



DSL

Drilling Services Limited



PROFESSIONAL DRILLING SERVICES AND EQUIPMENT



W E L C O M E

Drilling Services Limited was incorporated in 2002, servicing the Oil & Gas Industry and has expanded steadily, going from strength to strength with an extensive worldwide clientele from the UK, Europe, Vietnam, Nigeria, Cameroon, China, Dubai, Oman, India, Belize, Azerbaijan, Iraq, Kazakhstan and Saudi Arabia.

Drilling Services sources and supplies a wide range of Oilfield equipment from Mud Pumps, BOP's and Drill Collars to Fishing and Downhole Tools, spares and general oilfield supplies. We supply spare parts for manufacturers such as Gardner Denver, Emsco, Ideco, and are continually expanding to offer a wider supply range.

As procurement specialists, we can locate both Original Equipment Manufacture (OEM) and Non-Original Equipment Manufacturer (Non-OEM) components from reputable sources from across the globe, ensuring our clients get the best delivery and price available on the market, without detriment to quality.

Our services also include rentals, repairs and NDT inspections as per latest API Specifications.

Shipping out of the United Kingdom and the United States of America, our logistical service ensures all orders are inspected for quality and quantity compliance and despatched promptly to arrive at our client's designated destination in a timely manner.

With a sales team of over 50 years experience in the Oil and Gas Industry we are confident we can provide an efficient service to meet our client's requirements.

Please contact our experienced team with your specifications for a prompt competitive response or visit our website at www.drilling-services.co.uk where we hope you will find our services of interest.

We look forward to hearing from you.

C O N T E N T S

03	Fishing Tools
18	Downhole Oil Tools
25	Drilling Tools
32	Pump Parts
37	Kelly Valves
38	Instrumentation
47	Pressure Control
55	Cementing Equipment
59	Material Testing Equipment
79	Rental Equipment
80	Inspection
82	NDT Inspection

NOTES



7-1-0318



BAILER

- Ideal for removing loose debris from hole bottoms
- Simple and economical
- Sturdy, trouble-free design.

The bailer is a sturdy, simple tool which is ideal for removing sand and loose debris from well bottoms. It is particularly valuable when used to remove debris dislodged from the hole walls. The bailer has a double acting valve. The tool is also available in either a 5 or 10 foot operating stroke.



BALL CATCHER SUB

The Ball Catcher Sub is used to catch the ball and shear out ball seat in hydraulic liner hanger completion. It is installed below the type II landing collar, and is designed with a perforated baffle plate so that the ball and ball seat will be contained, yet cement will be able to pass through the ball catcher sub.



BLANKING PLUG

The basic purpose of a blanking plug is the prevention of flow in either direction to make possible wellhead workover, pressure testing of the tubing, or zone separation in multiple zone completions.

Blanking plugs have a built-in method of equalizing pressure across the tool and those listed on this page use proven chevron packing to seal off in the specially honed sealing bore of seating nipples.

BOLL MULTICONE HANGER

This hanger is set by reciprocation without rotation. Slips are retracted as long as dog springs attached to slips are restrained by a stop. Upon reaching setting depth the hanger is raised enough to engage the dog springs on a sliding sleeve. Then the liner is lowered, causing the dog springs to move over both the sliding sleeve and the stop. The slips move along cone segments and wedge against the casing to support the liner.



Multicone Single Core



CASING SCRAPER

Casing Scrapers are used to clean Mud, Rust, Mill Scale, Cement, Paraffin, and any other foreign material from inside the casing walls. These casing scrapers are manufactured from heat treated alloy steel. The scraper blades are arranged for complete 360 degree full circumference..

NOM. SIZE	CASING RANGE	A.P.I. CONN.	WT.
2-3/8"	2-3/8"	1-13/16" WILSON	12#
2-7/8"	2-7/8" - 3-1/2"	2-1/4" WILSON	21#
4"	4" - 4-1/4"	2-3/8" API REG.	60#
4-1/2"	4-1/2" - 5-1/2"	2-3/8" API REG.	85#
5-1/2"	5-1/2" - 6-5/8"	2-7/8" API REG.	110#
6-5/8"	6-5/8" - 8-5/8"	3-1/2" API REG.	190#
7"	7" - 8-5/8"	3-1/2" API REG.	190#
9-5/8"	8-5/8" - 13-5/8"	4-1/2" API REG.	380#
13"	13-3/8"	6-5/8" API REG.	690#
20"	20"	8-5/8" A.P.I. REG.	1,580#



CASING SWAGE

The Casing Swage is an economical method to swage or open collapsed casing. The tool is also used to make a swage run prior to running a production tool to make sure the casing I.D. is clear.

The tool has a long tapered nose which leads the tool through the damaged or collapsed section, and a tapered heel that leads back through the tight spot on retrieving the tool. Generous circulation slots are provided. In certain instances it may be necessary to run a succession of swages, each larger than the previous one, so as to gradually force the casing back to its original I.D.

The tool is usually run with a safety joint, drill collars, bumper subs and jars. Swages are available for all sizes of casing and tubing.



CEMENT VALVE

This valve is a pressure-operated valve used to provide a temporary circulating port to pump cement from inside the casing or liner to the annulus. The valve is held in the closed position with shear pins to prevent premature opening while running in the hole or circulating below the valve.

To open the valve, a ball or plug is landed below the valve; pressure is applied to the inside of the casing, shearing the screws and moving the spring loaded sleeve upward to open the ports.

The valve will remain open as long as pump pressure is being applied. When the pressure is released, the spring force moves the sleeve downward, closing the ports.



CIRCULATING VALVE

The Circulating Valve is run immediately above the liner setting tool. When run in the open position, it allows circulation to be established from above the liner. The valve is closed by set-down weight. With the valve closed, circulation is through the bottom of the liner.

The pump open shoe is generally run with the circulating valve to allow fluid to pass upward through the liner and out the circulating valve.

The increased fluid by-pass area greatly decreases the plunger effect on the open hole, and practically eliminated the chance of breaking down the formation due to plunger effect.

A flapper valve assembly is recommended whenever a pump is open.



CIRCULATING WASHER

"E" Type Circulating Washer

The "E" Type Circulating Washer is used for washing or acidizing perforations in casing or sand screens, for checking new perforations to establish injectivity and verify penetration, or to open a void being the casing for more effective gravel packing and sand consolidation.

It is a swab cup, straddle-type tool, incorporating proven washing tool characteristics, among the more important design features of the "E" type circulating washer are modular construction which permits rapid replacement of worn or damaged parts, and the ability to effectively reverse sand and debris off bottom.



COMBINATION PLUG DROPPING HEAD AND SWIVEL

The type 2 plug dropping head is made up in the top joint of the liner running-in string in any liner cementing operation. It is equipped with an elevator lifting neck and has a heavy duty swivel at its lower end to permit easy rotation of the running-in string. This type dropping head is used for 4", 4-1/2", and 5" drill pipe and 4-1/2" O.D. tubing.

The pump down plug is contained above a screw operated ram running across the body of the dropping head. Circulation ports above and below this ram make it possible to direct the fluid first below the ram and then, with the ram retracted, to the upper end of the pump down plug. An external manifold equipped with two full opening plug valves is normally standard equipment for directing the flow of current of drilling mud.

Type 1 plug dropping head and swivel is available for similar use for smaller sizes of drill pipe and tubing.



7-1-0318

Type A
Die CollarType B
Die Collar
with lipped
guideOversize
Guide

DIE COLLAR

Die Collars are the simplest fishing tool available for engaging a fish externally.

In operation, it is necessary only to run the die collar in the hole to the top of the fish, apply less than one point of weight and rotate sufficiently to embed the tapered threads of the die collar into the fish, cease rotation and pull the fish.



DRILLING DRAG TYPE UNDERREAMER

A drilling drag type underreamer is available. It will accommodate a standard rock bit to drill and underream simultaneously, and with a jet sub on bottom. This allows for good hole cleaning and bottom hole stabilization, as well as being able to wash the cutter arms

TOOL SERIES	STD OPENING DIA	BODY DIA	TOP PIN CONN API REG	WEIGHT LBS
4700	12	4-3/4"	2-7/8"	230
5700	16	5-3/4"	3-1/2"	350
7200	22	7-1/4"	4-1/2"	750
9500	28	9-1/2"	6-5/8"	1100
11000	36	11"	6-5/8"	1400



DRAG BLADE TYPE UNDERREAMER

Drag Type Underreamers are used in poorly consolidated soft to medium formations where large diameter intervals are required for gravel packing or cementing. It is also an effective tool for bell hole operations in fault zones. Pilot holes can be enlarged up to three times the body diameter in a single trip. These tools can be operated with water, mud, air, aerated mud, or any other circulating fluid. Low cost cutter arms are field replaceable and are dressed with Tungsten Carbide for good cutting action.

TOOL SERIES	STD OPENING DIA	BODY DIA	TOP PIN CONN API REG	WEIGHT LBS
3600	9	3-5/8"	2-3/8"	185
4700	12	4-3/4"	2-7/8"	230
5700	16	5-3/4"	3-1/2"	350
7200	22	7-1/4"	4-1/2"	750
9500	28	9-1/2"	6-5/8"	1100
11000	36	11-3/4"	6-5/8"	1400



FISHING BUMPER SUB

The Fishing Bumper Sub is a simple tool which is composed of only five parts. The hexagon-shaped mandrel slides into a similar shaped mandrel body to provide continuous torque capability. The standard 20" stroke of these tools is optimum for most purposes, but longer strokes can be furnished upon request.

The Fishing Bumper Subs are suited for all fishing operations. They will bump down, jar up, or help disengage a fish after retrieval.



ECONOMILL

Economills are a low-cost mill for light-duty milling jobs. Dressed with tungsten carbide it is an effective tool for milling packers, retainers, bridge plugs, and cement. Manufactured with standard api connections, the mill is made up and broken out with a standard bit breaker. No additional subs are required. Circulation is directed along each cutting blade and through the center of the head for proper cutting removal and cooling.

TOOL SERIES	DRESSED DIA.	TOP PIN CONN. API REG	OVERALL LENGTH IN.	WT LBS.	RECOMMENDED TORQUE FT/LBS
3000	3-1/4"-4-3/8"	2-3/8"	7-5/8"	17	3,000 - 3,500
4000	4-1/2" - 5-3/8"	2-7/8"	8-5/8"	26	6,000 - 7,000
5000	5-1/2" - 7-3/8"	3-1/2"	9"	40	7,000 - 9,000
7000	7-1-2"-8-3/4"	4-1/2"	11-1/2"	76	12,000 - 16,000
10000	10-1/4"-12-1/4"	6-5/8"	16-1/2"	125	28,000 - 32,000
12000	13"-16"	7-5/8"	18"	250	45,000 - 60,000



EQUALIZING CHECK VALVES

The use of check valves that will permit upward but not downward flow in the tubing. Equalizing check valve performs this function at any point in virtually any tubing string.

The check valves are for use with seating nipples or sliding sleeves; check valves for sealing off in the tubing id. All of the valves feature chevron packing for maximum dependability and have equalizing devices that can be opened for quick and easy equalizing of pressure across the tools before retrieving.

Models "fb-2" check valves are complete units (not control bottoms) used to run and land in "f" seating nipples.

The "fb-2" seats on the no-go shoulder of an "f" nipple. No-go shoulders prevent downward movement, but the valves are not locked into the nipples to prevent upward movement.

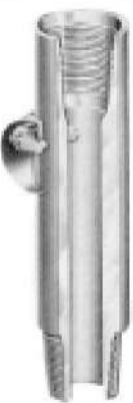


FISHING MAGNET

The Fishing Magnets are the best available special purpose fishing tools to retrieve undrillable objects having magnetic attraction. Small shaped items which cannot be caught by other conventional (inside or outside catch) fishing tools are readily attracted and retrieved by the fishing magnet.

These magnets are available in all common sizes from 1" O.D. through 14" O.D., and with all popular threaded pin connections, for both wire line and pipe operation. SST fishing magnets are capable of exerting pulls from 5 pounds to 3,000 pounds, depending on size. Full circulation may be maintained through these tools at all times during service.

Flat Bottom Guide



FLAG SUB

Flag Sub is placed in the liner drill pipe immediately below the plug dropping head and swivel.

The position of a flag proves that the pump down plug has been released from the head to move down the drill pipe.



HYDRAULIC SHORTY HANGER

Hydraulic Shorty Hanger is an economical medium-duty hanger for hanging liners of moderate length. The hanger is set with pressure applied to the drill string. A standard c-2 setting tool may be used to run and cement the liner.

However, a spacer nipple hanger and the setting sleeve to allow pressure applied to the drill string to enter the posts in the hydraulic hanger. Some method of temporarily plugging the liner below the hanger, such as a type 2 landing collar, must be provided so that pressure may be applied to the drill string.



FLAPPER VALVE ASSEMBLY

The flapper valve seal assembly is a sub placed in the liner string just above the hanger to provide a positive two-way seal at the top of the liner during cementing operations. The flapper acts as an added back-pressure valve to prevent cement from u-tubing once the stinger is removed.

The flapper valve seal system reduces piston effect (pressure acts on cross section of stinger only - not on the larger seal area); It is easily drilled or milled following the cementing operation.



