hydraulic disconnect provides a predetermined release point in a BHA. Its ability to withstand the extreme torsional and tensile loads exerted during jarring and underreaming make it a key component in demanding operations.

Actuated at a preset pressure that is created by dropping a ball, an internal piston allows the disconnect assembly to separate, leaving the lower section downhole. Circulation ports open upon the separation, and the resulting pressure drop is seen at surface as confirmation of the disconnect. The lower section has an internal G-neck fishing profile for ease of future retrieval.

Applications

- Milling, jarring, underreaming, and other high-torque applications

Benefits

- Internal G-neck for ease of future retrieval
- High resistance to tensile and torsional stresses
- Ability to transmit torque for underreaming
- Circulation ports that open upon disconnect
- Designed to prevent shear screw fatigue

TJ Hydraulic Disconnect

TT Turbomill

TT TURBOMILL (THRU-TUBING TURBOMILL) IS SPECIFICALLY DESIGNED FOR COILED TUBING CLEANOUTS

TT Turbomill

Applications

- Scale clean outs
- Mills Copperhead bridge plugs
- Mills composite bridge plugs
- High-temperature conditions
- Low-pressure conditions where nitrogen is used to maintain well flow

Features

- Extended gage protection combats turbodrill's output speed
- Two rows diamond-enhanced insert (DEI) gage inserts ensures durability
- Limited-depth cutting profile reduces torque demand cuttings production

TT TURBOMILL SPECIFICATIONS

Outer Diameter, in.	Overall Length, in.	Fishing Neck Outer Diameter, in.	Fishing Neck Length, in.	Connection
3.250	10	2⅞	4	2⅜ in. PAC Box
3.500	10	2⅞	4	2⅜ in. PAC Box
3.625	10	2⅞	4	2⅜ in. PAC Box
3.750	10	2⅞	4	2⅜ in. PAC Box
3.875	10	2⅞	4	2⅜ in. PAC Box
4.375	10.5	2⅞	4	2⅜ in. PAC Box
4.415	10.5	2⅞	4	2⅜ in. PAC Box
4.625	10.5	2⅞	4	2⅜ in. PAC Box

i-MILL TT Intervention Mill

I-MILL TT INTERVENTION MILL SPECIFICATIONS					
OD, in.	Overall Length, in.	Part Number (TCI Inserts)	Fishing Neck OD, in.	Fishing Neck Length, ft	Connection
3.500	12.2	80017088	2⅞	6	2⅜ PAC DSI Pin
3.500	12.2	80017085	2⅞	6	2⅜ PAC Box
3.625	12.3	80017084	2⅞	6	2⅜ PAC DSI Pin
3.625	12.3	80017083	2⅞	6	2⅜ PAC Box
3.750	12.3	80017087	2⅞	6	2⅜ PAC DSI Pin
3.750	12.3	80017086	2⅞	6	2⅜ PAC Box
3.875	12.4	80017526	2⅞	6	2⅜ PAC DSI Pin
3.875	12.4	80017523	2⅞	6	2⅜ PAC Box
3.900	12.4	80017525	2⅞	6	2⅜ PAC DSI Pin
3.900	12.4	80017522	2⅞	6	2⅜ PAC Box
4.000	12.4	80017524	2⅞	6	2⅜ PAC DSI Pin
4.000	12.4	80017521	2⅞	6	2⅜ PAC Box
4.125	12.6	80017708	2⅞	6	2⅜ PAC DSI Pin
4.125	12.6	80017709	3⅜	6	2⅜ PAC DSI Pin
4.125	12.6	80017704	2⅞	6	2⅜ PAC Box
4.250	12.6	80017707	2⅞	6	2⅜ PAC DSI Pin
4.250	12.6	80017705	3⅜	6	2⅜ PAC DSI Pin
4.250	12.6	80017704	2⅞	6	2⅜ PAC Box
4.400	12.4	80017075	2⅞	6	2⅜ PAC DSI Pin
4.400	12.4	80017076	3⅜	6	2⅜ PAC DSI Pin
4.400	12.4	80017074	2⅞	6	2⅜ PAC Box
4.500	12.4	80017061	2⅞	6	2⅜ PAC DSI Pin
4.500	12.4	80017062	3⅜	6	2⅜ PAC DSI Pin
4.500	12.4	80017060	2⅞	6	2⅜ PAC Box
4.625	12.4	80017058	3⅜	6	2⅜ PAC DSI Pin
4.625	12.4	80017059	2⅞	6	2⅜ PAC DSI Pin
4.625	12.4	80017057	2⅞	6	2⅜ PAC Box
4.750	12.8	80017718	2⅞	6	2⅜ PAC DSI Pin
4.750	12.8	80017717	3⅜	6	2⅜ PAC DSI Pin
4.750	12.8	80017716	2⅞	6	2⅜ PAC Box
4.250	12.6	80017704	2⅞	6	2⅜ PAC Box
4.400	12.4	80017075	2⅞	6	2⅜ PAC DSI Pin
4.400	12.4	80017076	3⅜	6	2⅜ PAC DSI Pin
4.400	12.4	80017074	2⅞	6	2⅜ PAC Box
4.500	12.4	80017061	2⅞	6	2⅜ PAC DSI Pin
4.500	12.4	80017062	3⅜	6	2⅜ PAC DSI Pin
4.500	12.4	80017060	2⅞	6	2⅜ PAC Box
4.625	12.4	80017058	3⅜	6	2⅜ PAC DSI Pin
4.625	12.4	80017059	2⅞	6	2⅜ PAC DSI Pin
4.625	12.4	80017057	2⅞	6	2⅜ PAC Box
4.750	12.8	80017718	2⅞	6	2⅜ PAC DSI Pin
4.750	12.8	80017717	3⅜	6	2⅜ PAC DSI Pin
4.750	12.8	80017716	2⅞	6	2⅜ PAC Box

Venturi Jet Basket

FLEXIBILITY TO CUSTOMIZE DESIGN FOR EFFICIENT RETRIEVAL

The Venturi Jet Basket retrieves gun debris, metal, and other loose obstructions. Fluid pumped down the workstring is diverted through a jet nozzle in the upper section, creating a vacuum-like effect in the lower chamber; debris is sucked in and trapped above cages in the lower sub. Fluid is then filtered through the sub and returned to the annulus.

Applications

- Retrieval of gun debris, metal shavings, and other loose obstructions

Benefits

- Big-bore catcher sub to handle large pieces
- Extensions available to increase amount of retrievable debris
- Special milling shoe available to facilitate motor applications

Venturi Jet Basket

Wellbore Integrity
SOLUTIONS

Wellbore Integrity Solutions
1310 Rankin Road
Houston, Texas 77073 USA

Copyright © 2024 Wellbore Integrity Solutions. All rights reserved.

No part of this book may be reproduced, stored in a retrieval system, or transcribed in any form or by any means, electronic or mechanical, including photocopying and recording, without the prior written permission of the publisher. While the information presented herein is believed to be accurate, it is provided "as is" without express or implied warranty.

Specifications are current at the time of printing.

WIS-BR-MKT-031_rev12

wellboreintegrity.com

RED BARON | DRILCO | THOMAS TOOLS