DRILLING TOOLS INTERNATIONAL

PRODUCT CATALOG

STRENGTH | INNOVATION | PERFORMANCE

DRILLING TOOLS INTERNATIONAL

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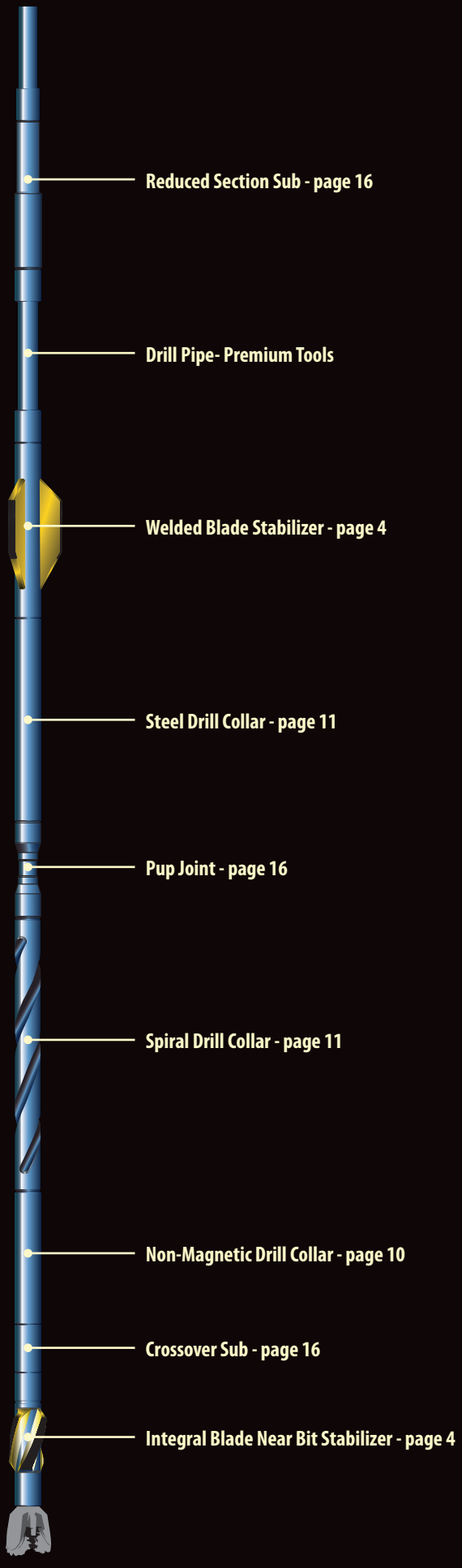


DRILLING TOOLS INTERNATIONAL

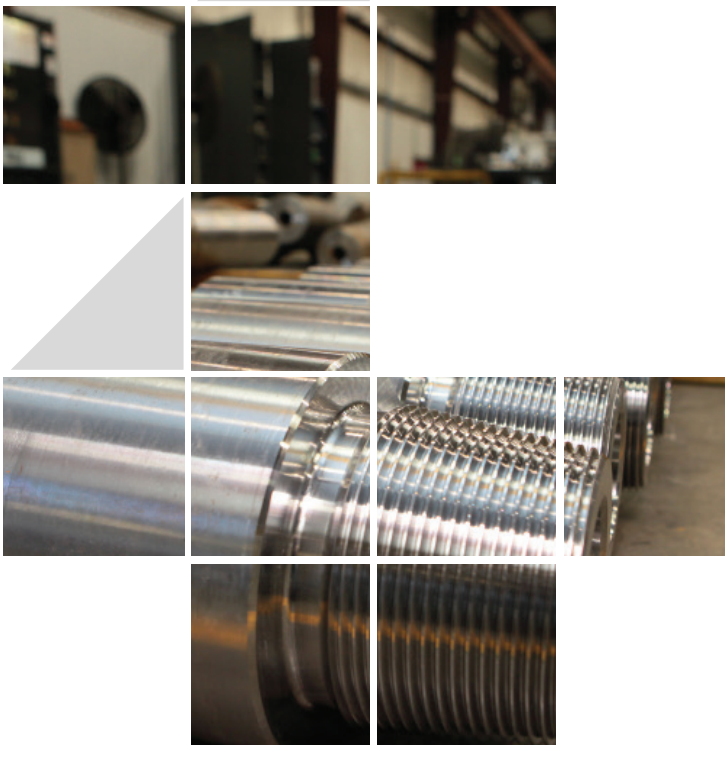
DRILLING TOOLS INTERNATIONAL: AN OVERVIEW

Since 1984, Drilling Tools International, Inc. has been the leading provider of downhole drilling tools to the global land and offshore markets. Our commitment to Strength, Performance, and Innovation is what separates us from our competition and drives us to deliver the most superior products and service.

With facilities strategically located throughout the world, we have the inventory and capacity to service our customers in a timely and efficient manner, 24 hours a day, 7 days a week. Our robust fleet includes a complete line of stabilizers, non-magnetic drill collars, pony collars, sub assemblies, steel drill collars, reamers, and drilling accessories.

Our goal is to exceed customer expectation with world class service and support while delivering reliable and innovative products for all drilling applications in today's market without compromising on performance. That is why Drilling Tools International is on the cutting edge of the oil and gas marketplace, developing performance enhancing tools specifically designed to improve drilling and production operations.

Drilling Tools International is committed to the safety of your employees and operations. We work diligently to ensure that we have identified and controlled exposures in our operations that can injure, interrupt production, or damage property, equipment, and material while remaining compliant with federal, state and local regulations.



DRILLING TOOLS INTERNATIONAL

MANUFACTURING, QA/QC, and ENGINEERING

Manufacturing

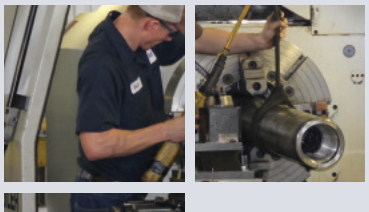
Located in Louisiana on a ten-acre site, our 30,500 square foot product center is a state-of-the-art manufacturing facility offering multiple hollow spindle lathes, CNC mills (accommodating up to 36" inch OD stabilizers), rack systems, lathes – both CNC and manual – and in-house drill collar spiraling services. Our product center also features a machine shop that can rework drill collars and heavy weight drill pipe; spiraling of drill collars, and anti-galling zinc phosphate application of threaded connections. We also have the ability to fabricate welded-blade stabilizers, provide stabilizer blade grinding up to 42" OD, and hardfacing in five different options which ensure precision and increase the life of your downhole tool. Our manufacturing center is committed to producing reliable, quality tools with unparalleled customer service. That's why more than 70% of our downhole tools utilized on international projects are from repeat customers.

QA/QC

Our Quality Management System is certified in compliance with ISO 9001 and API Spec Q1. Our manufacturing center is certified in API Spec 7-1 and complies with the threading and gauging requirements of API Spec 7-2. The scope of our API Spec 7-1 license includes the manufacturing of drill stem subs, drill collars, stabilizers, and threading for rotary shouldered connections. Our commitment to quality guides all of our processes starting with planning and process control to delivery. Our Quality Management System ensures that we consistently manufacture defect-free products and accessories on-time, every time.

Engineering Capabilities

Technical oversight of each product's specifications is provided by our in-house professional engineer and a team of technical staff. Models of each product are generated in 3D using the latest modeling software which are then used to create manufacturing drawings for shop use and inspections. The engineering and quality departments work hand-in-hand to ensure reliability and durability, as well as the efficient manufacturing of all DTI products. The engineering team is also involved in providing technical customer support and participating in forensic investigations.



Casper, WY

Charleroi, PA

Dubai, UAE

Broussard, LA

Midland, TX

Newfoundland, Canada

Oklahoma City, OK

DRILLING TOOLS INTERNATIONAL

FACILITIES and SERVICE CENTERS

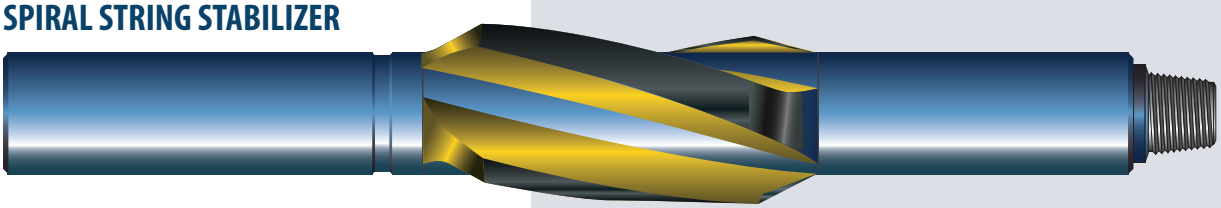
With eight domestic US facilities and three international locations, we are uniquely positioned to efficiently satisfy the needs of our customers. Due to our network of locations and inventory across the globe, we are able to deliver unsurpassed quality and 24/7 service. We understand how costly it can be when drilling operations are put on hold. That's why we work diligently to ensure our customers always have access to the products and tools that they need to complete their projects on time.