7-1-0318

Stuckey's Specialty Tools

FISHING TOOLS AND SPECIALIZED EQUIPMENT



ISO 9001

FISHING TOOLS



GLOBE TYPE JUNK BASKET

The Globe Type Junk Basket is a simple but rugged and dependable fishing tool. Its simple construction, operation, and maintenance enables drilling crews to use and maintain it easily.

The Junk Basket assures through pick-up and retention of all types of junk because of the two free-revolving catchers. A variety of shoes are available for use with the junk basket. The Globe Type Junk Basket is composed of a barrel, shoe, upper catcher, and lower catcher.

The standard regular shoe –“r” will be furnished, unless otherwise specified. The shoe holds the two catchers or one magnet element and has milling teeth faced with conventional hard metal. Available options are shoes with sintered tungsten carbide - shoe “g”, the milling shoe “m”, and the finger type shoe.



GRANT TYPE CASING SCRAPER

This casing scraper excels in removing Cement, Bullet Burrs, and other foreign material before packers are set, swabs are run, and other completion work is performed. One size tool can be used in all weights of the size casing it is designed to scrape.

CONSTRUCTION

The Casing Scraper is unusually simple and rugged. Six cutters are held against the I.D. of the casing by heavy springs. They are so spaced that they cover the casing bore. The arrangement permits full fluid circulation. Helical blades efficiently shear foreign material from the casing bore whether the tool is rotated or used vertically. Cutting edges are faced with tungsten carbide.

Casing sizes to Run in (All Weights)	DIMENSIONS: IN. (")									
	4-1/2"	5"	5-1/2"	6-5/8"	7"	7-5/8"	8-5/8"	9-5/8"	13-3/8"	
Body Size No.	0375	0375	0450	0537	0537	0537	0650	0775	0775	
Max Scraping Size	4-1/8"	4-5/8"	5-1/8-5-3/8"	6-1/4"	6-1/4"	7-3/16"	8-3/8"	9-1/4"	12-7/8"	
Min. Scraping Size	3-3/4"	4"	4-5/8-4-1/2"	5-1/2"	5-1/2"	6"	7-1/4"	8-1/4"	11-7/8"	
Maximum Body O.D.	3-3/4"	3-3/4"	4-1/4-4-1/2-1/2"	5-3/8"	5-3/8"	5-3/8"	6-1/2"	7-3/4"	7-3/4"	
Shoulder to Shoulder	44"	44"	62-1/2-46-1/2"	49-1/4"	49-1/4"	49-1/4"	50-3/4"	47"	47"	
Max Circulation Hole Size	1"	1"	3/4-1-1/4"	1-1/2"	1-1/2"	1-1/2"	2-1/8"	2-1/4"	2-1/4"	
API Tool Joint and Box Connections.*	2-3/8"	2-3/8"	2-7/8"	3-1/2"	3-1/2"	3-1/2"	4-1/2"	4-1/2"-6-5/8"		



HOLE OPENER

The Hole Opener is designed for use on soft to medium-hard formations, soft clays and shales and medium limestone. The tool is particularly effective in sticky formations where balling problems are encountered.

The hole opener featured demountable cutters which are easily replaced on the rig floor.

The hole openers feature jets with replaceable diffuser nozzles behind each cutter to clean cutters, prevent balling and assure fast penetration.

On sizes 17-1/2" and larger, there are three additional jets with replaceable nozzles to assure effective hole cleaning.



HYDRAULIC CASING CUTTER

The Hydraulic Casing Cutter is a field proven tool for most single cut casing operations at precision depths. The cutter features hydraulically activated knives for smooth, efficient cuts and a built-in flo-tel which signals when the cut is completed.

The cutter is made up on the running string and lowered to the cutting depth. With the tool in position, the rotary is turned at the suggested cutting speed to establish a free torque figure. Rotation is continued and circulation is started through the tool. Circulation is increased to a rate that will produce an appropriate pressure drop across the cutter nozzle. Rotation is continued until a decrease in torque and a pressure drop indicate a successful cut has been made. The Casing Cutter is available in cutter O.D.'s from 5-1/4" to 16" and is capable of cutting a 60" diameter.

SIZE O.D.	CUTTING RANGE	TOP CONN.	WT.
5-1/4"	6-5/8" - 11-3/4" CSG	3-1/2" REG	250#
5-1/2"	7" - 13-3/8" CSG	3-1/2" REG	270#
5-3/4"	7" - 16" CSG	3-1/2" REG	270#
8-1/4"	9-5/8" - 30" CSG	6-5/8" REG	787#
11-3/4"	13-3/8" - 36" CSG	6-5/8" REG	1925#



HYDRAULIC SET MULTICONE MC HANGER

The multicone hangers are similar in design except for the method of setting. Each hanger has two staggered rows of slips, with three slip segments in each row. Staggered design provides large by-pass area for easy running and free circulation. Large distributed slip contact area reduces stress in the supporting casing.

This hanger is set by hydraulic pressure in the running-in string. The setting ball or setting plug lands below the hanger in a catcher sub. Fluid pressure acting on an annular piston drives the slips and wedges them between cone segments and casing wall. The liner may be moved during cementing by setting the hanger with pressure after the wiper plug lands.



HYDRAULIC SET PACKER

Hydraulic Set Packer is designed and built to be used in sour service, as a single packer, lower packer in multiple-packer hook-ups, using dual or triple string packers, or as an upper packer in selective single-string completions. It is set by applying a differential pressure to the tubing at the packer, and released by a straight pull on the tubing or rotating the tubing eight turns to the right at the packer.

Setting Procedure: The hydraulic set packer is set by pressuring the tubing at the packer. This can be accomplished by a blanking plug, ball seat, or hydro-trip sub, all of which must be located below the packer.

Minimum setting pressure will depend on the element system combination used; in general, 2500 psi will set any available element system.

Releasing: The hydraulic set packer provides two methods of release.

1. Shear release allows the packer to be released by simply pulling on the tubing string.
2. Rotational release permits the packer to be retrieved by tubing rotation. This is not an optional feature, but it is built into every packer.



HYDRAULIC SINGLE STRING PACKER

Model "HB" hydraulic single string packer is designed and built to be used in sour service, as a single packer, lower packer in multiple-packer hookups, using dual or triple string packers, or as an upper packer in selective single-string completions. It is set by applying a differential pressure to the tubing at the packer, and released by a straight pull on the tubing or rotating the tubing eight turns to the right at the packer.

Setting Procedure: The "hb" hydraulic single string packer is set by pressuring the tubing at the packer. This can be accomplished by a blanking plug, ball seat, or hydro-trip sub, all of which must be located below the packer.

Minimum setting pressure will depend on the element system combination used; in general, 2500 psi will set any available element system.

Releasing: The "hb" hydraulic single string packer provides two methods of release.

1. Shear release allows the packer to be released by simply pulling on the tubing string.
2. Rotational release permits the packer to be retrieved by tubing rotation. This is not an optional feature, but it is built into every packer.



HYFLO HANGER-PACKER

The need for a separate liner hanger and packer is eliminated by the combination hanger-packer. This tool is unusually compact and rugged. Large by-pass area for free circulation and low pressure drop while cementing is provided by the segmented design of slip cones.

The hanger-packer is available either with or without external hold-down slips; all have internal inner lock slips. A c-2 setting tool is used to lower the liner and the hanger-packer into the well and to compress the packer sealing element.



LANDING COLLAR

The landing collar is usually run in the liner one joint above the set shoe. It provides the seat and latch profile for the liner wiper plug.

Type I and type II landing collar with shear out ball seats are designed for fast drill out.



The type II landing collar has a sleeve shear pinned below the liner wiper plug catch section. A ball dropped from the surface seats in the sleeve to provide the pressure increase to set the hydraulic hanger. Additional pressure shears the pin; the ball and sleeve then drop to a baffle catcher sub.



7-1-0318



HYDRAULIC TUBING CUTTER

The Hydraulic Tubing Cutter is a ruggedly designed hydraulic tool that runs inside a smaller inner string and is able to cut multi-strings of pipe from production casing to conductor drive pipe. The tool is capable of cutting concentric or eccentric strings of pipe or casing. After the cutter arms are fully extended, a pressure drop is detected giving a positive cut-out indication. The cutter arms are dressed with Tungsten Carbide and can be easily replaced on the rig floor to accommodate the next size casing.

SIZE O.D.	CUTTING RANGE	TOP CONN. WT.
1-7/8"	2-7/8" - 3-1/2" TBG	1-13/16" WFJ 30#
2-1/4"	2-3/8" - 2-7/8" TBG	1-1/4" REG 35#
2-3/4"	3-1/2" - 4" TBG	1-1/4" REG 38#
3-1/2"	4-1/2" - 7" CSG	2-3/8" REG 65#
4-1/2"	5-1/2" - 8-5/8" CSG	2-7/8" REG 165#



HYFLO HANGER

The use of a liner hanger lands the liner in tension and insures free running of production tools and better cement jobs. Often cement plugs or bridge plugs can be eliminated for liners set on bottom. The liner hanger mandrels are the same I.D. and wall thickness as the liner.

The hyflo liner hanger can be used with any type liner packer, to suspend either a cemented or non cemented liner. Increased by-pass area for free circulation during cementing operations is provided by the splitting the slip cone into the segment.

The hanger is made up for left hand release and is set by picking up, turning to unlatch the jay and lowering the running-in string.



ITCO TYPE JUNK BASKET

The Itco Type Junk Basket is a simple but rugged and dependable fishing tool. Its simple construction, operation, and maintenance enables drilling crews to use and maintain it easily.

The junk basket assures thorough pick-up and retention of all types of junk because of the two free-revolving catchers. A variety of shoes are available for use with the junk basket. The itco type junk basket is composed of a barrel, shoe, upper catcher, and lower catcher.

The standard regular shoe -"r" will be furnished, unless otherwise specified. The shoe holds the two catchers or one magnet element and has milling teeth faced with conventional hard metal. Available options are shoes with sintered tungsten carbide - shoe "g", the milling shoe "m", and the finger type shoe.



JUNK MILL

Designed for use in milling up tools such as retainers, bridge plugs, and retainer type production packers that are cemented or stuck. Complete coverage is provided by the cutting surface dressing of tungsten carbide chips and matrix material. The location of the circulation ports allow for complete removal of cuttings and are highly resistant to impact loads.

The junk mills are supplied with flat or concave bottom and blades, or unbladed. The standard O.D. range covers from 1-7/8" to 13" or to any desired customer specifications.



K MILL TYPE (SECTION MILL)

Section Mills Cutter Arms are designed with a single blade. The blade is dressed with Tungsten Carbide Matrix to provide a rugged and durable cutting surface that results in economical milling.

The Six Cutter Arm Knives are two lengths, half for cut-out and all for milling. The cut-out begins as the arms are expanded by the piston when pressure is applied. Once the arms are fully open, the second set of arms automatically begins milling.

This Section Mill is provided with a flo-tel which provides the driller with a positive indication on the rig floor to know when the arms are fully open. This is indicated by a drop in pump pressure and followed by a pick-up in pump stroke.

TOOL SERIES	CASING SIZE	BODY DIA.	OVERALL LENGTH	TOP PIN CONN	WEIGHT LBS.
3600	4-1/2"	3-5/8"	56"	2-3/8"	135
4100	5"	4-1/8"	66"	2-3/8"	175
4500	5-1/2"	4-1/2"	68"	2-3/8"	190
5500	6-5/8 - 7"	5-1/2"	74"	3-1/2"	350
6100	7-5/8"	6-1/8"	74"	3-1/2"	368
7200	8-5/8 - 9-5/8"	7-1/4"	89"	4-1/2"	554
8200	9-5/8"	8-1/4" 6-5/8"	87"	4-1/2"	900
9200	10-3/4" 11-3/4"	9-1/4" 6-5/8"	87"	4-1/2"	980
11700	13-3/8"	11-1/2"	90"	6-5/8"	1725



LINER SETTING SLEEVE

The Setting Sleeve has a course thread matching the liner setting tools.

Right-hand rotation then releases the setting tool from the setting sleeve.

Various setting sleeve tie-back extensions are available to extend the liner back to the surface. They would be used with tie-back stems. (available with box down)



NON-PORTED SEATING NIPPLE

Seating Nipples provide the ideal location for any downhole flow control device.

The model "f" features a honed id dealing surface for use with chevron-type packing.

A locking-groove/shoulder combination in the upper end of the nipple accepts selective locks and no-go locks. Any number of "f" nipples can be used in one tubing string.



LINER HANGER PACKERS

The Hanger Packer is used when the liner is not to be cemented. As the liner is suspended, the seal is compressed to pack off against the casing. They serve both as hangers and as packers. The two types differ only in method of setting.

Type D is set by picking up, turning to unlatch the jay and lowering the running-in string. The type d boll weevil hanger packer is used where pipe rotation is impractical, as it is set entirely by vertical movement. To suspend and pack off the liner, the hanger packer is raised enough to engage the dog springs over the sliding sleeve, then the running-in string is lowered until the slips support the liner.



LINER PACKERS

The type pr and cr liner packers are weight set packers applied by the c-2 setting tool packer setting dogs. The pr packer differs from the cr in that it has hold down slips which prevent upward movement due to pressure from below. The type pr packer may be set before all cement is displaced so the remaining cement may be squeezed into the liner open hole annulus.

Types prl and crl are identical to pr and cr except that the sealing element is rubber with a lead retaining ring at each end. Type prl and crl are recommended for maximum depths and temperatures.

Any of the packers will provide a pack-off between the top of the liner and the casing.

The packer isolates the open hole and prevents reverse circulating pressure from acting on formation, thus preventing formation breakdown and loss of cement slurry. We highly recommend the use of a liner packer on offshore wells where safety is a primary consideration.



7-1-0318



MARINE SPEAR

The Marine Spear is an excellent companion tool with the casing / pipe cutter, stabilizer, and swivel conversion from one casing / pipe size to another is accomplished simply by changing the slip and guide rings using a basic mandrel and releasing mechanism.

The Marine Spear can be used as a bumper type spear (with a stop sub to restrict depth of spear engagement), or a stringer type which allows setting the spear at any depth.

The Marine Spear is manufactured from alloy heat treated steel with only a few parts subject to heat, thus providing indefinite performance. The Marine Spear is usually furnished in two basic tools to cover 7" through 9-5/8", 10-3/4", through 30" sizes.



MARINE SWIVEL

The Marine Swivel is used in conjunction with the Marine Cutter and non-rotating stabilizer. The swivel's primary use is to maintain the marine cutter at a desired location for a smoother and easier cut. The Marine Swivel is designed so that the thrust bearings are in an oil bath, which insures longer, trouble free operation. The swivel can be used with various landing adapters for all sizes of pipe from 13-3/8" to 30".

UPPER CONN.	LOWER CONN.	I.D.	O.D.	WT.
6-5/8" REG.	6-5/8" REG.	3"	12-1/4"	1095#



MODEL "S" LOCK

Model "s" is a selective lock in a model "f" seating nipple.

It is described as selective because it can be run through any number of seating nipples or sliding sleeves until the selected seating location is reached.

This lock has a standard-design external fishing neck and can be used with the various types of blanking plugs, chokes, equalizing check valves.



MECHANICAL CUTTER

The internal cutters are ruggedly built, efficient tools for cutting tubing, casing, or drill pipe. Sizes ranging from 1.900" tubing up to 20-3/4" casing are available. Internal cutters are manufactured to exacting standards of interchangeability, permitting relative ease of maintenance after use and the redressing of a basic assembly to cut alternate sizes of pipe.

The internal cutter is used to cut tubing, casing or drill pipe. It may be run on "macaroni" tubing, tubing or drill pipe, depending upon the diameter of the pipe to be cut.



NON ROTATING STABILIZER

The Non-Rotating Stabilizer is a specially designed stabilizer used with a marine cutter when cutting 20" or larger casing. The non-rotating stabilizer is positioned in the string directly above the cutter in order to center the cutter in the casing. The tool consists of four components: Top Sub, Body, Sleeve, and Blades. During rotation, the blades remain stationary and only the top sub and body rotates. The blades can easily be removed and installed for various sizes of casing. The non-rotating stabilizer is 12-1/4" O.D.



MILLING TOOLS

Through the use of one of our milling tools or plug plucker, permanent bridge plugs, cement retainers, and packers can be quickly and safely milled over and/or retrieved from the well.

Because only a very small portion of the plug, retainer, or packer ever needs to be milled out, and the milling shoes have been specifically designed to remove only the necessary sections, mill-out time is greatly reduced.

Cementing and treating work previously limited by the capabilities of retrievable plugs or packers can be done with high performance drillable tools since they can safely be removed following treatment.

MODEL "CJ" PACKER MILLING TOOL

For milling over permanent packers and retrieving the milled out packer from the well.



MULTICONE HANGER

Multicone Hangers are similar in design except for the method of setting. Each hanger has two staggered rows of slips, with three slip segments in each row. Staggered design provides large by-pass area for easy running and free circulation. Large distributed slip contact area reduces stress in the supporting casing.

This hanger has a jay latch which holds the slips in the retracted position. Upon reaching setting depth the hanger is raised a few inches and turned to unlatch the jay. Then the running-in string is lowered to transfer liner weight to the slip.



PACKER RETRIEVER SPEAR

The Packer Retriever Spear is interchangeable with the H-E Retriever Spear and is used in conjunction with the Packer Milling retrieving tool. The packer retriever spear is designed for the removal of or to mill through the packer. Due to its J-slot design the spear will remain at its proper catch position at all times.

The packer retriever spear is composed of four parts: Top Coupling, Mandrel, Slip, and Bull Nose Plug. The slips are available in all sizes to catch from 1-1/4" to 5" packers.



NON ROTATING CASING SCRAPER

The Non-Rotating Casing Scraper has been designed to meet the demands of complex wellbore cleanups and is better suited to current practice when performing pre-completion and work-over wellbore cleanup operations. The Non-Rotating Casing Scraper is recognized widely as a useful tool to assist mechanically in cleaning wellbore casings by removing large pieces of cement and burrs. The tool can be run as a stand-alone device or, more usually with circulating tools.

The Non-Rotating Casing Scraper consists of a one-piece main mandrel complete with non-rotating, blades covering 360 degrees. The main tool body rotates through blade housing so avoiding wear or damage to the casing during pipe rotation.

The blades are self-centralizing inside the pipe to ensure equal cleaning force at all angles of well inclination.

NOM. SIZE	CASING RANGE	A.P.I. CONN.
4-1/2"	4-1/2" - 5-1/2"	2-3/8" API REG.
5-1/2"	5-1/2" - 6-5/8"	2-7/8" API REG.
6-5/8"	6-5/8" - 8-5/8"	3-1/2" API REG.
7"	7" - 8-5/8"	3-1/2" API REG.
9-5/8"	8-5/8" - 13-5/8"	4-1/2" API REG.
13"	13-3/8"	6-5/8" API REG.



ORIFICE FLOAT COLLAR

The Orifice Float Collar makes up one joint above a tie-back stem or tie-back packer in the casing string which is being tied into a liner assembly. A drillable metal orifice is mounted in the rubber sleeve as shown. When going in the hole, the orifice prevents the rubber from closing completely and permits restricted fluid passage into the casing string.

This reduces plunger effect on the mud below the string. When adequate fluid volume is pumped through the orifice, pressure increase expands the rubber and the orifice pumped out to make a large opening for cementing.



PACKER TYPE CASING PATCH

The Packer Type Casing Patch is used to repair casing/tubing strings which have become damaged. To set the patch the casing is removed to a point below the damaged section. The top of the downhole casing is then dressed with a milling tool and the casing patch is run in over the casing remaining in the well to sufficient depth to engage the slip. The string is raised to engage the slip, compressing the rubber packing ring until a permanent seal is accomplished between the patch and the casing. After squeezing the packer, the casing is suspended in the well to keep it under tension.

The packer type casing/tubing patch permits fast, economical casing repairs without reducing the casing I.D. it comes in both regular and slim hole types.



7-1-0318



PACKER RETRIEVER SPEAR MILLING TOOL

The Packer Retriever Spear is interchangeable with the H-E Retriever Spear and is used in conjunction with the Packer Milling retrieving tool. The packer retriever spear is designed for the removal of or to mill through the packer. Due to its J-slot design the spear will remain at its proper catch position at all times.

The packer retriever spear is composed of four parts: Top Coupling, Mandrel, Slip, and Bull Nose Plug. The slips are available in all sizes to catch from 1-1/4" to 5" packers.

The Packer Milling and Retrieving tool will retrieve a packer in a single operation. The tool is designed to mill over any size bore packer, catching the operation. The packer milling and retrieving tool is capable of milling over the full bore packer, catching the packer and retrieving the packer in a single operation. The spear is also able to be released at any time during this operation.

The tool consists of: bushing, wash pipe extension, retrieving tool, and a rotary type milling shoe. The rotary type milling shoes are dressed with Tungsten Carbide and may be furnished in any type of configuration or size. The retrieving tool may be used to retrieve packer or various downhole equipment with bores ranging from 1-1/4" through 8-1/4".



PILOT MILL

The Pilot Mills are ruggedly dressed with tungsten carbide to provide the most effective tool for milling washpipe, liners, washover shoes, safety joints, and swag. Milling rates are very rapid over other milling tools and milling time is greatly reduced.

The pilot mills are provided in all standard milling sizes. Any special customer requirement for changes can easily be provided.

STD MILLING DIA	PIN API REG	PILOT DIA	OVERALL LENGTH	FISHING NECK LENGTH	FISHING NECK DIA
3-1/4 - 3-7/8	2-3/8	1-3/4 - 2-3/4	27	12	3
4 - 4-3/8	2-3/8	1-3/4 - 2-3/4	27	12	3-1/8
4 - 5-3/8	2-7/8	2 - 3-1/4	27	12	3-3/4
5-1/2 - 5-5/8	3-1/2	2-1/2 - 4-3/4	38	16	4-1/4
5-3/4 - 7-3/8	3-1/2	2-1/2 - 4-3/4	38	16	4-3/4
6 - 9-7/8	4-1/2	4-3/4 - 6-3/4	42	18	5-3/4
9-7/8 - 17-1/2	6-5/8	7-3/4 - 15	45	18	7-3/4



RELEASING & CIRCULATING OVERSHOT

Stuckey's Specialty Tools' releasing and circulation overshot is the strongest available fishing tool for externally engaging, packing off or pulling a catch. Its basic outside construction consists of a top sub, the bowl, and the guide. The internal parts depend on the catch desired. A spiral grapple, spiral grapple control, and type "a" packer can be used or a basket grapple and a mill control packer.

Stuckey's Specialty Tools' releasing and circulation overshot requires only right hand rotation during both engaging and releasing operations. No damage or distortion results to the catch or the overshot due to the helically tapered spirals on the inside diameter of the bowl.

Stuckey's Specialty Tools' releasing and circulating overshot is interchangeable with the series 150 overshot



ROTARY REAMER

The Rotary Reamer is a heavy-duty designed downhole-hole reamer. It has a wide range of downhole uses. The reamer body utilizes drive-fit hardened reamer pin and bearing blocks. A wide range of cutter types are available for most efficient cutting action in all types of formations:

1. Type v/hm cutter for maximum reaming action in the softer formations such as soft lime or shale where penetration of the teeth into the formation is desirable. The v/hm cutter carburized, hardened and hard-faced with tungsten carbide along the leading edge of the teeth.
2. Type q cutter for maximum reaming action in hard formations such as dolomite, hard lime, and chert where crushing action against the formation is desirable. The q cutter is hardfaced in grooves on the face of the teeth, carburized, hardened, and ground to gage.
3. Button cutter for extremely hard formations such as chert, granite, or hard sand. Tungsten carbide compacts act as teeth to fracture the formation.



REVERSE CIRCULATION JUNK BASKET

The reverse circulation junk basket is an excellent tool for retrieving all types of small junk objects from the well bore. Its unique design of reversing the circulation of the flow assures complete clean-up procedures and eliminates the possibility of a plugged core. Stuckey's specialty tools' reverse circulation junk basket can be adapted with a fishing magnet and still retain the reverse circulation feature.

A single junk catch is used in the assembly and a lifting sub is provided for ease in handling. The lifting sub also provides ideal storage space for the steel ball. During operation the steel ball fits into a valve cup to allow the fluid to flow through the inner passage of the barrel and out the vents in the lower end. This causes a continuous stream of fluid to flow through the center of the tool and up through the return port in the upper end of the barrel. Thus all of the junk is carried into the barrel and deposited in the junk catcher.

The reverse circulation junk basket is manufactured from 3-5/8" o.d. to 16" o.d.



RHR SCAB LINERS

The use of packers at both top and bottom of short liners permits sealing off holes or bad places in production casing strings. A type d or type d boll weevil liner hanger may be placed at the bottom of the liner for a seal and support. The top seal may be a stuckey type c, p, cr, or pr. The bottom seal is compressed by liner weight and the top seal by a c-2 setting tool.

The new rhr scab liner assembly provides maximum I.D. through the liner. It is run on a jay type setting tool and sets by right hand rotation. The bottom packer sets first, a pin shears in the top packer with continued torque and then it is set.

When a scab liner is to be set near the bottom of the well, a straight, pin type packer canvas element (type f), with tail pipe extending to well bottom, may be used in place of the pack-off type liner hangers. The pin packer is compressed by applying weight to the shoulder on a mid string setting sleeve located in the liner above the packer.



RUNNING TOOL

The model "g" running tool will locate and land "s" - type locks in any sealing bore in a tubing string.

Operation of the model "g" is similar to the model "e" shown at left, but this tool allows the up-facing locks to trail while running in.



PBR SEAL UNIT

The PBR Seal Unit is a retrievable seal used with a regular length polished bore receptacle or a special short length pbr (honed I.D.) to provide a positive two-way seal at the top of the liner during cementing operations.

It can be provided with high temperature seals for deep server.