Through our state-of-the-art manufacturing facilities we are able to manufacture innovative and quality products to enhance your drilling performance. We also have the ability to refurbish and rent a wide variety of downhole tools and accessories for the global market.

Houston, TX

STANDARD STABILIZERS*

INTEGRAL BLADE SPIRAL STRING STABILIZER

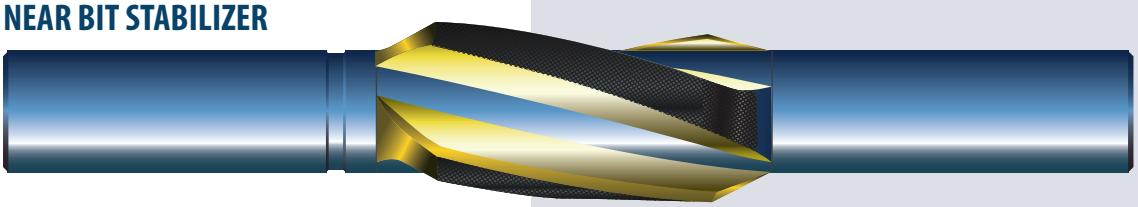


Used primarily in rotating application

Specifications

- Three blades x 270-degree wrap
- Longer crown lengths
- Typically highest total flow area (TFA)
- Most meet API 7-1 stabilizer dimensional requirements
- Hardfacing on crown and leading edges

INTEGRAL BLADE NEAR BIT STABILIZER

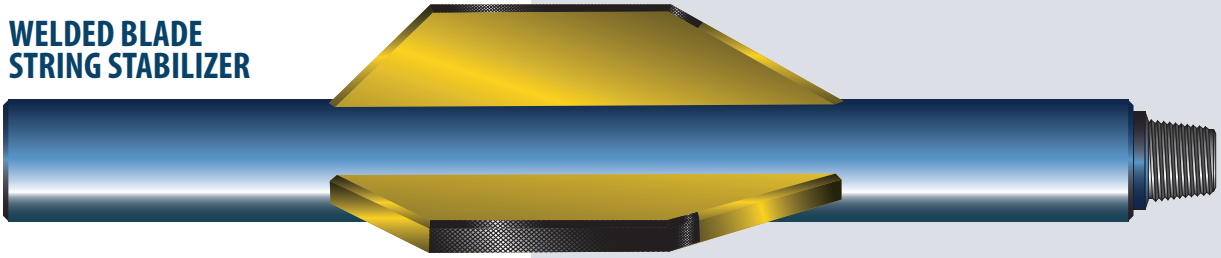


Only used at the bit

Specifications

- Like a three-blade spiral string, but with:
  - Box connections both ends
  - Bore for float on bottom end
- Typically highest total flow area (TFA)
- Most meet API 7-1 stabilizer dimensional requirements
- Hardfacing on crown and leading edges

WELDED BLADE STRING STABILIZER



For large diameter holes

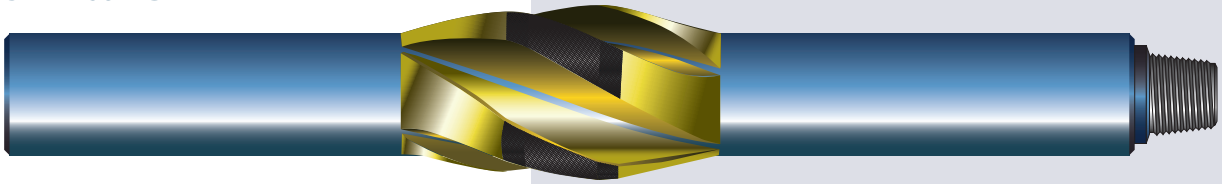
Specifications

- Three or four blades, usually straight
- Hardfacing on crown and leading edges

* There are other types of integral and welded stabilizers that are used less frequently

DIRECTIONAL and HORIZONTAL STABILIZERS*

INTEGRAL BLADE D-TRAC STABILIZER



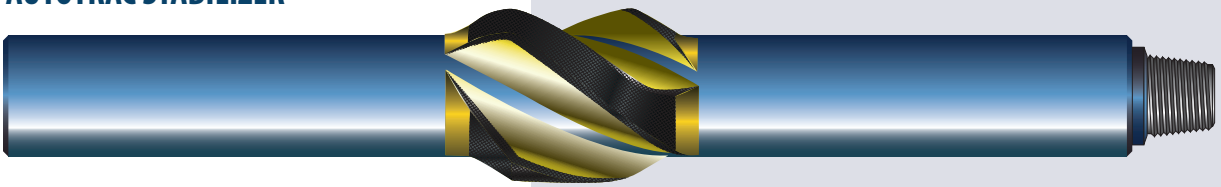
Integral blade spiral stabilizer with short crown length and long smooth taper angles

Used to reduce vibration and torque leading to great reliability of downhole tool life on MWD, LWD, Mud Motor, and RSS assemblies

Specifications

- Four or five blades x tighter spiral with 300–330 degrees
- Short crown length
- Low flow area (TFA)
- Smooth transitions each end of crown
- Hardfacing on crown and both leading and trailing taper angles
- Used in rotating and sliding applications (Used in both directional and horizontal applications)

INTEGRAL BLADE AUTOTRAC STABILIZER

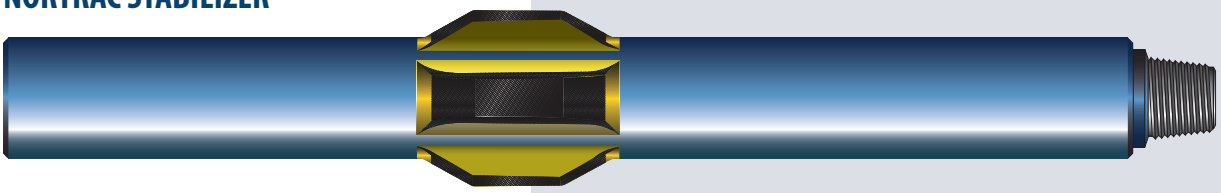


Integral blade spiral stabilizer with medium crown length and shorter taper angles

Specifications

- Three blades with 270-degree spiral
- Medium crown length
- Medium flow area (TFA)
- Hardfacing on crown and both leading and trailing taper angles
- Used in both directional and horizontal applications

INTEGRAL BLADE NORTRAC STABILIZER



Straight blade stabilizer used to maintain directional control during sliding operations

Specifications

- Three or four straight blades
- Short crown length
- Medium to high flow area (TFA)
- Hardfacing on crown and both leading and trailing taper angles
- Used in both directional and horizontal applications

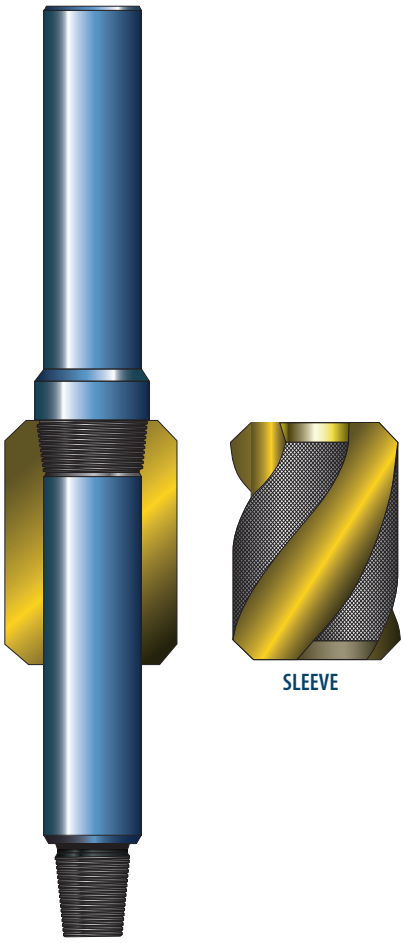
* There are other types of integral and welded stabilizers that are used less frequently

INTEGRAL BLADE STABILIZERS

Our integral blade stabilizer sets the standard in both directional and straight hole drilling applications. The all-in-one construction makes it an industry workhorse – able to perform in the most rugged and abrasive drilling conditions. Milled directly into a steel forging, the one-piece rotating stabilizer can be run near the bit or up in the drill string in soft to medium and abrasive formations.

With our unique hardfacing capabilities, this tool can be dressed with five hardfacing materials, including HF2000 for soft formations and HF3000 for non-magnetic stabilizers. In hard or abrasive formations, HF5000, HF6000 and HF6500 hardfacing will extend this tool's lifespan by 3x–5x longer making it a very economical choice.