ROCK TYPE UNDERREAMER

Rock Type Underreamers are used to enlarge sections of the hole below the surface. The Underreamer is a rugged hydraulically activated tool used to provide clearance for running casing, obtaining suitable annular space for cementing, enlarging sections for gravel packing, or for other downhole operations during drilling or production procedures. Since the rugged design of the tool allows for larger cones and bearings to be used, more penetration can be obtained. Medium hard formation cones are standard, but other cones are available from hard to soft formation. A position stop assures true gauge diameter. Flow through the tool is regulated by a Tungsten Carbide Orifice. By using this orifice, a wide selection of sizes are available that will meet any mud pump requirements.

TOOL O.D.	OPERATING RG.	PIN CONN.	WT./LB.
3-3/4"	4-1/2" - 6-1/4"	2-3/8" REG.	150
4-1/2"	4-3/4" - 9"	2-7/8" REG.	200
5-3/4"	6-1/2" - 13"	3-1/2" REG.	360
8-1/4"	11-1/2" - 17"	6-5/8" REG.	810
9-1/2"	13" - 18"	6-5/8" REG.	1175
11-3/4"	14-3/4" - 22"	6-5/8" REG.	1725
14-3/4"	17-1/2" - 30"	6-5/8" REG.	2600



7-1-0318



ROTO-VERT CASING SCRAPER

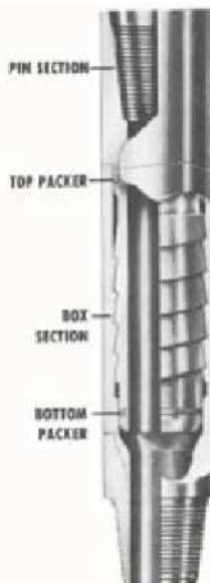
The Roto-Vert Casing Scraper is ideal to remove Cement, Sheath, Scale, Perforating Burrs, and other foreign substances from the inside walls of casing. The importance of keeping the casing id clean and smooth is necessary as nearly all subsequent operations in the well are affected in one way or another by the condition of the casing bore. Any jagged imperfection in the casing, variation in the id, or layer of mud or cement can cause tool failure in a variety of operations.

PERFORMANCE FEATURES:

The body and blade blocks of the Roto-Vert are machined from solid bar stock. The blade blocks are hardened by heat treatment to provide maximum strength and working life for the scraper. The Roto-Vert operates successfully when rotated or reciprocated vertically either on drill pipe or tubing. The angle and direction of shear on the scraping edges of the blades guarantee that no imperfections are bypassed.

CONSTRUCTION

The body and blades of the tool are machined from solid bar stock to ensure maximum strength, while the replaceable blade blocks are hardened by heat treatment. The angle and direction of shear on these scraping edges further negate the chance of imperfection bypass. The tool operates successfully when rotated or reciprocated, on drill pipe or tubing.



SAFETY JOINTS

Safety Joints are two-piece releasing devices which provide a positive means of parting the drill pipe, tubing or washover string if the need arises. They are simple and easy to make up, release, and re-engage. They transmit full torque in either direction and withstand every normal operation. No movement can take place between the two sections of the joint, nor can it be broken without specific mechanical procedure.

The construction of the safety joints is simple, making them rugged and reliable. They consist of a pin section, a box section, a top packer and a bottom packer.

THREE SPECIFIC TYPES ARE AVAILABLE AS FOLLOWS: Drill

Pipe Safety Joints with tool joint connections; O.D. and I.D. correspond to those of tool joints.

Tubing Safety Joints with tubing connections O.D. same as O.D. of coupling; I.D. same as I.D. of tubing string.

Washover Safety Joints, run between drill pipe and washover string, have tool joint box in safety joint pin section, and washover string pin on safety joint box section. Diameters conform to those in use on washover pipe.



STARTER MILL

The Starter Mill is a specialized milling tool used in conjunction with the sidetracking system. Because of the tapered pilot, the starter mill is used to mill only the first 18 - 24 inches of casing. The starter mill is dressed with tungsten carbide.



TAPER MILL

The Taper Mill has proven most successful in correcting collapsed casing problems. These rugged mills (dressed with tungsten carbide) will mill out full gage casing that is split and collapsed. The taper mills are also used for removing burrs and cleaning up permanent whipstock windows. It is recommended to run mills on stabilized drill collars for maximum results.



TUBING/CASING ROLLER

Stuckey's specialty tools' tubing and casing roller is the ideal tool for restoring your collapsed, buckled, or dented casing to its normal roundness and diameter. This rugged tool is composed of three eccentric rollers around a mandrel. These rollers are held in place by a nose cone which is secured to the mandrel. The nose cone houses a series of ball bearings which allow the roller to move freely around the mandrel.

Larger casing can be straightened by simply redressing the mandrel with larger size rollers. Stuckey's rubbing and casing roller is a simple tool with no springs, pins, or loose parts to interfere with the operation.



SINGLE GRIP RETRIEVABLE CASING PACKER

In wells where excessive bottom-hole pressure is not expected, the single-grip 'r-3' is the answer to your need for a setdown, retrievable packer. From the packing elements down, the 'r-3' single grip is identical to the double-grip model. Running, setting, and releasing procedures are the same for both packers.

To set the packer: the 'r-3' is set by picking up, rotating to the right, and then slacking off on the tubing. Setdown weight closes and seals the bypass valve, sets the slips, and packs off the packing elements.

To release the packer: picking up the tubing releases the packer (no rotation required). When the tubing is raised, the bypass valve opens to permit circulation through and around the packer. When the tubing string is raised to the full length of the packer. The j-pins (on the bottom sub) are oriented for automatic re-engagement. By then lowering the tubing slightly, the j-pin engages the j-slot thus assuring complete release and preventing accidental resetting while retrieving the packer.



TYPE 'C' LINER SWIVEL

The Type 'C' Liner Swivel is run below cmc, hyflo and 'C' liner hangers ("jay" slip release designs) to permit setting the hanger even if the liner below the hanger is stuck.

A stuck liner in a completion design which does not use the swivel may prevent even the small angle rotation required to release the jay cage and slips.

If so, the liner could not be top supported. Addition of the 'c' swivel to the string permits rotation to release the cage.



TAPER TAP

Taper Taps are the simplest fishing tools available for engaging a fish internally.

In operation, it is necessary only to run the taper tap in the hole to the top of the fish, apply less than one point of weight and rotate sufficiently to embed the tapered threads of the tap into the fish, cease rotation and pull the fish.



TUBING ANCHOR

Slip designed to hold in two directions Each rugged slip contains two sets of directional wickers, one designed to prevent upward movement, the other to prevent downward movement.

The long experience with directional wicker slip design in their bridge plugs, retainer packers and retrievable cementers has clearly proven the superiority of this design over the so-called "universal" non-directional tooth profile.

Operating Information:

At the desired setting depth rotate tubing to the left with hand tongs (5 to 8 turns, depending on casing weight). after slips contact casing, pull full calculated tension, slack off and, while holding left-hand torque on tubing, alternately pull up and set down weight several times to firmly set the slips. Release torque and apply full tension.

Applying tension at the surface: The "overstretch" of several inches required to apply tension with doughnut-type hanger can be reduced to about one inch through use of the double box bushing.



VALVE TYPE ORIFICE FLOAT COLLAR

The Valve Type Orifice Float Collar makes up in the casing above the tieback stem.

It provides restricted automatic fill up of the tie-back liner through an orifice when it is run in the hole.

When circulating down the liner during cementing, the valve opens to permit large volume fluid flow.



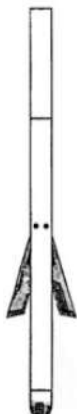
WINDOW MILL

The Window Mill is used with a sidetracking system to cut the window in the casing wall. After beginning the cut out with the starter mill, the bottom hole assembly is changed to add the window mill and the Watermelon mill.

The window mill is dressed with tungsten carbide to provide maximum cutting ability for greater penetration.



7-1-0318



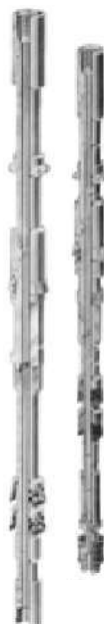
TUBING UNDERREAMER

The Tubing Underreamer - clean out tool and cutter is hydraulically operated with a minimum of 75 PSI pressure. All tools are designed with positive stops which allow the cutter arms to expand only to a predetermined diameter. The cutter arms are dressed with various size and chips of Tungsten Carbide for maximum penetration and material removal. A blade type bit or bullnose is also dressed with Tungsten Carbide.

The Tubing Underreamer - clean out tool and cutter is a uniquely designed tool which will operate underneath production packers without removing or pulling the packer. Scale, cement, corrosion, or formation debris that may have formed beneath the packer can easily be removed. By dislodging this unwanted foreign material from the well bore beneath the production packer, production of the well will increase without removing the packer from the well bore. The tool can also be dressed with Tungsten Carbide to cut tubing.

The Tubing Underreamer - clean out tool and cutter are available in sizes that can be operated 1.900" through 3-1/2" tubing. The maximum operating range of each tool is listed below. The tubing underreamer - clean out tool and cutter can also be furnished for H2S service.

TUBING SIZE	TOOL O.D.	(MAXIMUM)
1.900"	1.600"	TUBING CUTTER
2-3/8"	1-7/8"	4-1/2" CSG. I.D.
2-7/8"	2-3/8"	5-1/2" CSG. I.D.
3-1/2"	3"	7" CSG. I.D.



TYPE C-2 SETTING TOOL

The c-2 setting tool is used to run and cement liners, and is designed to compress weight set packers after the cementing operation is completed. The c-2 setting tool has a splined left-hand threaded nut which engages coarse left-hand threads in the packer to support the liner as it is run. This joint should be made up tight to prevent release while running in hole.

The setting tool has a ball bearing to provide easy release by right-hand rotation after the liner is suspended. A sealing system prevents upward flow around the tool during cementing operation; the flapper valve and pbr systems also prevent downward flow around the tool. The liner wiper plug is released when the pump-down plug lands in the wiper plug and shears the holding pins or lugs.

Where a weight set packer is to be compressed after the cement has been displaced, the setting tools is raised so the setting dogs are above the packer setting sleeve; then weight is applied to set the packer. When a packer is not used, a spacer replaces the dogs in the setting tool.

TYPE C-2 "J" SETTING TOOL

The c-2 'j' setting tool is essentially the same as the c-2 tool. The jay replaces the splined nut. It is used when torque is to be applied to the liner, as in the case of the rotating liner hanger.



WATERMELON/STRING MILL

The string mill is usually positioned in the drill collar string for milling out tight spots in casing. The string mill (placed in the drill collar string) is reamed up and down over the sidetracking portion to debar and cut clearance for subsequent casing or liner operations. The string mill is dressed with tungsten carbide material.

The watermelon mill is used in running the sidetracking system. The watermelon mill is used in the same string with the window mill for smoothing and cutting clearance in the pack-stock window. The string mill is then added to the string with the taper mill and watermelon mill to make a stiffer cutting assembly and further open the window for subsequent drilling operation. Once again the mill is dressed with tungsten carbide material.



TYPE CS SETTING TOOL

The Type CS setting tool is used with the ss (screw set) liner packer which is set by right-hand rotation. Like the c-2, the cs setting tool has a left-hand thread splined nut which supports the packer and liner.

In addition, the cs tool has a winged packer setting nut with left-hand threads.

This nut fits slots in the top of the ss packer; after the setting tool is released from the packer and the liner has been cemented, further right-hand rotation of the setting tool compresses the sealing element.



TYPE SS LINER PACKER

The ss (screw set) packer is recommended for deep hole liner settings and it may be used with any cemented liner. It is placed above the liner hanger and is usually equipped with a tie-back sleeve so that more pipe may be tied in later to make a fullstring. A cs setting tool on the running-in string is used to land the liner and ss packer. The packer has a rubber sealing element which is compressed by right-hand rotation of the running in string.

Inside the ss liner packer there is an optional drillable flapper valve with o-ring in which the setting tool stinger seals. After removal of the setting tool, the flapper valve closes and becomes a secondary back pressure valve.

DOWNHOLE OIL TOOLS

High-Quality Oil Tools Manufacturer



SJS DOWNHOLE OIL TOOLS SERIES

Bridge Plug • Cement Retainer • Setting Tools • Permanent Packer
Retrievable Packer • Tubing Anchor • Flow Control Tools • Coiled Tubing Tools
Drilling Tools • Accessories • SJS Downhole Solutions

SJS Oil Tools Series

I	II	III	IV
SJS Downhole Solutions	Testing	Conventional Testing	Single Test String
		Zonal Testing	Multi-Test String
	Treating	Single Acid Fracturing	Retrievable Packer
		Multi-Acid Fracturing	Multi-Acid Fracturing String
		Acid Fracturing Horizontal Wells	Hydraulic Packer
	Production	Conventional Production Completion String	Landing Nipple,Circulating Sleeve,Packer
		Single Production String	Simple Mechanical Packer
		High-Pressure Injection String	Intubation Packer
	Workover	Isolate The Zone	Permanent Bridge Plug
		Re-Cementing	Retrievable Bridge Plug
Composite Solutions	Perforation,Fracturing,Testing, Combination	Cement Retainer	
	Multi-Fracturing Testing	Testing Tools,Packer,Perforating Gun	
			Multi-Fracturing Testing Combination String

I	II	III	IV
SJS Oil Tools	Production Tools	Production Packer	Permanent Production Packer
			Retrievable Production Packer
		Accessories	Stinger
			Expansion Joint
	Tubing Anchor		
	Service Tools (1)	Retrievable Tools	Mechanical Packer
			Hydraulic Packer
			Retrievable Bridge Plug
			Hydraulic Anchor,Cycle Valve,Safety Valve
	Service Tools (2)	Permanent Tools	Bridge Plug
			Cement Retainer
		Accessories	Setting Tools
			Stinger
			Centralizer
			Dump Bailer
	Flow Control Tools	Tubing Mounted Equipment	Landing Nipple, Circulating Sleeve
		Flow Control Accessories	Lock Mandrel, Blanking Plug
		Slickline Service Tool	Slickline Tools String
	Coiled Tubing Tools	Standard Toolstring Component	Coiled Tubing Toolstring
Application Tool		Wash,Mill, Plug Tools	
Coiled Tubing Fishing Tool		Spear, Overshot, Grab	
Drilling Tools	Drilling Tools	Drill Collar, Stabilizer, Jar, Shock Absorber	
	Cementing Tools	Float Collar, Float Shoe, Cementing Head, Liner Hanger	
	Workover Tools	Fishing Tools,Milling Tools	





"SJS Limited is a joint venture between Chinese JHPA and American SERVAGroup. It is located in Jingzhou, Hubei province near the Yangtze River in the central part of China. SJS limited is an integrated manufacturing and engineering company recognized for its technology and quality products. Founded in June 1992, the company has focused on developing products for the oil and gas industry by designing and manufacturing oilfield high pressure triplex and quintuplex pumps, cementing and fracturing equipments, downhole oil tools, clutches and brakes. Our mission is to develop products to service the global markets and to become the recognized leader in quality, innovation, value and customer satisfaction through the integration of the people and technology throughout SERVAGroup.

SJS Limited is registered under the ISO 9001 quality program and certified by DNV since 1999, We obtained API 11D1 certification for the downhole oil tools since 2005."



QUALITY CONTROL

Under the restrict implementation of ISO9001 each purchasing orders are tracked and controlled sternly through 2BizBox™ ERP system. We are No. 1 certified by API manufacturing base in China in conjunction with certificate No.11D1-0005.

TESTING WELL

"Total commitment to customer satisfaction" is our promise. We invest millions on two testing wells, especially for development and research experimentation, to ensure all promised physical and mechanical properties. Through design and testing circulation we are capable to complete customer's special requirements.

RUBBER ELEMENTS

We have been developing and supplying sealing kits since 1997, which are exported with tools worldwide. Promised properties can reach Max. 350°F and Max. 10,000PSI. SJS elastomer material lab is certified by CNAS No. 2009171626J and validates the qualified material data. Recently we are devoting ourselves to the research of composite bridge plugs and 400°F sealing kits.



BRIDGE PLUG



Model: MWB
 Size: 2 3/8"-20"
 Temperature: 148 °C(300 °F)
 177 °C (350 °F)
 Pressure: 70Mpa (10,000PSI)
 Setting: Wireline/Hydraulic
 Application: Isolate The Lower Zone



Model: MMB
 Size: 4 1/2"-16"
 Temperature: 148 °C(300 °F)
 177 °C (350 °F)
 Pressure: 70Mpa (10,000PSI)
 Setting: Mechanical
 Application: Isolate The Lower Zone



Model: WRBP
 Size: 1 1/2"-5 1/2"
 Temperature: 148 °C(300 °F)
 177 °C (350 °F)
 Pressure: 52Mpa (7,500PSI)
 Setting: Wireline/Hydraulic
 Application: Plugging Tubing Snubbing

SETTING TOOLS



Model: MWSB / MWSG
 Size: 1 11/16"-3 7/8"
 Temperature: 204°C (400°F)
 Pressure: 70Mpa (10,000PSI)
 Setting: Wireline
 Application: Set bridge plugs, production packer or cement retainers



Model: MHSB / MHSG
 Size: 1 11/16"-3 7/8"
 Temperature: 148°C (300 °F)
 177°C (350 °F)
 Pressure: 42Mpa (6,000PSI)
 Setting: Hydraulic
 Application: Set bridge plugs, production packer or cement retainers



Model: WRBP
 Size: 4 1/2"-16"
 Temperature: 148°C (300 °F)
 177°C (350 °F)
 Pressure: 70Mpa (10,000PSI)
 Setting: Mechanical
 Application: Set bridge plugs, production packer or cement retainers

CEMENT RETAINER



Model: MWR
 Size: 4 1/2"-16"
 Temperature: 148°C (300 °F)
 177°C (350 °F)
 Pressure: 70Mpa (10,000PSI)
 Setting: Wireline/Hydraulic
 Application: Cementing Operation

Model: MMR
 Size: 4 1/2"-16"
 Temperature: 148°C (300 °F)
 177°C (350 °F)
 Pressure: 70Mpa (10,000PSI)
 Setting: Mechanical
 Application: Cementing Operation

Model: Stinger / Centralizer
 Size: 4 1/2"-20"
 Temperature: 148°C (300 °F)
 177°C (350 °F)
 Pressure: 52Mpa (7,500PSI)
 Setting: -
 Application: Plugging Tubing Snubbing

PRODUCTION PACKER







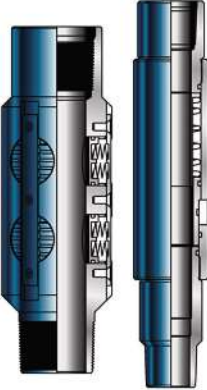


Model: DGL / DGXL
 Size: 2 7/8"-11 3/4"
 Temperature: 148°C (300 °F)
 177°C (350 °F)
 Pressure: 70Mpa (10,000PSI)
 Setting: Wireline/Hydraulic
 Application: Production, injection

Model: REPEAT-A-B
 Size: 3 1/2"-9 5/8"
 Temperature: 148°C (300 °F)
 177°C (350 °F)
 Pressure: 70Mpa (10,000PSI)
 Setting: Wireline/Hydraulic
 Application: Production, injection

Model: WRBP
 Size: 4 1/2"-9 5/8"
 Temperature: 148 °C(300 °F)
 177 °C (350 °F)
 Pressure: 52Mpa (7,500PSI)
 Setting: Mechanical
 Application: Production, injection

RETRIEVABLE PACKER

				
<p>Model: Size: Temperature: Pressure: Setting: Application:</p>	<p>JS-2 / CS-1 4 1/2"-16" 148°C (300 °F) 177°C (350 °F) 70Mpa (10,000PSI) Mechanical Testing, Fracturing, Acidizing, Production, Workover</p>	<p>RS-1 / SRT 4 1/2"-9 5/8" 148°C (300 °F) 177°C (350 °F) 70Mpa (10,000PSI) Mechanical Testing, Fracturing, Acidizing, Production, Workover</p>	<p>MAD-1 / SME 4 1/2"-13 3/8" 148°C (300 °F) 177°C (350 °F) 52Mpa (7,500PSI) Mechanical Testing, Fracturing, Acidizing, Production, Workover</p>	<p>PHP / MFH 4 1/2"-9 5/8" 148°C (300 °F) 177°C (350 °F) 52Mpa (7,500PSI) Hydraulic Testing, Fracturing, Acidizing, Production, Workover</p>
				
<p>Model: Size: Temperature: Pressure: Setting: Application:</p>	<p>Model: Size: Temperature: Pressure: Setting: Application:</p>	<p>Model: Size: Temperature: Pressure: Application:</p>		
<p>SHC / SHP SHB 5 1/2"-9 5/8" 120°C (248 °F) 148°C (300 °F) 70Mpa (10,000PSI) Hydraulic Testing, Fracturing, Acidizing, Production, Workover</p>	<p>MWBR Retrievable Bridge Plug 4 1/2"-9 5/8" 148°C (300 °F) 177°C (350 °F) 70Mpa (10,000PSI) Wireline/Hydraulic Testing, Fracturing, Acidizing, Production, Workover</p>	<p>Hydraulic Anchor Circulation Valve Expansion Joint 4 1/2"-9 5/8" 148°C (300 °F) 177°C (350 °F) 70Mpa (10,000PSI) Testing, Fracturing, Acidizing, Production, Workover</p>		

FLOW CONTROL TOOLS			COILED TUBING TOOLS		
Model:	Landing Nipple Circulating Sleeve	Blanking Plug Service Tools	Model:	Standard Toolstring Downhole Motor	Application Tools
Size:	1 1/2"-3 1/2"	2 3/8"-3 1/2"	Size:	1 11/16"-3 1/8"	4 1/2"-9 5/8"
Temp:	148°C (300 °F) 177°C (350 °F)	148°C (300 °F) 177°C (350 °F)	Temp:	148°C (300 °F) 177°C (350 °F)	148°C (300 °F) 177°C (350 °F)
Pressure:	70Mpa (10,000PSI)	35Mpa (5,000PSI)	Pressure:	35Mpa (5,000PSI)	35Mpa (5,000PSI)
Setting:	-	Wireline/Slickline	Setting:	-	-
App:	Flow Control System	Flow Control System	App:	Coiled tubing Operation	Coiled tubing Operation

DRILLING TOOLS					
Model:	Jar Intensifier	Model:	CEMENTING HEAD liner hanger	Model:	Milling Tools Fishing Tools
Size:	4 3/4"-9"	Size:	4 1/2"-20"	Size:	2 3/8"-7"
Temperature:	148°C (300 °F) 177°C (350 °F)	Temperature:	120°C (248 °F) 148°C (300 °F)	Temperature:	-
Pressure:	35Mpa (5,000PSI)	Pressure:	52Mpa (7,500PSI)	Pressure:	-
Setting:	-	Setting:	-	Setting:	-
Application:	Drilling	Application:	Cementing	Application:	Workover



DRILL COLLARS

The Drill Collars are made of modified AISI 4145H Chromium Molybdenum alloy Steel. These Drill Collars bars are full length heat treated, quenched to obtain mechanical properties as per ASTM A-370. All Drill Collars are provided with a set of Mill Test Certification as per BS EN 10204 – latest edition. These mill test certification assures a hardness range of 285-341 BHN and a Charpy V Notch impact value of 40ft lbs at room temperature one inch below the surface. Connections are precision machined to API specifications.

To ensure close tolerance bores, all drill collars bars are trepanned then drifted to API Spec 7-1 requirements. Bar surface finish is “as rolled” which is original mill finish.

CONNECTIONS:

All connections are precision machined to API Spec 7-1 (API Relief Groove Pin and Bore Back Box Stress Relief Features are available on request). Thread roots are cold rolled to offer a greater resistance to fatigue. All connections are then phosphated to minimize galling during makeup. API dope or thread compound is applied on connections. Pressed steel thread protectors or Cast steel lifting bail type thread protectors (As per customer requirements) are installed to ensure adequate joint protection during Handling, Packaging, Storage & Delivery.

SPIRAL DRILL COLLARS:

The Spiral cut is added to a Drill Collar to prevent the likelihood of differential wall sticking by reducing wall contact between the Drill Collar and the wall of the Hole. The box end of the spiral collar is left uncut 79

inches from Box shoulder and the pin end is left uncut 30 inches from Pin shoulder as per Standard Practices.

Interdril offers several hardbanding options from Fine Particle, Flush Raised Carbide or special hardbanding options supplied by third parties.

Interdril recommended Hardbanding design is as follows

- 1 Drill Collars without slip & elevator recess: 10” long wear bands at 30” minimum from the pin end.
- 2 Drill Collars with slip & elevator recess: 4” long wear bands above elevator recess, 1” band between elevator & slip recess & 10” long wear band below slip recess.
- 3 Drill Collars with slip recess only: 10” long wear band below slip recess.

Hardbanding Types available: Tungsten Carbide, SMOOTH X, ARMACORM, Arnco 100, 200 & 300XT, and TCS Titanium etc.

OPTION: Hardbanding can be provided on request.