Hole Size (in)	Standard DC Size (in)	Wall Contact (in)	Blade Width (in)	Fishing Neck Length (in)	Blade Undergage (in)	Overall Length (in)		Approximate Weight (kgs)
						String	Near-bit	
6″ – 6 ¾″	4 ½″ – 4 ¾″	16″	2 3/16″	28″	-1/32″	74″	70″	160
7 ⅝″ – 8 ½″	6 ½″	16″	2 ⅜″	28″	-1/32″	75″	70″	340
9 ⅝″ – 12 ¼″	8″	18″	3 ½″	30″	-1/32″	83″	78″	750
14 ¾″ – 17 ½″	9 ½″	18″	4″	30″	-1/16″	92″	87″	1000
20″ – 26″	9 ½″	18″	4″	30″	-1/16″	100″	95″	1800



RIG REPLACEABLE SLEEVE TYPE STABILIZERS and MANDRELS

Our sleeve stabilizers are the product of simple design coupled with engineered technology. We understand the need to swiftly change out a sleeve on the rig floor which is why our sleeve and mandrel design is virtually foolproof. Our one-piece mandrel is manufactured from high strength 4145 heat treated alloy with ample tong space for connection recuts.

Easily interchanged with other brands, our sleeve and mandrel design is long-wearing and extremely economical. When they wear out, they can simply be thrown away – a must for remote areas where there is limited access to a field shop and inventory must be kept light.

Due to our hardfacing abilities, our sleeves can be stocked in the same sizes to meet different formation demands while being interchangeable to fit the same mandrel.

- Easily changed out on the rig floor
- Sleeve and mandrel design is interchangeable with similar brands
- Sleeves can be discarded when worn out

SLEEVE SPECIFICATIONS

REAMCO Sleeve Series/Size	Hole Size or Blade O.D. Range (in)	Sleeve Body Diameter (in)	Sleeve I.D. (in)	Sleeve Length (in)	Blade Width (in)	Minimum Crown Length (in)	Maximum Sleeve Weight (lbs)
475	6 ¼″– 6 ¾″	5 ¾″	4 ¾″	14″	2″	12 ⅕″	43
625	8 ⅜″– 9 ⅞″	7 ½″	6 ¼″	14″	2 ½″	11 1⁄10″	84
775	8 ⅞″– 12 ¼″	9 ¼″	7 ¾″	18″	3″	14 ⅗″	162
775	10 ⅝″– 17 ½″	10″	7 ¾″	18″	3″	11 1⁄10″	294
963	12 ¼″– 17 ½″	11″	9 ⅝″	18″	3 ½″	11 9⁄10″	253

MANDREL SPECIFICATIONS

REAMCO Mandrel Series	Maximum Fishing Neck Diameter (in)	Mandrel Upset Diameter (in)	Sleeve End Diameter (in)	Fishing Neck Length (in)	Sleeve End Length (in)	Total Overall Length (in)	Bore I.D.		Maximum Mandrel Weight (lbs)
							Near Bit	String	
47	4 ¾″–5″	5 ⅛–5 ¾″	4 ¾″	23″	32″	62″	1 ½″	2 ¼″	302
62	6 ½″–7″	7 ½″	6 ¼″	23″	32″	62″	2 ¼″	2 13⁄16″	500
77	8 ¼″	9 ¼″	7 ¾″	27″	37″	71″	2 13⁄16″	2 13⁄16″	893
96	10″	11″	9 ⅝″	27″	37″	71″	2 13⁄16″	2 13⁄16″	1400

MAKE-UP TORQUE

Series	41	47	62	65	77	85	96
Make-up Torque (ft-lbs)	2000–2500	2000–2500	4500–5500	5000–6000	7000–8000	10000–12000	10000–12000

DRILLING TOOLS INTERNATIONAL

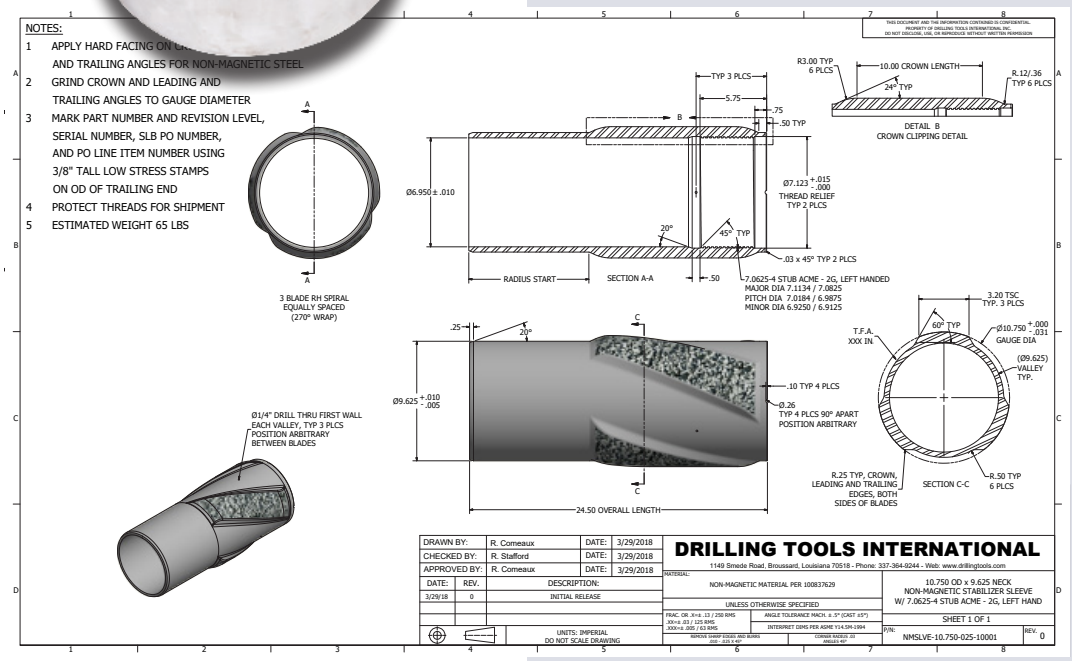
CUSTOM MOTOR / MWD and RSS SLEEVE STABILIZERS

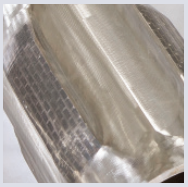
Using client supplied drawings and specifications, Drilling Tools International is able to manufacture any type of 4145 HT steel sleeve stabilizer or non-magnetic type sleeve.

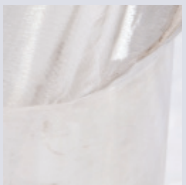
Utilizing our in-house engineering team and the latest 3D modeling software, we are also able to assist with the design process. Coupled with the latest CNC milling equipment we are able to produce any blade configuration or dimensional requirement a client might need.

With a large inventory of steel and non magnetic heavy wall tubing and custom forgings, we are able to deliver custom sleeves with relatively short lead times.

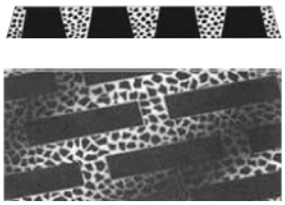
This ability coupled with the application or our latest hardfacing technology assures optimal run time and durability.



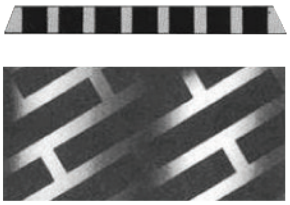




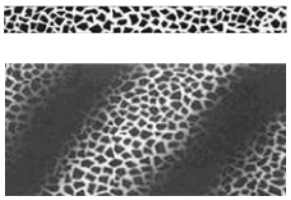
HF2000



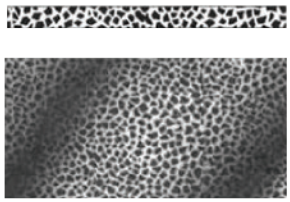
HF3000



HF5000



HF6000



HF6500

HARDFACING

To meet a variety of the most demanding drilling conditions, we offer hardfacings in five different options for our stabilizer blades. We are constantly working to develop improvements on wear characteristics and matrix hardness. Our extensive research has increased reliability in bonding. Each hardmetal is tailored to your specific needs and our expert application ensures exceptional resistance to wear and tear, prolonging the life of your tool.

HF2000

Geothermal hardfacing utilizes tungsten carbide bricks, brazed to the stabilizer blade and surrounded by tungsten impregnated composite rod.

HF3000

A hardfacing method that applies the maximum amount of premium tungsten carbide on any wear surface. It can be applied in varied thickness and uses tungsten carbide inserts to maximize abrasive and impact durability.