Hardbanding available Tungsten Carbide, ARNCO 100XT, 200XT, 300XT, SMOOTH X, ARMACOR M, TCS Titanium

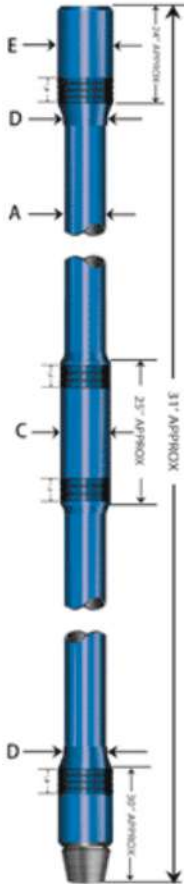
When ordering or requesting quotations on Drill Collars, please specify:

- 1 Outside Diameter, Bore and Length
- 2 Size and type of connection, Stress Relief features
- 3 Slick or Spiral
- 4 Other special features: Elevator and Slip Recess and or Harbanding type

DIMENSIONAL DATA

(STANDARD SIZES, BORES, AND CONNECTIONS FOR DRILL COLLARS)

Size OD Inch	Bore		Connection Style and Size				Approx. Weight 31ft. Lbs.
	Standard In	Optional In	For Standard Bore		For Optional Bore		
			NC	API	NC	API	
3 1/8	1 1/4	1	NC 23	---	---	2 3/8 Reg	682
3 1/2	1 1/2	1 1/4	NC 26	2 3/8 IF	NC 26	2 3/8 IF	837
4 1/8	2	1 3/4	NC 31	2 7/8 IF	NC 31	2 7/8 IF	1085
4 3/4	2	2	NC 35		NC 38	3 1/2 IF	1550
5	2 1/4	2	NC 38	3 1/2 IF	NC 38	3 1/2 IF	1643
6	2 1/4	2 13/16	NC 44	---	NC 40	4 1/2 FH	2573
6 1/4	2 1/4	2 13/16	NC 44	---	NC 46	4 IF	2821
6 1/4	2 13/16	2 13/16	NC 46	4 IF	NC 46	4 IF	2573
6 1/2	2 1/4	2 13/16	NC 46	4 IF	NC 50	4 1/2 IF	3069
6 1/2	2 13/16	2 13/16	NC 46	4 IF	NC 50	4 1/2 IF	2821
6 3/4	2 1/4	2 13/16	NC 46	4 IF	NC 50	4 1/2 IF	3348
7	2 1/4	2 1/4	NC 50	4 1/2 IF	NC 50	4 1/2 IF	3627
7	2 13/16	2 1/4	NC 50	4 1/2 IF	NC 50	4 1/2 IF	3410
7 1/4	2 13/16	3	NC 50	4 1/2 IF	---	5 1/2 FH	3689
7 3/4	2 13/16	3	NC 56	6 5/8 Reg	NC56	6 5/8 Reg	4309
8	2 13/16	3	NC 56	6 5/8 Reg	NC 56	6 5/8 Reg	4650
8 1/4	2 13/16	3	---	6 5/8 Reg	---	6 5/8 Reg	4960
9	2 13/16	2 13/16	NC 61	7 5/8 Reg	NC 61	7 5/8 Reg	6045
9 1/2	3	2 13/16	---	7 5/8 Reg	---	7 5/8 Reg	6696
9 3/4	3	2 13/16	NC 70	8 5/8 Reg	NC 70	8 5/8 Reg	7099
10	3	2 13/16	NC 70	8 5/8 Reg	NC 70	8 5/8 Reg	7533
11	3	2 13/16	---	8 5/8 Reg	---	8 5/8 Reg	9269



HEAVY WEIGHT DRILL PIPE

MATERIAL (4145 H MOD) – MECHANICAL PROPERTIES as per API SPEC.7-1, Latest Edition

Precision machined from one integral piece of AISI 4145 H MOD Q & T bar stock. Interdril fully integral Heavy Weight Drill Pipe are manufactured from full length bar stock of material specification AISI 4145 H Mod, Quenched & Tempered, API SPEC 7-1 (latest edition) specification requirement.

HARDBANDING:

To optimize wear resistance, hardbanding is applied on tool joint and centre upset. This heavy duty hard metal application is a closely controlled welding process applied with a hardbanding

machine. Hardbanding is applied 4 inches on the Box Tool Joint , 4 inches on the pin tool joint, and two 3 inch bands on centre upset as per Standard Hardbanding Practices (Varies as per customer requirements). Hardbanding types available are Tungsten Carbide, ARNCO 100 XT, 200XT, 300XT, SMOOTH X, ARMACOR M, TCS Titanium.

CONNECTION FEATURES:

API Stress Relief Groove on Pin and Bore Back Relief features on boxes are standard on the 3 1/2 inch to 6 5/8 inch Heavyweight. All connections are phosphated, applied with API dope and provided with thread protectors. Thread roots are cold rolled on all sizes applicable.

DIMENSIONAL DATA – RANGE II

Nom Size (A)	Tool Joint OD (E)	Nom ID (B)	Wall Thickness	Centre Upset OD (C)	Elevator Upset OD (D)	Connection size and type	Approx Weight		Make Up Torque* Ft/lbs		
							Per Foot	Per Joint 31ft			
3 1/2	4 3/4	2 1/4	.625	4	3 5/8	NC 38 (3 1/2 IF)	25.3	784	11500		
	4 7/8		.719				30.0	930		13700	
	5		.750				30.0	930		14400	
4	5 1/4	2 1/2	.750	4 1/2	4 1/8	NC 38 (4 FH)	28.0	868	15100		
			.719				30.0	930		14600	
4 1/2	6 1/4	2 11/16	.906	5	4 11/16	NC 46 (4 IF)	41.5	1,287	23500		
			.875				41.0	1,271		22500	
5	6 1/2	3	1.000	5 1/2	5 1/8	NC 50 (4 1/2 IF)	49.3	1,528	30000		
			.844				50.4	1,562			
5 1/2	7	3 1/4	1.125	6	5 11/16	5 1/2 FH	57.0-	1,700-	29200-37700		
	7 1/4	3 3/8	1.06							62.0	1900
	7 1/2	3 7/8	.812								
		4	.750								
6 5/8	8	4	1.312	7 1/8	6 3/4	6 5/8 FH	71.5	2,217	38400-52700		
	8 1/4	4 1/2	1.06								
	8 1/2	5	.813								

* MUT values calculated assuming min yield strength of material 1,20,000 psi
Hardbanding Type: Tungsten Carbide, Arnco 100XT, 200XT, 300XT, SMOOTH X, ARMACOR M, TCS Titanium



SPIRAL HEAVY WEIGHT DRILL PIPE

MATERIAL (4145 H MOD) – MECHANICAL PROPERTIES as per API 7-1, Latest Edition

Precision machined from one integral piece of AISI 4145 H Mod Q & T bar stock

Interdril fully integral Spiral Heavy Weight Drill Pipes are manufactured from full length bar stock of material specification AISI 4145 H Mod, Quenched & Tempered, API 7-1 (latest edition) specification requirement.

HARDBANDING :

To optimize wear resistance, hardbanding is applied on tool joint and centre upset. This heavy duty hard metal application is a closely controlled welding process applied with an hardbanding machine.

Hardbanding is applied 4 inches on the Box Tool Joint, 4 inches on the pin tool joint and two 3 inch bands on the 18° tapered shoulder of Box Tool Joint and two 3 inch bands on centre spiral upset as per Standard Hardbanding Practices (Varies as per customer requirements). Hardbanding types available are Tungsten Carbide, ARNCO 100 XT, 200XT, 300XT, SMOOTH X, ARMACOR M, TCS Titanium.

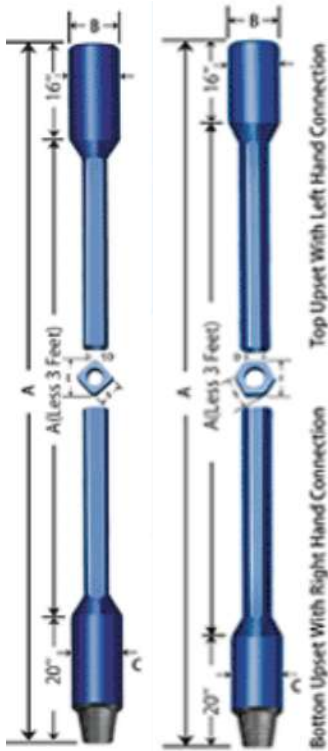
CONNECTION FEATURES :

API Stress Relief Groove on Pin and Bore Back Relief features on boxes are standard on the 3 1/2 inch to 6 5/8 inch Heavyweight. All connections are phosphated, applied with API dope and provided with thread protectors. Thread roots are cold rolled on all sizes applicable.

DIMENSIONAL DATA – RANGE II

Nom Size (A)	Tool Joint OD (E)	Nom ID (B)	Wall Thickness	Centre Upset OD (C)	Centre Upset Length (Ft)	Elevator Upset OD (D)	Connection size and type	Approx Overall	Approx Overall	Approx Weight		Make Up Torque Ft. lbs
								Length Pin / Box	Length (Ft)	Per Foot	Per Joint 30ft	
3 1/2	4 3/4	2 1/4	.625	4	18.5	3 5/8	NC 38 (3 1/2 IF)	24 / 30	31.0	26.7	828	11,500
										31.0	977	
4	5 1/4	2 9/16	.719	4 1/2	18.5	4 1/8	4 FH	24 / 30	31.0	31.5	977	14,600
										31.0	1395	
4 1/2	6 1/4	2 13/16	.844	5	18.5	4 5/8	NC 46 (4 IF)	24 / 30	31.0	45.0	1395	22,500
										31.0	1674	
5	6 1/2	3	1.000	5 1/2	18.5	5 1/8	NC 50 (4 1/2 IF)	24 / 30	31.0	54.0	1674	30,000
										31.0	1944	
5 1/2	7	3 1/2	1.000	6	18.5	5 11/16	5 1/2 FH	24 / 30	31.0	62.7	1944	37,400
										31.0	2387	
6 5/8	8	4	1.313	7 1/8	18.5	6 3/4	6 5/8 FH	24 / 30	31.0	77.0	2387	52,700
										31.0		

* MUT values calculated assuming min yield strength of material 1,20,000 psi
Hardbanding Type : Tungsten Carbide, Arnco 100XT, 200XT, 300XT, SMOOTH X, ARMACOR M, TCS Titanium.



ROTARY KELLY

The Kellys are made from AISI 4145 H Modified Alloy bars which are quenched and tempered full length. A Hardness range of 285-341 BHN and a minimum impact value of 40ft lbs is maintained one inch below the surface at room temperature. All ends and centre drive sections are machined. The Kellys are precision trepanned to provide true bores. They are drilled to API Specifications 7-1 and all connections are precision machined and tested to stringent quality standards.

When ordering or requesting quotations on Kellys, please specify:

- 1 Hexagonal or Square Kelly
- 2 Nominal Size (Section F)
- 3 Bore (Section D)
- 4 Size and Type of Top Connection
- 5 Size and Type of Bottom Connection
- 6 Top Upset OD (Section B)
- 7 Bottom Upset (Section C)
- 8 Packaging Plain Shipping Scabbards available

DIMENSIONAL DATA – SQUARE KELLYS

Nom Size	Available Lengths (Ft.) (A)	Top Upset		Bottom Upset		Bore (D)	Drive Section		Approx wt. 40ft (lbs)
		API Box Thread Left Hand	OD (B)	Right Hand Connection	OD (C)		Across Corners (E)	Across Flats (F)	
3 1/2	40, 42, 46	6 5/8 Reg 4 1/2 Reg	7 3/4 5 3/4	NC 38 (3 1/2 IF)	4 3/4	2 1/4	4.437	3 1/2	1320
4 1/4	40, 42, 46	6 5/8 Reg 4 1/2 Reg	7 3/4 5 3/4	NC 46 (4 IF) NC 50 (4 1/2 IF)	6 1/4 6 3/8	2 13/16	5.500	4 1/4	1820
5 1/4	40, 42, 46, 54	6 5/8 Reg	7 3/4	NC 56 or 5 1/2 FH	7	3 1/4	6.750	5 1/4	2780
6	40, 42, 46	6 5/8 Reg	7 3/4	6 5/8 Reg	7 3/4	3	7.625	6	3700

DIMENSIONAL DATA – HEXAGONAL KELLYS

Nom Size	Available Lengths (Ft.) (A)	Top Upset		Bottom Upset		Bore (D)	Drive Section		Approx wt. 40ft (lbs)
		API Box Thread Left Hand	OD (B)	Right Hand Connection	OD (C)		Across Corners (E)	Across Flats (F)	
3 1/2	40, 42, 46	6 5/8 Reg 4 1/2 Reg	7 3/4 5 3/4	NC 31 (2 7/8 IF)	4 1/8	1 3/4	3.937	3 1/2	1300 1200
4 1/4	40, 42, 46	6 5/8 Reg 4 1/2 Reg	7 3/4 5 3/4	NC 38 (3 1/2 IF)	4 3/4	2 1/4	4.781	4 1/4	1740
5 1/4	40, 42	6 5/8 Reg	7 3/4	NC 46 (4 IF)	6 1/4	2 13/16	5.900	5 1/4	2550
6	40, 42, 46	6 5/8 Reg	7 3/4	NC 56 or 5 1/2 FH	7	3 1/2	6.812	6	3040



INTEGRAL BLADE STABILIZERS

Interdri's Integral Blade Stabilizer is top of the line in blade type stabilization. Solid one piece construction from Spec AISI 4145 H Modified Quenched & Tempered steel offers a highly durable, superior stabilizer. Fluid passages are precision machined to provide maximum blade to wall contact and fluid circulation.

HARDFACING:

All types of Hardfacing are available.

BLADE SPIRAL:

Standard Design 270 degree Open Spiral (Optional Design 360 degree Full Wrap)

Notes:

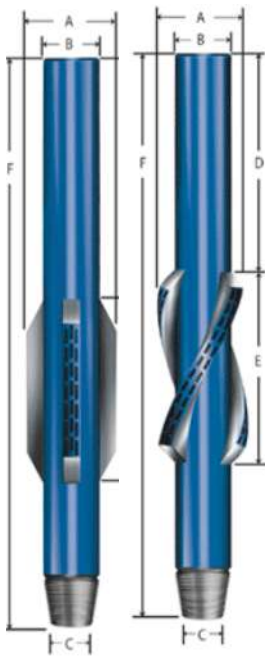
1. Standard lengths, other lengths, sizes available on customer request.
2. API Pin Stress Relief Groove and Bore Back Box supplied as an option.

When ordering or requesting quotations on Integral Blade Stabilizers, please specify:

1. Hole Size
2. Bore
3. Fishing Neck Diameter
4. Connections, Top and Bottom
5. Hardfacing

DIMENSIONAL DATA

Hole Size Diameter (A)	Fishing Neck Diameter/ St. DC Size (B)	Fishing Neck Length (C)	Bore (D)	Bottom Neck Length (E)	Blade Length / Wall Contact (F)	Blade Width (G)	Overall Length (H)	Approx. Weight lbs
6 - 6 3/4	4 1/2 4 3/4	30	2 1/4	28	16	3	75	380
7 3/8 - 7 7/8	6 1/4	30	2 1/4	28	16	3	75	780
8 3/8 - 8 1/2	6 1/2	30	2 13/16	28	16	3	75	
9 1/2 - 9 7/8	8	36	2 13/16	30	18	3	100	2100
10 5/8 - 11	8	36	2 13/16	30	18	3	100	
12 - 12 1/4	8	36	2 13/16 - 3	30	18	3	100	3000
14 3/4	9 1/2	36	2 13/16 - 3	30	18	3 1/2	100	
16	9 1/2	36	2 13/16	30	18	4	100	
17 - 17 1/2	9 1/2	36	2 13/16	30	20	4	100	4400
---	---	---	---	---	---	---	---	
21 - 24	9 1/2	36	3	30	22	4	110	
26	9 1/2	36	3	30	24	4	110	



WELDED BLADE STABILIZERS

Interdril's Welded Blade Stabilizer are manufactured to be long wearing, low cost tools, designed to give optimum wear performance in most formations. They are available with 360 degree coverage Spiral Blades or a Straight blade configuration.

FEATURES:

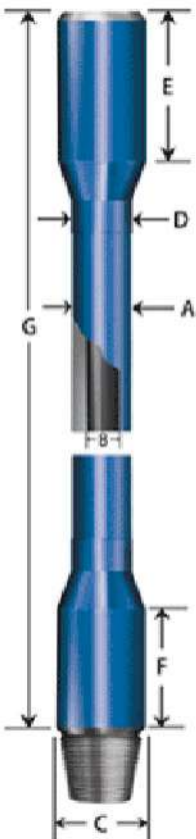
The body is manufactured from AISI 4145 H Modified Q & T Alloy Steel. The blades are manufactured from Mild Steel (which is easily washed over if necessary) and welded to the body following pre heating welding and post heating operations. A choice of four different hardfacings are available (see hardfacing illustration).

All connections are machined to API specifications.

When ordering or requesting quotations on Welded Blade Stabilizers, please specify:

1. Hole Size
2. Bore
3. Body or Drill Collar O.D
4. Top and Bottom tool joint connections
5. Hardfacing
6. Special requirements such as Stress Relief Groove on Pin and Bore Back on Box

Hole Size Diameter (A)	Body OD (B)	Bore Diameter (C)	Fishing Neck Length (D)	Blade Length (E)	Overall Length (F)	Approx Weight (lbs)	Replacement Blades Shipping Weight (lbs) (per set)
5 7/8 - 6 1/4	4 1/4 - 4 3/4	2	24	11	60	200	25
6 1/2 - 6 3/4	4 3/4 - 5	2	24	11	50	230	30
7 3/8 - 7 7/8	5 3/4 - 6 1/4	2 1/2	24	13	61	375	45
8 3/8 - 8 3/4	6 1/4 - 6 1/2	2 13/16	24	13	61	490	60
9 1/2 - 9 7/8	6 3/4 - 7 3/4	2 13/16	24	15	61	680	85
10 5/8 - 11	7 3/4 - 8	2 13/16	24	15	62	750	100
12 - 12 1/4	7 3/4 - 8 1/4	2 13/16	28	18	62	980	120
14 3/4 - 15	7 - 8	2 13/16	28	23	66	1170	170
17 - 17 1/2	7 3/4 - 9 1/2	2 13/16	28	23	66	1360	225
22	9 1/2 - 11	2 13/16	28	28	69	1775	300
24	9 1/2 - 11	2 13/16	28	28	69	1775	325
26	9 1/2 - 11	2 13/16	28	28	69	1775	340



PUP JOINTS

Interdril fully integral Drill Pipe Pup Joints are manufactured from full length bar stock of material specification AISI 4145H Modified, Q & T Alloy Steel.

When ordering or requesting quotations on Pup Joints, please specify:

1. Nominal Pipe diameter (A)
2. Bore Diameter (B)
3. Tool Joint diameter (C)
4. Size and type of connections
5. Overall length / Shoulder to Shoulder (G)
6. Grade & ppf

Notes

1. Upon request tool joints can be supplied 2" longer than standard to facilitate additional connection repairs
2. Pup Joints can be manufactured with alternative connections / diameters to those shown above
3. All connections are machined and finished in accordance with API Specifications.

DIMENSIONAL DATA

Drill Pipe	Inside Diameter	Tool Joint (C)	Connection Type and	Upset Elevator	Tong Space		Available Lengths	Approx Weight
					(E)	(F)		
3 1/2	2 7/16	5	NC 38 (3 1/2 IF)	3 7/8	10 1/2	8	5	143
							10	224
							15	310
							20	394
3 1/2	2 1/8	5	NC 38 (3 1/2 IF)	3 7/8	10 1/2	8	5	132
							10	198
							15	200
							20	332
4	2 7/16	5 1/2	NC 40 (4 FH)	4 3/16	10	7	5	178
							10	286
							15	394
							20	504
4	2	5 1/2	NC 40 (4 FH)	4 3/16	10	7	5	167
							10	242
							15	312
							20	365
4 1/2	3 1/4 3	6	NC 46 (4 IF)	4 1/2	10	7	5	220
							10	348
							15	477
							20	607
4 1/2	2 1/2 2 1/4	6 1/4	NC 46 (4 IF)	4 11/16	10	7	5	208
							10	310
							15	418
							20	524
5	3 3/4 3 1/2	6 5/8	NC 50 (4 1/2 IF)	5	10	7	5	161
							10	264
							15	345
							20	429
5	3 1/2 3	6 5/8	NC 50 (4 1/2 IF)	5	10	7	5	253
							10	422
							15	594
							20	763
5	3 1/4 2 3/4	6 5/8	NC 50 (4 1/2 IF)	5 1/8	10	7	5	229
							10	374
							15	519
							20	664



SLEEVE TYPE STABILIZERS

Interdril's Replaceable Sleeve Stabilizers are designed to reduce inventory problems by offering complete thread interchangeability. The Sleeve is a one piece casting designed for easy make up to the one piece Mandrel. The Mandrel is made AISI 4145 H Modified Q & T Alloy Steel or Non Magnetic Steel.

APPLICATIONS / FORMATIONS :

Soft to Medium – Crushed Tungsten Dressing

A wear resistant material of densely compacted, crushed Sintered Tungsten Carbide.

Hard – Tungsten Carbide Insert Dressing

Dressed with 9 /16" diameter densely spaced pressed-in Serrated Tungsten Carbide inserts the bearing area and the lower level.

Hard to Abrasive – Geothermal Dressing

Tungsten Carbide Slugs (3/8" x 1" long half round) densely spaced with a highly wear resistant matrix of Chrome and Nickel. This dressing offers the greatest wear resistance and is recommended for Geothermal Drilling.

When ordering or requesting quotations on Replaceable Sleeve Type Stabilizers, please specify:

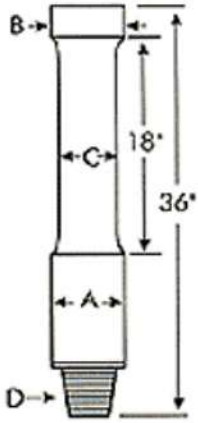
1. Drill Collar or Fishing Neck Diameter
2. Hole Size
3. Bore
4. Connections

Hole Size Range	Drill Collar Dia.	Tool Series	Sleeve Dimensions				Mandrel Dimensions								
			Length	Body Dia.	Weight Lbs. (Max)	Upset Dia	Bore		Overall Length (Nom)	Sleeve End		Fishing Neck Length		Fishing Neck Dia	Weight Lbs (Approx)
							String	Near Bit		Dia.	Length	Near Bit Pin Up	String		
6 1/4-6 3/4	4 3/4 - 5	47	14	5 3/4	46	5 3/4	2 1/4	1 1/2	54	4 3/4	27	19	23	4 3/4 - 5	235
8 3/8-11	6 - 6 1/2	62	14	7 1/2	70	7 1/2	2 13/16	2 1/4 - 2 13/16	65	6 1/4	33	22	27	6 1/4 - 7	475
8 3/8-11	6 - 7 1/4	65	14	9 3/4	95	7 3/4	2 13/16	2 1/4 - 2 13/16	65	6 1/2	33	22	27	6 1/2 - 7 1/4	510
11 1/2-12 1/4	7 3/4 - 8 1/2	77	16	9 1/4	114	9 1/4	2 13/16	2 13/16	66	7 3/4	33	22	27	7 - 8 1/2	750
13 3/4-18 1/2	7 3/4 - 8 1/2	77	19 5/8	9 1/4	368	9 1/4	2 13/16	2 13/16	66	7 3/4	33	22	27	7 - 8 1/4	750
12 1/8-12 1/4	9 - 10	96	16	11	95	11	2 13/16	2 13/16 - 3	66	9 5/8	33	22	27	9 - 10	1200
13 3/4-18 1/2	9 - 10	96	19 5/8	11	258	11	2 13/16	2 13/16 - 3	66	9 5/8	33	22	27	9 - 10	1200
20 - 26	9 - 10	96	22 1/2	12	703	11	2 13/16	2 13/16 - 3	90	9 5/8	33	22	27	9 - 10	1200

ROTARY SUBS AND OTHERS

LIFT SUBS

All Lift Subs are made from the same materials used in Drill Collars. They are machined and heat treated according to Drill Collar specifications 7-1. All connections are phosphated to prevent galling on initial make up



Drill Collar Size	Approx Weight
3 1/2 - 3 7/8	40
4 - 4 3/8	50
4 1/2 - 4 7/8	84
5 - 5 3/8	88
5 1/2 - 5 7/8	120
6 - 6 3/8	150
6 1/2 - 6 7/8	168
7 - 7 3/8	169
7 1/2 - 7 7/8	242
8 - 8 3/8	257
8 1/2 - 8 7/8	280
9 - 9 7/8	305
9 1/2 - 9 7/8	320
10	333
11	368

When ordering or requesting quotations on Lift Subs, please specify:

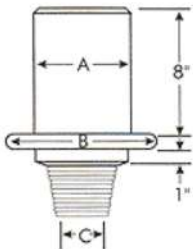
1. Drill Collar OD (Diagram Section A)
2. Tool Joint OD (Diagram Section B)
3. Tapered, Square Shoulder or combination
4. Drill Pipe OD (Diagram Section C)
5. Drill Collar connection size and type (Diagram Section D)
6. Bore

Notes

1. Add 6 inches to overall length for a box in the top of the Lift Sub

LIFT PLUGS

If specified Lift Plugs will be centre bored to reduce weight. All are manufactured from AISI 4145 H Modified Q & T Alloy Steel. For reworking the Pin threads, the Lift Subs has 1 inch of neck below the lifting plate.



Drill Collar Size (A)	Lifting Plate Dia (B)	Connections Bore (C)	Approx Weight (Ibs)
3 1/2 - 3 7/8	5 1/2	1 1/2	35
4 - 4 3/8	6	2	40
4 1/2 - 4 7/8	6 1/2	2 1/2	50
5 - 5 3/8	7	2 1/4	58
5 1/2 - 5 7/8	7 1/2	2 1/4	70
6 - 6 3/8	8	2 1/4	82
6 1/2 - 6 7/8	8 1/2	2 1/4	90
7 - 7 3/8	9	2 13/16	100
7 1/2 - 7 7/8	9 1/2	2 13/16	118
8 - 8 3/8	10	2 13/16	128
8 1/2 - 8 7/8	10 1/2	2 13/16	132
9 - 9 3/8	11	2 13/16	150
9 1/2 - 9 7/8	11 1/2	2 13/16	165
10	12	2 13/16	178
11	13	2 13/16	245

When ordering or requesting quotations on Lift Plugs please specify:

1. Drill Collar OD (Diagram Section A)
2. Drill Collar Connection Size and Type
3. Bore (Diagram Section C)

SUBS

Interdri's Integral Substitutes are manufactured from Alloy Steel AISI 4145 H Modified conforming to the requirements of API specification 7-1. All connections are machined to API specification. Thread roots are cold rolled and phosphated to minimize galling. Substitutes are manufactured with straight or reduced section as shown below.