HF5000

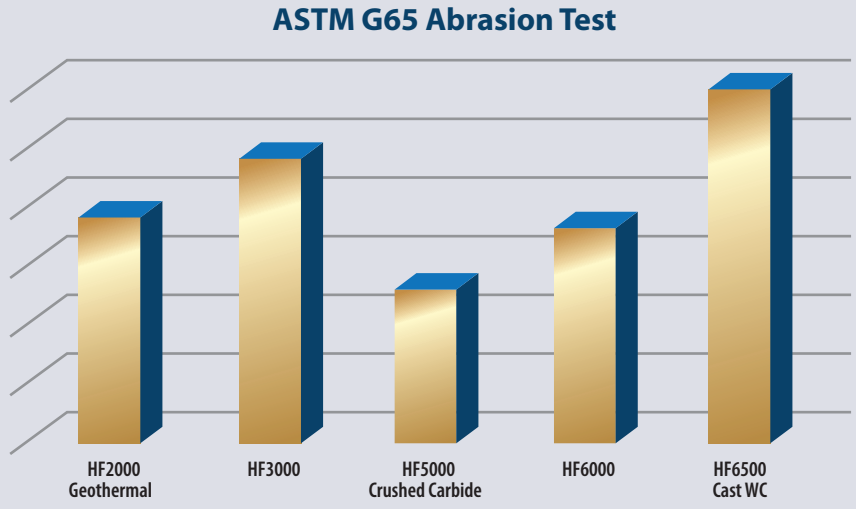
Most common hardfacing technique that utilizes crushed tungsten in a nickel bronze matrix for soft to medium drilling applications.

HF6000

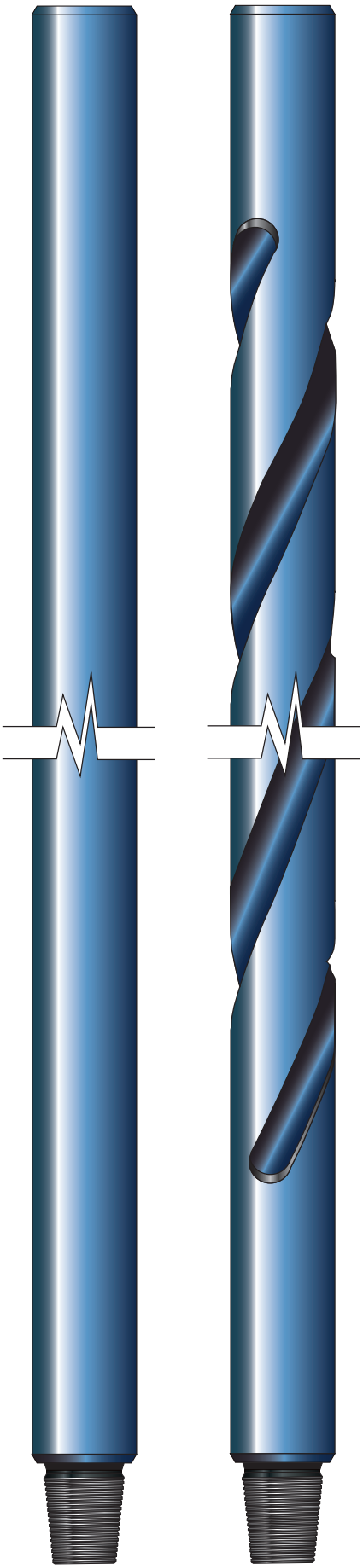
A premier hardfacing which suspends fine tungsten carbide pellets or crushed material in a hard, ferrous matrix. The matrix attains a hardness of approximately 45 HRC and is completely saturated with carbide. It is typically used with non-magnetic stabilizers due to lower application temperature.

HF6500

This slag-free material features a high density of hard-cast tungsten carbide particles evenly distributed in a nickel allow matrix. It offers exceptional resistance to abrasive and erosive particles with moderate impact and is applicable with all body materials. This matrix attains a hardness of approximately 55 HRC.



Abrasion testing completed per ASTM G65 – 16 using the dry sand/rubber wheel test method and quantitative values determined from adjusted weight loss.



NON-MAGNETIC SLICK DRILL COLLAR

NON-MAGNETIC SPIRAL DRILL COLLAR

NON-MAGNETIC DRILL COLLARS

As you drill in areas closer to the earth's magnetic poles, it is essential to use a non-magnetic drill collar. Our non-mag drill collars offer strength and hardness while neutralizing magnetic interference. Compatible with standard drill string tools and stabilizers, our non-mag drill collars are manufactured to API Spec 7-1. Inventory includes:

- Slick
- Flex
- Spiral
- Pony

We treat our non-mag material ID with a shot peening operation to compress the inside diameter which prevents stress corrosion while drilling in H_2S environments.

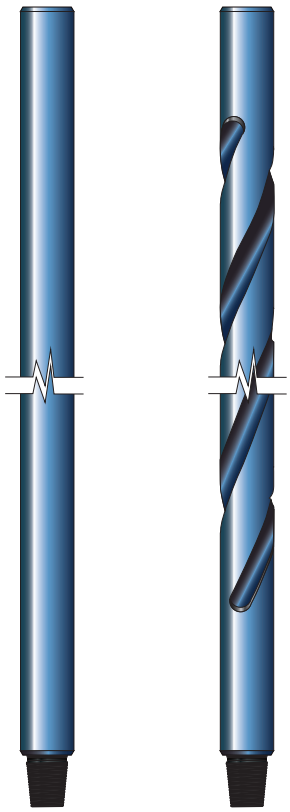
- Resistant to stress corrosion in sour gas environments
- Compatible with standard drill string tools and stablizers
- Spiraling available on request

MECHANICAL PROPERTIES

Room Temperature. ASTM A 370					
Drill Collar OD Range (in)	Min. Yield Strength (at 0.2%)	Min. Tensile Strength	Min. Elongation %	Min. Reduction %	Impact Test CHARPY V. notch
	MPa PSI	MPa PSI			J (min.) ft-lbs(min.)
3 ½" through 6 ⅞"	760 110 000	900 130 000	25	50	81 60
7" through 11"	690 100 000	830 120 000	25	50	
Larger than 7"	620 90 000	760 110 000	25	50	

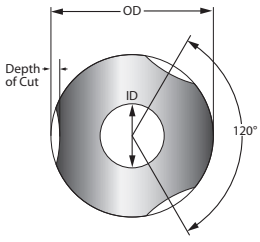
SPECIFICATIONS

Common Connections	OD (in)	ID (in)	Approximate Weight (lbs)
2 ⅞ Reg	3 ½ to 3 ⅞"	1 ¼ to 1 ¾"	760–1114
3 ½ Reg	4 ⅛ to 4 ½"	1 ¼ to 2 ¼"	989–1490
3 ½ IF NC38	4 ¾ to 5 ½"	1 ¾ to 2 13/16"	1350–2250
4 FH NC40	5 to 6"	1 ¾ to 2 13/16"	1552–2726
4 ½ FH	5 ½ to 6 ½"	2 to 3"	1759–3166
4 ½ XH NC 46	5 ¾ to 6 ¾"	2 ¼ to 3"	1992–3352
4 ½ IF NC 50	6 ¼ to 7 ½"	2 ¼ to 3 ¼"	2359–4237
5 ½ FH NC 56	7 to 7 ¾"	2 ¼ to 3 ¼"	3182–4552
6 ⅝ Reg	7 ¼ to 8"	2 ½ to 3 ¼"	3476–4780
6 ⅝ FH	7 ½ to 8 ¼"	2 ½ to 3 ¼"	3782–5116
7 ⅝ Reg	8 ½ to 9 ½"	2 ½ to 3 ¾"	4816–6953

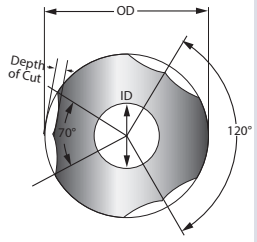


SLICK DRILL COLLAR

SPIRAL DRILL COLLAR



7" OD and Less



7-1/4" OD - 12" OD

We can provide you with the technical assistance necessary to assist you in properly using drill collars in the bottom hole assembly.

- Stress relieved connections
- Spiraling on OD (RH standard)
- Hardbanding
- Slip and elevator recesses
- Manufactured to DS-1 specifications

MECHANICAL PROPERTIES

(4145 H Modified)		
Ultimate tensile strength (UTS)	PSI Mpa	135,000 to 140,000 938 to 973
Yield Strength (YS)	PSI Mpa	100,000 to 110,000 695 to 764
Elongation (L = 4 D)	%	13 min
Reduction of area	%	45 min
Impact strength (ASTM A 370 Charpy - V)	J	52 min
Hardness (Brinell) (one inch below surface)	BHN	285 to 341

STEEL DRILL COLLARS

Used to add weight to the bit and stiffness to bottom hole assembly, our drill collars are an invaluable downhole tool.

To keep you drilling in the right direction, run our drill collars in combination with our stabilizers to resist buckling. Manufactured from an AISI 4145H modified heat treated alloy steel, our strict quality assurance guidelines assure metallurgical integrity of each and every bar.

Our drill collar bars are batch or continuous line heat treated and have both cold-worked and phosphate coated connections.

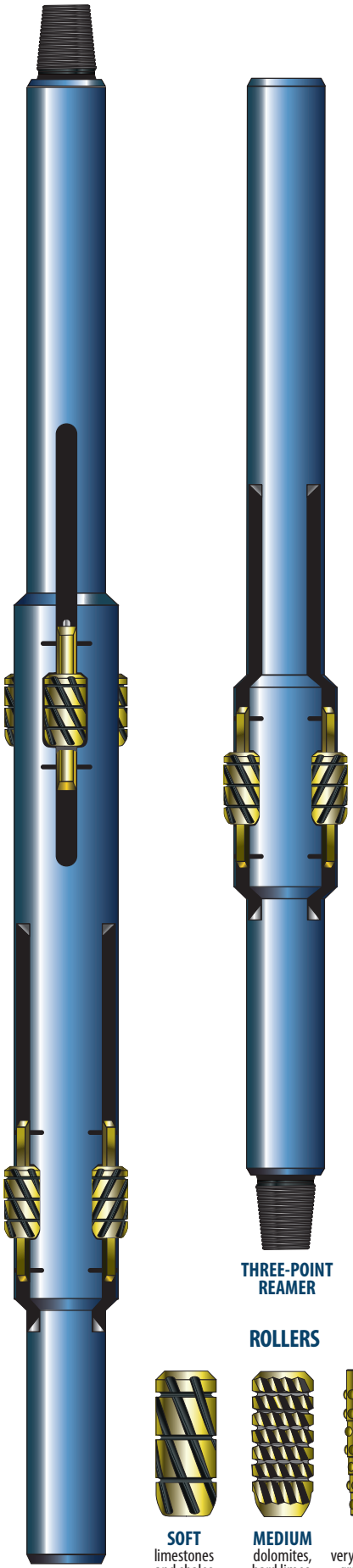
STANDARD SPECIFICATIONS FOR SLICK OR SPIRAL DRILL COLLARS

O.D. (in)	I.D. (in)	Weight in Air (lbs)	Unit Weight (lbs/ft)	Standard End Connections
3 ½"	1 ½"	826.8	26.7	NC-26 thru 35
4 ⅛"	2"	1076.2	34.7	NC-31 thru 41
4 ¾"	2 ¼"	1447.0	46.7	NC-38 thru 47
5"	2 ¼"	1648.5	53.2	NC-38 thru 50
6"	2 ¼"	2558.0	82.5	NC-44 thru 60
6"	2 13/16"	2322.3	74.9	NC-44 thru 60
6 ¼"	2 ¼"	2811.2	90.7	NC-44 thru 62
6 ¼"	2 13/16"	2575.6	83.1	NC-46 thru 65
6 ½"	2 ¼"	3074.8	99.2	NC-46 thru 65
6 ½"	2 13/16"	2839.1	91.6	NC-46 thru 65
6 ¾"	2 ¼"	3348.7	108.0	NC-46 thru 67
7"	2 ¼"	3632.9	117.2	NC-50 thru 70
7"	2 13/16"	3397.2	109.6	NC-50 thru 70
7 ¼"	2 13/16"	3691.8	119.1	NC-50 thru 72
8"	2 13/16"	4637.5	149.6	6 5/8 Reg
8 ¼"	2 13/16"	4973.4	160.4	6 5/8 Reg
9 ½"*	3"	6718.0	216.7	7 5/8 Reg
9 ¾"*	3"	7116.0	229.5	7 5/8 Reg
11"*	3"	9260.6	298.7	8 5/8 Reg

*low torque face available

RECOMMENDED SLIP AND ELEVATOR RECESS DIAMETERS FOR DRILL COLLARS

Collar O.D. (in)	Elevator Recess Dia (in)	Slip Recess Dia (in)	Elevator Recess Radius (in)	Top Elevator Bore (in)	Lower Half Elevator Bore (in)
4 ⅛"	3 11/16"	3 ¾"	⅛"	3 13/16"	4 ¼"
4 ¾"	4 ¼"	4 3/8"	⅛"	4 3/8"	4 7/8"
5"	4 ½"	4 5/8"	⅛"	4 5/8"	5 ⅛"
6"	5 3/8"	5 ½"	⅛"	5 ½"	6 ⅛"
6 ¼"	5 5/8"	5 ¾"	⅛"	5 ¾"	6 3/8"
6 ½"	5 7/8"	6"	⅛"	6"	6 5/8"
6 ¾"	6"	6 ¼"	3/16"	6 3/16"	6 7/8"
7"	6 ¼"	6 ½"	3/16"	6 7/16"	7 ⅛"
7 ¼"	6 ½"	6 ¾"	3/16"	6 11/16"	7 3/8"
8"	7 ¼"	7 ½"	3/16"	7 7/16"	8 ⅛"
8 ¼"	7 ½"	7 ¾"	3/16"	7 11/16"	8 3/8"
9 ½"	8 5/8"	9"	¼"	8 7/8"	9 5/8"
9 ¾"	8 7/8"	9 ¼"	¼"	9 ⅛"	9 7/8"
11"	10 ⅛"	10 ½"	¼"	10 3/8"	11 ⅛"



ROLLER REAMERS

We manufacture, sell, and rent roller reamers in three-point and six-point configurations. Another versatile downhole drilling component, roller reamers complement our broad range of downhole stabilization products. They can be used in straight and directional drilling applications when a side wall cutting action is necessary and/or for point stabilization near the bit or further up in the drill string.

Our roller reamers make the difference downhole when used to maintain hole gauge, wipe out key seats, and smooth out rough and troublesome ledges which will cause the drill stem to stick and bind. Our roller reamers also help to reduce drill stem torque in highly deviated (horizontal) boreholes and can greatly assist the operator in maintaining drill stem stability.

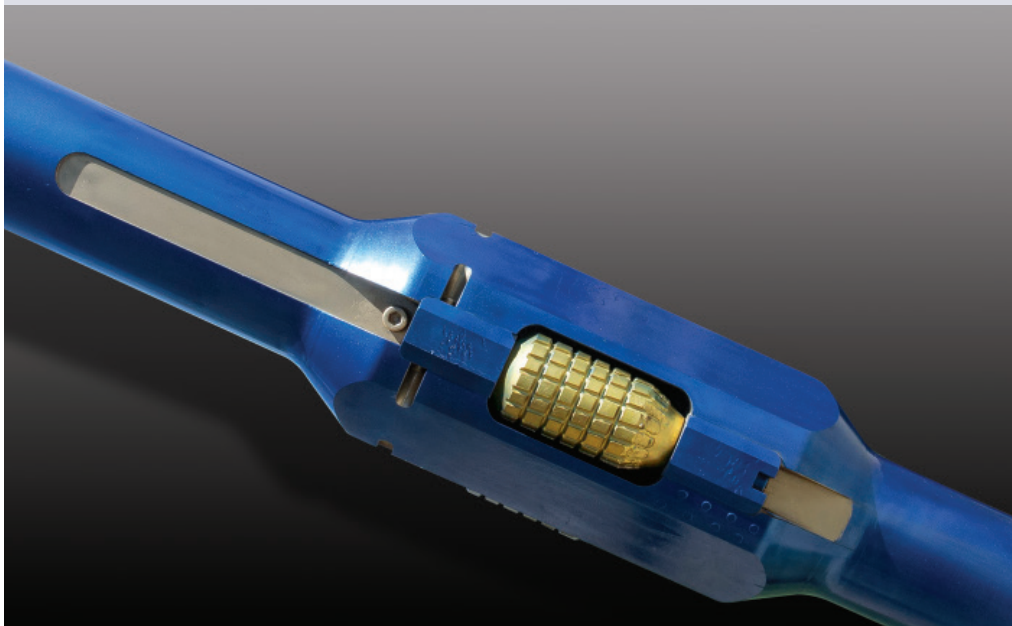
You have the flexibility to use the style that suits your drilling needs best and provides you with the maximum reaming and side wall cutting action. Combining three or six point stabilization with reaming keeps the hole to size, the bit on track, and ensures smoother drilling operations.

- Available in soft, medium, hard, and smooth
- Available in three-point and six-point configurations
- Cutters can easily be replaced on rig floor

Heat treated and machined with precise dimensional control, our roller reamer parts are inspected in the pre- and post- manufacturing process phases and checked again for conformance to interchangeability needs and requirements.

SEALED BEARING ROLLER REAMER

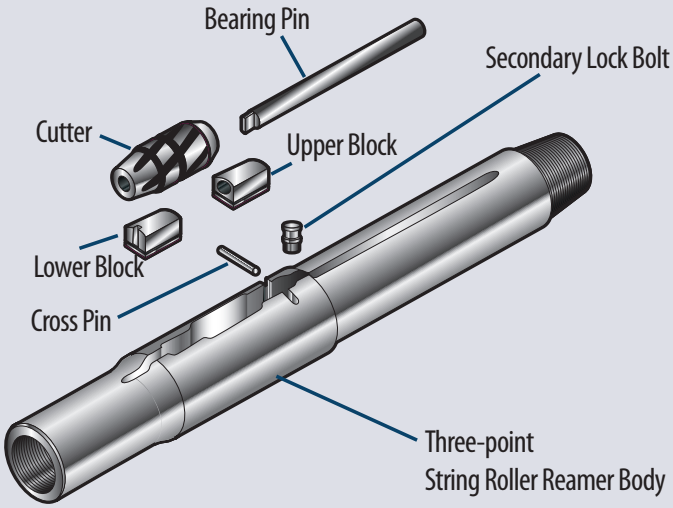
The improved reliability of a sealed bearing cutter and compression fit blocks has helped mitigate the effects of side load impacts and effectively withstands the high rates of rotation placed on the reamer during drilling. Adding the seals to the cutter has allowed us to meet customers performance expectations and provide a value competitive product in the high-performance reamer market.



ROLLER REAMERS ORDERING INFORMATION:

To order spare parts or to request quotes on complete reamer assemblies, please specify:

- Three- or six-point style
- String or nearbit application
- Roller cutter type
- Connections top and bottom
- Preferred fishing neck diameter and length
- Hole size
- Reamer inside diameter
- Bore for float



SPECIFICATIONS

Hole Size (in)	Roller Reamer Series	Upset Diameter (in)	Maximum Fishing Neck Diameter (in)	Maximum Inside Diameter (in)	Overall Length		Block Size	Bearing Pin Size (in)	Cross Pin Size OD x Length	Cutter Size (in)	Secondary Locking Bolt OD x Length	Assembly Weight	
					3PT (lbs)	6PT (lbs)						3PT (lbs)	6PT (lbs)
4 1⁄8″	R3750	3.75″	3 1⁄2″	1.000″	48	74	3/4A	3⁄4″	1⁄4″ x 1 3⁄4″	1 3⁄8″	N/A	150	200
4 5⁄8″	R4250	4.25″	4″	1.000″	48	74	7/8A	7⁄8″	1⁄4″ x 1 3⁄4″	1 1⁄2″	N/A	300	400
4 3⁄4″	R4250	4.25″	4″	1.000″	48	74	7/8B	7⁄8″	1⁄4″ x 1 3⁄4″	1 1⁄2″	N/A	300	400
5 5⁄8″	R5000	5.00″	4 1⁄2″	1.000″	79	114	1A	1″	6⁄16″ x 2″	2″	N/A	350	600
5 7⁄8″	R5000	5.00″	4 1⁄2″	1.000″	79	114	1C	1″	5⁄16″ x 2″	2″	N/A	350	600
6″	R5500	5.50″	5″	1.250″	79	114	1A	1″	5⁄16″ x 2″	2″	1⁄2″ x 1⁄2″	425	700
6 1⁄8″	R5500	5.50″	5″	1.250″	79	114	1B	1″	5⁄16″ x 2″	2″	1⁄2″ x 1⁄2″	425	700
6 1⁄4″	R5500	5.50″	5″	1.250″	79	114	1C	1″	5⁄16″ x 2″	2″	1⁄2″ x 1⁄2″	425	700
6 1⁄2″	R5501	5.50″	5″	1.875″	79	114	1C	1″	5⁄16″ x 2″	2″	N/A	425	700
6 5⁄8″	R5501	5.50″	5″	1.875″	79	114	1D	1″	5⁄16″ x 2″	2″	N/A	425	700
6 3⁄4″	R5501	5.50″	5″	1.875″	79	114	1E	1″	5⁄16″ x 2″	2″	N/A	425	700
7 5⁄8″	R7001	7.00″	6 1⁄4″	2.250″	79	114	1 1/8A	1 1⁄8″	1⁄2″ x 2 1⁄2″	2 1⁄4″	1⁄2″ x 1⁄2″	750	1200
7 7⁄8″	R7001	7.00″	6 1⁄2″	2.250″	79	114	1 1/8C	1 1⁄8″	1⁄2″ x 2 1⁄2″	2 1⁄4″	1⁄2″ x 1⁄2″	750	1200
8 3⁄8″	R7751	7.75″	6 3⁄4″	2.250″	82	124	1 3/8A	1 3⁄8″	1⁄2″ x 2 1⁄2″	2 5⁄8″	1⁄2″ x 1⁄2″	950	1500
8 1⁄2″	R7751	7.75″	6 3⁄4″	2.250″	82	124	1 3/8B	1 3⁄8″	1⁄2″ x 2 1⁄2″	2 5⁄8″	1⁄2″ x 1⁄2″	950	1500
8 5⁄8″	R7751	7.75″	6 3⁄4″	2.250″	82	124	1 3/8B	1 3⁄8″	1⁄2″ x 2 1⁄2″	2 3⁄4″	1⁄2″ x 1⁄2″	950	1500
8 3⁄4″	R7751	7.75″	6 3⁄4″	2.250″	82	124	1 3/8C	1 3⁄8″	1⁄2″ x 2 1⁄2″	2 3⁄4″	1⁄2″ x 1⁄2″	950	1500
9 1⁄2″	R8750	8.75″	8″	2.250″	84	129	1 3/4A	1 3⁄4″	1⁄2″ x 3″	3 1⁄8″	1⁄2″ x 3⁄4″	1250	2000
9 5⁄8″	R8750	8.75″	8″	2.250″	84	129	1 3/4B	1 3⁄4″	1⁄2″ x 3″	3 1⁄8″	1⁄2″ x 3⁄4″	1250	2000
9 7⁄8″	R8750	8.75″	8″	2.250″	84	129	1 3/4D	1 3⁄4″	1⁄2″ x 3″	3 1⁄8″	1⁄2″ x 3⁄4″	1250	2000
10 5⁄8″	R9500	9.50″	8″	2.250″	84	129	1 3/4A	1 3⁄4″	1⁄2″ x 3″	3 1⁄4″	1⁄2″ x 3⁄4″	1300	2200
11″	R9500	9.50″	8″	2.250″	84	129	1 3/4D	1 3⁄4″	1⁄2″ x 3″	3 1⁄4″	1⁄2″ x 3⁄4″	1300	2200
12″	R10500	10.50″	10″	2.812″	89	140	2 1/4C	2 1⁄4″	1⁄2″ x 3 3⁄4″	4″	3⁄4″ x 3⁄4″	2000	3300
12 1⁄4″	R10500	10.50″	10″	2.812″	89	140	2 1/4E	2 1⁄4″	1⁄2″ x 3 3⁄4″	4″	3⁄4″ x 3⁄4″	2000	3300
13 3⁄4″	R11750	11.75″	10″	2.812″	89	140	2 1/4E	2 1⁄4″	1⁄2″ x 3 3⁄4″	4″	3⁄4″ x 3⁄4″	2200	3700
14 3⁄4″	R12750	12.75″	10″	2.812″	93	148	2 1/2A	2 1⁄2″	7⁄8″ x 4 3⁄4″	5 1⁄2″	1″ x 1″	2400	4400
15″	R12750	12.75″	10″	2.812″	93	148	2 1/2C	2 1⁄2″	7⁄8″ x 4 3⁄4″	5 1⁄2″	1″ x 1″	2400	4400
17 1⁄2″	R15000	15.00″	11″	3.000″	93	148	2 1/2E	2 1⁄2″	7⁄8″ x 4 3⁄4″	5 1⁄2″	1″ x 1″	2800	5500
18 1⁄2″	R16375	16.38″	11″	3.000″	93	148	2 1/2A	2 1⁄2″	7⁄8″ x 4 3⁄4″	5 1⁄2″	1″ x 1″	3300	6500
20″	R16375	16.38″	11″	3.000″	93	148	2 1/2M	2 1⁄2″	7⁄8″ x 4 3⁄4″	5 1⁄2″	1″ x 1″	3300	6500
24″	R2200	22.00″	11″	3.000″	100	N/A	3A	3″	7⁄8″ x 4 3⁄4″	7″	1″ x 2 1⁄2″	5000	N/A
26″	R2200	22.00″	11″	3.000″	100	N/A	3C	3″	7⁄8″ x 4 3⁄4″	7″	1″ x 2 1⁄2″	5000	N/A

Bladed Hole Opener
Devil Drill

HOLE OPENERS

Bladed Hole Opener – Devil Drill

The bladed hole opener is used for wellbore enlargement where roller cones are not necessary or applicable. Integral body construction provides extra strength. Blades are dressed with tungsten carbide chips and inserts for gauge protection. For use in reaming soft to hard formations. Hole sizes from 3-1/2" through 30".

IB PDC Devil-Drill

Enables the operator to use a rotating steerable directional system while simultaneously opening the hole.

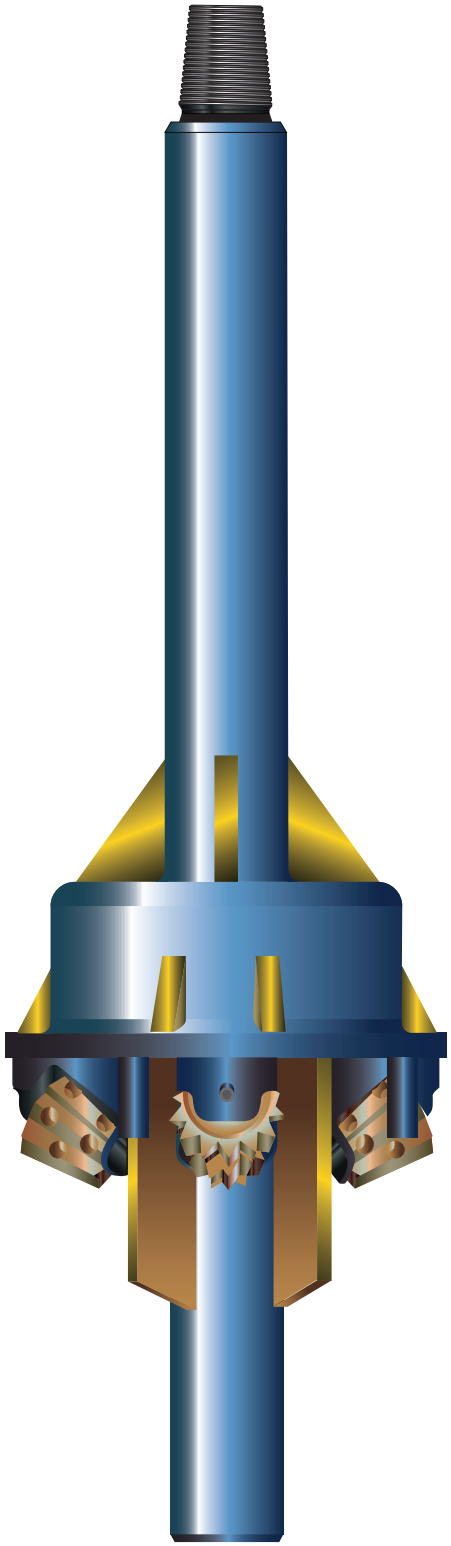
Devil Drill Features

- Machined out of AISI 4140HT/4145HT
- Blade structures may be integral spiral, integral straight, or welded straight
- Blades are dressed with tungsten carbide chips to allow for backreaming
- Slick blade OD helps reduce vibrations and ensures full gauge hole
- Three-field changeable jets allow for effective blade and hole cleaning
- May be box down, integral bull nose, or fitted with the spherical pilot bit
- Note: May be dressed with PDC

SPECIFICATIONS: DEVIL DRILL HOLE OPENER

Size Range	Pilot Hole Size	Standard Top Connection (Pin)	Standard Bottom Connection (Box)	Standard Bull Nose Length
3 ½" – 4 ¼"	3"	2 ⅜" Reg	2 ⅜" Reg/Bull Nose	24" – 42"
4 ⅜" – 4 ¾"	3 ¾"	2 ⅞" Reg	2 ⅞" Reg/Bull Nose	24" – 42"
5 ⅞" – 6 ⅞"	3 ⅞"	3 ½" Reg	3 ½" Reg/Bull Nose	36" – 42"
7 ½" – 8 ¾"	4 ¾"	4 ½" Reg	4 ½" Reg/Bull Nose	36" – 48"
9 ⅝" – 10 ⅝"	6 ¾"	6 ⅝" Reg	6 ⅝" Reg/Bull Nose	42" – 60"
12 ¼" – 13 ½"	8 ⅛"	6 ⅝" Reg	6 ⅝" Reg/Bull Nose	42" – 60"
14 ½" – 14 ¾"	8 ⅛"	6 ⅝" Reg	6 ⅝" Reg/Bull Nose	42" – 60"
17 ¼" – 17 ¾"	9 ⅞"	6 ⅝" / 7 ⅝" Reg	6⅝" / 7⅝" Reg/Bull Nose	42" – 60"
18 ½" – 26"	11 ½"	7 ⅝" Reg	7 ⅝" Reg/Bull Nose	42" – 60"

All measurements are in inches unless otherwise noted



Security Custom Hole Opener

HOLE OPENERS

Security Type Hole Opener

The security custom hole openers are designed to handle big-hole drilling projects, offshore well conductor holes and other drilling needs where speed and reliability are important.

Security Features

- Quick change cutter assembly to allow fast, easy changes on rig floor using hand tools
- High velocity jet circulation for efficient hole cleaning and longer cutter life
- "Nail-Lock" retained nozzles can be changed quickly and easily for matching particular pump capacities or hydraulics programs
- One piece body eliminates unnecessary threaded connections
- Cutters can be changed quickly and easily
- Cutter Types:
  - Type S: Tooth type for soft formations
  - Type MG: Tooth type for medium to hard formations. Carbide inserts for gauge protection, sealed bearing
  - Type S6: Insert type for soft to medium formations, sealed bearing
  - Type H8: Insert type for hard formations, sealed bearing
  - Type H10: Insert type for extremely hard, abrasive formations, sealed bearing

SECURITY CUSTOM HOLE OPENER SPECS

Popular Hole Sizes (in)	Recommended Pilot Hole (in)	Number of Cutter Saddles	Standard Top Connection (Pin)	Standard Bottom Connection (Box)
26"	14 ¾" – 17 ½"	3	7 ⅝" Reg	7 ⅝" Reg
36"	17 ½" – 26"	4	7 ⅝" Reg	7 ⅝" Reg
42"	26" – 36"	4	7 ⅝" Reg	7 ⅝" Reg

Sizes are most common, however security custom hole openers are available any size up to 42" with different saddle quantities and arrangements for varying pilot hole sizes.

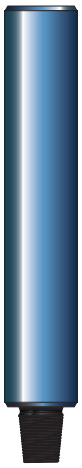
PUP JOINT

REDUCED SECTION SUB

Used to go from one diameter to another.

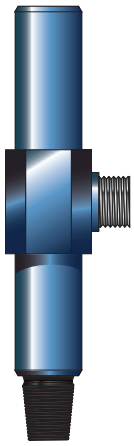
TOP DRIVE SAVER SUBS

Used to protect wear on the top drive system, these subs are manufactured to client specifications in any configuration from 4145 HT steel.

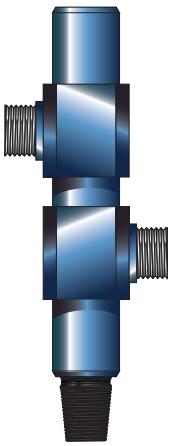


CROSSOVER SUB

Crossover subs adapt to different size drill pipe connections to drill collars, or drill collars to drill collars.



SINGLE SIDE-ENTRY SUB



DOUBLE SIDE-ENTRY SUB

PUP JOINTS

Key components in special drilling operations, our pup joints are manufactured from AISI 4145H alloy steel to meet API specifications. Our pup joints can be ordered with an 18-degree taper or square shoulder and with pressed or cast steel thread protectors.

PUP JOINT SPECIFICATIONS

Nominal Drill Pipe Size (in)	Standard End Connections	Tool Joint Dia (in)	Pipe I.D. (in)	Nominal Wall Thickness (in)	Elevator Upset Dia (in)	Tong Space Length (in)		Approximate Unit Weight (lbs/ft)
						Box	Pin	
3 ½″	NC-38	4 ¾″	2 ⅜″	9⁄16″	3 ⅞″	9 ½″	7″	33
	NC38	5″	2 11⁄16″	13⁄32″	3 ⅞″	9 ½″	7″	19
4″	NC-40	5 ¼″	2 13⁄16″	17⁄32″	4 3⁄16″	10″	7″	37
	NC-40	5 ½″	2 13⁄16″	17⁄32″	4 3⁄16″	10″	7″	24
4″	NC-40	5 ¾″	3 ¼″	⅜″	4 ½″	10″	7″	41
	NC-40	6″	3 ¼″	⅜″	4 ½″	10″	7″	28
4 ½″	NC-46	6″	3 ½″	⅝″	4 11⁄16″	10″	7″	50
	NC-46	6 ¼″	3 ¼″	⅝″	4 11⁄16″	10″	7″	32
4 ½″	NC-46	6 ⅛″	3 ½″	½″	5″	10″	7″	48
	NC-46	6 ¼″	3 ½″	½″	5″	10″	7″	28
	NC-46	6 ⅜″	3 ½″	½″	5″	10″	7″	30
4 ½″	NC-46	6 ⅛″	3 ¾″	⅜″	5″	10″	7″	43
	NC-46	6 ¼″	3 ¾″	⅜″	5″	10″	7″	23
	NC-46	6 ⅜″	3 ¾″	⅜″	5″	10″	7″	26
5″	NC-50	6 ⅜″	3 ½″	¾″	5 ⅛″	10″	7″	58
	NC-50	6 ½″	3 ½″	¾″	5 ⅛″	10″	7″	33
5″	NC-50	6 ⅜″	3 ¾″	⅝″	5 ⅛″	10″	7″	53
	NC-50	6 ½″	3 ¾″	⅝″	5 ⅛″	10″	7″	28
6 ⅝″	6 ⅝″FH	8 ¼″	4 ¾″	15⁄16″	6 ¾″	10″	7″	25.20
	6 ⅝″FH	8 ½″	4 ¼″	1 3⁄16″	6 ¾″	10″	7″	27.70

ROTARY SUBS

Drilling Tools International offers cross-over subs, top driver saver subs, and bit subs for any drill string connection size and function need. Manufactured from alloy heat treated steel, our subs meet API specifications.

INTEGRAL SIDE-ENTRY SUBS

INTEGRAL SINGLE SIDE-ENTRY SUBS

OD (in)	ID	Connection Size	Overall Length
4 ¾″	As required	As required	42″
6 ½″	As required	As required	42″
6 ¾″	As required	As required	42″
7″–7 ¼″	As required	As required	42″
8″–8 ¼″	As required	As required	42″
8 ½″	As required	As required	42″

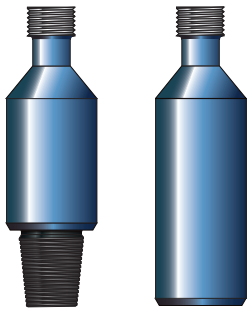
All single side-entry subs are integral one-piece design tested to 1 ½ times safe working pressure.

INTEGRAL DOUBLE SIDE-ENTRY SUBS

OD (in)	ID	Connection Size	Overall Length
4 ¾″	As required	As required	54″
6 ½″	As required	As required	54″
6 ¾″	As required	As required	54″
7″–7 ¼″	As required	As required	54″
8″– 8 ¼″	As required	As required	54″
8 ½″	As required	As required	54″

All double side-entry subs are integral, one-piece design tested to 1 ½ times safe working pressure.
Designed with a solid ID on one end made to pump thru or pressure test

INTEGRAL CIRCULATING SUBS, LIFT SUBS, STEEL THREAD PROTECTORS/LIFT BAILS, and LIFT CAPS

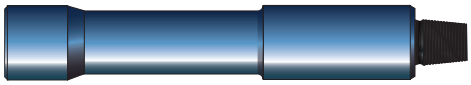


CIRCULATING SUBS

INTEGRAL CIRCULATING SUBS OR PUMP-IN SUBS

OD (in)	ID	Connection Size	Overall Length
4 ¾″	2″	As required	18″
6 ½″	2″	As required	18″
6 ¾″	2″	As required	18″
7″ – 7 ¼″	2″	As required	18″
8″ – 8 ¼″	2″	As required	18″
8 ½″	2″	As required	18″

Circulating subs are made with a pin or box connection and includes a WECO figure 1502 union. All circulating/pump-in subs are integral, one-piece design.



LIFT SUB

LIFT SUBS

Drilling Tools International lift subs are manufactured from heat treated AISI 4145H alloy steel. Upon request, connection threads can be kemplated to prevent galling during make-up.

For handling ease while tripping, lift subs are screwed into the drill collar and used to lift the collars from the hole. The sub's elevator recess and connections are machined to fit the elevator and drill collar connections.

LIFT SUB DIMENSIONS

Drill Collar Size (in)	Approx Weight (lbs)
3 ½″	40
4 ⅛″	50
4 ¾″	84
5″	88
6″	150
6 ¼″	168
6 ½″	168
6 ¾″	168
7″	169
7 ¼″	167
8″	257
8 ¼″	257
9 ½″	320
9 ¾″	320
11″	368

PIN LIFT BAIL

BOX LIFT BAIL

THREAD PROTECTORS

LIFT CAP BOX CONNECTION

LIFT CAP PIN CONNECTION

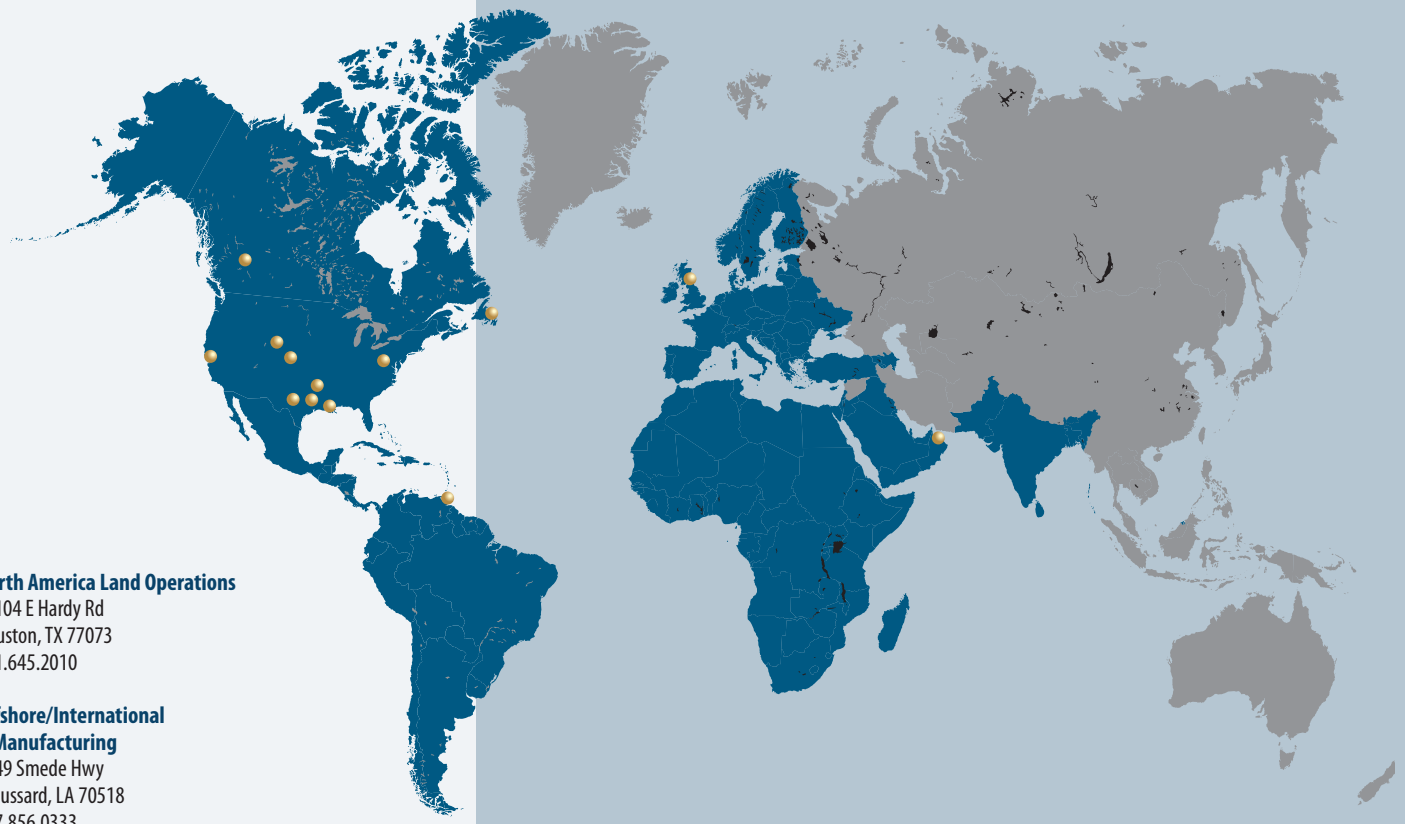
LIFT CAPS

LIFT BAIL DIMENSIONS

Connection Size and Type	Max. Drill Collar Size (in)	Pin Protector Weight (lbs)	Box Protector Weight (lbs)
NC 23	3 ½″	6	6
2 ⅜ Reg		6	6
NC 26		6	6
2 ⅜ IF		6	6
2 ⅞ IF	4 ⅜″	9	9
2 ⅞ XH		9	9
NC 31		9	9
3 ½ Reg		9	9
NC 35	5 ⅛″	12	12
3 ½ XH		12	12
NC 38		12	12
3 ½ IF		12	12
3 ½ H-90	5 ¾″	15	15
NC 40		15	15
4-FH		15	15
4 H-90	6 ¼″	21	21
4 ½ Reg		21	21
NC 44		21	21
4 ½ FH		21	21
4 IF	6 ¾″	20	20
NC 46		20	20
4 ½ H-90		20	20
5 H-90	7 ½″	23	23
5 ½ Reg		23	23
5 ½ H-90		23	23
NC 50		23	23
4 ½ IF		23	23
5 ½ FH	8 ¼″	33	33
6 ⅝ Reg		33	33
6 ⅝ H-90		33	33
NC 56		33	33
7 H-90	9″	32	32
NC 61		32	32
7 ⅝ Reg	10″	66	66
7 ⅝ H-90		66	66
NC 70		66	66
8 ⅝ Reg	11″	77	77
8 ⅝ H-90		77	77

DRILLING TOOLS INTERNATIONAL

What, Where, and When You Need Us



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Drilling Tools International, Inc. is a leading provider of downhole tools to the land and offshore drilling markets. For more than 30 years our company has been guided by the principals of Strength, Innovation and Performance. We consistently deliver world class customer service while providing quality products that meet the demanding drilling applications of today's market.

Our Quality Management System is certified in compliance to ISO 9001, and API Spec Q1 and our manufacturing is licensed to API Spec 7-1. Our Quality Management System governs all of our processes from planning, to process control, to delivery. This ensures that we consistently manufacture products that not only meet API standards but also meet the ever-changing needs of our customers.

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