When ordering or requesting quotations on Subs, please specify:

1. Identify use (e.g. DC/DC-DC/DP-Bit Sub etc)
2. Outside Diameter
3. Bore
4. Overall length
5. Size and Style of connection
6. Whether stress Relief Groove and or Bore Back are to be incorporated

For reduced section Substitutes include :

1. Outside diameter of reduced section
2. Length of reduced section

For Bit Substitutes include

1. Float Bore & Style

THREAD PROTECTORS

Interdril Heavy Duty Pressed Steel Thread Protectors are fitted to Tubulars and other products to protect threads during transit and storage.

When ordering or enquiring, please specify:

1. Connection type, size and if Pin or Box protector is required.



Pin Protector



Box Protector

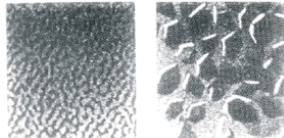
DIMENSIONAL DATA

OD Range	Connection Size and Type	Pin Protector Wt. (lbs)	Box Protector Wt. (lbs)	Wt. per set (lb)
3 1/8 - 3 1/2	2 3/8 Reg NC 26 (2 3/8 IF)	1/2	1/2	1
		1	3/4	1 3/4
4 - 4 3/8	NC 31 (2 7/8 IF) 2 7/8 Reg 3 1/2 Reg	1 1/2	1 1/4	2 3/4
		1 1/2	1 1/4	2 3/4
		1 1/2	1	2 1/2
4 1/2 - 5 1/8	3 1/2 XH NC 38 (3 1/2 IF)	1 1/2	1 1/4	2 3/4
		2 1/4	1 3/4	4
5 1/8 - 5 3/4	3 1/2 FH NC 40 (4 FH)	1 3/4	1 1/2	3 1/4
		2 1/4	2 1/4	4 1/2
5 3/4 - 6 1/4	4 1/2 Reg 4 1/2 FH	2 1/2	1 1/2	4
		2 1/2	2 1/4	4 3/4
6 1/4 - 6 3/4	NC 46 (4 IF) 4 1/2 XH 4 1/2 H-90	3	1 3/4	4 3/4
		3	1 3/4	4 3/4
		3	2	5
6 3/4 - 7 1/2	5 1/2 Reg NC 50 (4 1/2 IF) 5 XH	3 1/4	2	5 1/4
		3 1/4	2	5 1/2
		3	2	5
7 3/4 - 8 1/4	5 1/2 FH 6 5/8 Reg 6 5/8 H-90	3 3/4	2 3/4	6 1/2
		6 3/4	6 3/4	9 1/2
		4 1/4	2 1/4	6 1/2
8 1/4	6 5/8 FH	6 1/2	5	11 1/2
		6 5/8 FH	6 5/8 FH	11 1/2
9 - 10	7 5/8 Reg	7 3/4	3 1/2	11 1/4
		7 3/4	3 1/2	11 1/4

HARDFACING

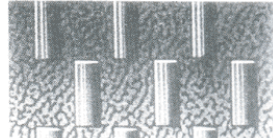
InterDril offers a complete line of premium hardfacings to match your drilling requirements.

Crushed Tungsten Carbide (CTC)



CTC – A composite of Crushed Tungsten Carbide in a wear-resistant Chrome Nickel Matrix “Weardril”.

Geothermal Dressing (GTD)



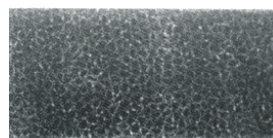
GTD – A combination of Tungsten Carbide Slugs and wear-resistant Chrome Nickel Matrix “Weardril”. This combination offers 50% more Carbide than CTC.

Tungsten Carbide Inserts (TCI)



TCI - Tungsten Carbide inserts with a serrated diameter to offer tighter placement in the blade material.

T2000



TC 2000 becomes physically fused to the parent metal. In this unique hardfacing process, additional protective strength is realized because the concentration of Tungsten Carbide particles covers over 70% of the wear surface and is suspended in a hard, tough matrix.

**BOX LIFT BAIL
PIN LIFT BAIL**

Interdril Cast Steel Lifting Bails thread protectors are fitted to Drill Collars to Protect threads during transit and storage Provide lifting points when the Drill Collars require picking up or laying down. The normal lift capacity of the Protectors is 1 1/2 times the Drill Collar weight.



OD Range	Connection Size and Type	Pin Protector Wt. (lbs)	Box Protector Wt. (lbs)	Wt. per set (lb)
3 1/8 - 3 1/2	3 3/8 Reg NC 26 (2 3/8 IF) 2 7/8 PAC	6	6	12
		6	6	12
		6	6	12
4 - 4 3/8	2 7/8 XH NC 31 (2 7/8 IF) 3 1/2 Reg	9	8	17
		9	8	17
		9	8	17
4 1/2 - 5 1/8	NC 35 3 1/2 XH NC 38 (3 1/2 IF)	12	10	22
		12	10	22
		12	10	22
5 - 5 3/4	NC 40 (4 FH)	15	14	29
5 3/4 - 6 1/4	4 1/2 Reg 4 1/2 FH	21	19	40
		21	19	40
6 1/4 - 6 3/4	NC 46 (4 IF) 4 1/2 H-90	20	18	38
		20	18	38
6 3/4 - 7 1/2	5 1/2 Reg 5 1/2 H-90 NC 50 (4 1/2 IF)	23	20	43
		23	20	43
		23	20	43
7 1/4 - 8 1/4	5 1/2 FH 6 5/8 Reg 6 5/8 H-90	33	30	63
		33	30	63
		33	30	63
8 1/4 - 9	NC 61	32	32	64
9 - 10	7 5/8 Reg	66	62	128
10 - 11	8 5/8 Reg	77	73	150

MUD PUMPS

DRILLING SERVICES LTD PROVIDES PARTS FOR THE FOLLOWING EQUIPMENT:

BOMCO: F-800, 100, 1300, 1600
BREWSTER: B-550-F, 750-F, B-1000-T, 1100-T, 1300-T, 1600-T
EMSCO: F-350, 500, 650, 800, 1000, 1300, FA-1300, 1600, FB-1300, 1600, FC-1300, 1600, 2200; D-175, 300, 375, 500, 550, 700, 1000, DA-500, 700, DB-550, 700
EWCO: W-250, 440, 446, 600, 850, 1000, 1000, 1312, 1612, 2215, WH-440, 600, 1000, 1300, 1312, 1612, 9W1000, 14W400, 15W600, 16W-800
GARDNER DENVER: TEE, PA8, TGF, TGH, PAH, PZ-7/8/9/10/11, PZL.PX-11

GASO: FIG 1550, 1654, 1742
GAPCO: GA-550, 750
IDECO: MM-450/550/600/700/1000, T 500/800/1000/1300/1600
DRILLMEC: 7T500/7T508/8T650, 9T800/1000, 12T1600
HONG HUA: HHF-1000/1300/1600
LS-NOW: 3NB-1000C/1300C/1600
LS-NOV JWS: 165/340/400, 7P/8P/9P/10P/12P/14P, C-150/250/350, K-380/500/700, G-700, N-1300
OILWELL: 350PT, A-560/600/850/1100/1400/1700, HD-1400/1700, 612P
OMEGA: D-750
OPI: 350/500/700/1000
WILSON: 600
WIRTH: TPK-1300/1600/2000/2200

MODULES

Modules are hardened internally from premium AISI 8620 or 4135 alloy steel & are available in various configurations. These highly durable modules can meet a wide range of applications.

The interchangeable suction and discharge connections enable adaptability to most OEM fluid end modules, eliminating the need for expensive spare part inventories. Pressure ranges include: 5,000, 7,500 & 10,000.



DIAPHRAGMS

Precision machined from high quality steel castings to assure OEM conformance under extreme pressures. Available in a variety of different styles and sizes.



CRANKSHAFTS

Crankshafts are precision machined, ground and highly polished from high tensile strength forged and cast steel blanks. This process ensures the precise and accurate balancing, designed for minimize the vibration, eliminating the problem of microscopic cracking which guarantees the extended run life of the rotating assembly.



CROSSHEADS AND GUIDES

Crossheads and guides are precision machined from high quality steel castings to original OEM specifications for a large variety of mud pumps; this part ensures that the piston rod only moves in the same direction of travel as the piston.



MANIFOLDS WELDED FITTINGS

Manufactured direct replacement Manifolds both for suction and discharge that control how much fluids flows are exact OEM specifications.

Manifolds are available for all major OEM pumps and consistent with ANSI/API standards.



HIGH CHROME LINERS

High chrome liners are made with a high chrome iron sleeve in a forged steel hull. The bore hardness is 60 to 67 on the Rockwell C scales, while the hull has a high tensile strength of more than 90,000 psi.

Combining the characteristics of chrome with state-of-the-art manufacturing, the liners can withstand mud pressures of up to 10,000 psi. The life of our high chrome liners have proven to reach on average more than 800 hours of service.



CERAMIC LINERS

Ceramic liners offer longer run times and lower operating costs when compared to chrome iron liners. The ceramic sleeve material is manufactured from alumina oxide, known for its wear resistance and proven run times in all types of operating conditions.

The outer hull material for large bore liners is manufactured from alloy steel to increase yield strength and aid in fatigue resistance. Ceramic liners are corrosion resistant and have a smoother surface finish which helps reduce friction and heat.



GEARS

Gears are precision cut from castings or forgings, depending on gear applications, to OEM specifications for exact interchangeability and extended service life.



BEARINGS

Bearings are manufactured to precise OEM tolerances assuring proper fit and alignment for extended service under extreme and demanding oilfield conditions.



PISTON AND EXTENSION RODS

A full line of Piston Rods and Extension Rods machining tolerance are tightly held to assure proper fit of all components, are available for various pumps. Made of forged alloy steel with thermal refining treatment, the result yields excellent mechanical characteristics. Duplex and triplex components are available.



PISTONS AND PISTON RUBBERS

Pistons are made to exact tolerances and include a variety of extended wear materials yielding excellent service life. Piston combinations include the following combinations from 3" to 8" sizes and available for all pressures.

- Long Life Bonded Piston with Rubber and Fabric
- Long Life Bonded Piston with Urethane
- Long-life Bonded Piston with NBR
- Long-life Bonded Dual-Hardness
- White Lighting Pistons

All pistons and piston rubbers mentioned above are ideally suited for either oil-based or water-based mud and interchangeable with OEM counterparts. Service life is dependent on electrometric choice which guarantees the maximum service life at the minimum cost.



VALVES & SEATS

High performance valves and seats contain the following features:

- Forged alloy steel AISI 4119 construction
- Heavy-duty valve design
- Deep carburized wear surfaces
- Heavy-duty durable retainer threads
- Taper post-heat treated and machined to eliminate distortion
- Precisely machined to API standards
- Available in a variety of sizes to fit all major mud pumps
- Expansive range of valves and seats
- Premium Cross Arms valves and seats
- Full-open valves and seats
- Long-life valves are available in a wide range of options for requirements not met by hardened or stainless steel valves and electrometric – insert valve seats.



HYDRAULIC SEAT PULLER

Our pullers offer a safe, quickly, efficient and economical option for removing seats quickly and efficiently with no chance of damage to the seat deck. Sizes are available from API 3 – API 9. We offer a complete line of puller heads compatible with most OEM models.



FLOAT VALVES

Drill Pipe Float Valves provide added blowout protection. String joints are added to prevent flow back and drill pipe plugging. Equipment is available in Baker and NOV styles.



SHEAR RELIEF VALVES

Shear Relief Valves are available in several OEM configurations, sizes and pressure ratings.



OTHER PARTS

We also supply other expendable fluid end parts such as threaded rings, O-Rings Non-Standard Sizes, Connecting Rods, Pinion Shaft, Liner Clamps, Rod clamps, Valve Pot Covers, Liner cages, Wear Plates and Valve Guides, Piston Hubs and Rods, piston red clamps, liner cages, liner end covers, Snaw rings, Power-End Gear Assy, Swivel Joint Packing Sets, API Urethane, Valve Inserts, Wash pipe Packing Sets, Wellhead Rubber Products, Oilfield Chains, BJ Stabilizer Rubbers, Mud Bucket Repair Parts, Hammer Union Seal Rings, Centrifugal Pump Packing Sets, Rod Baffles and Splash Guards, AR Valve Inserts, Coupling Gaskets, Pipe wipers, for most major OEM's. These parts are machined from top quality material to ensure long hours of operation.

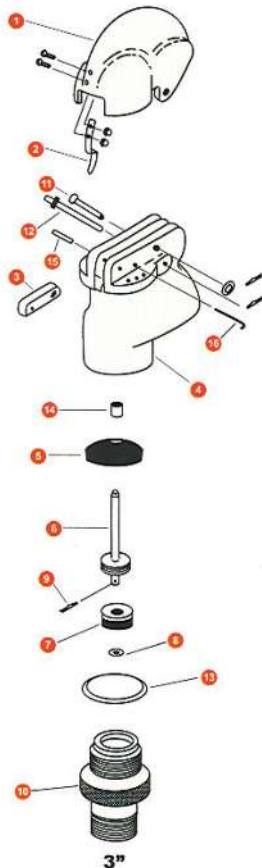
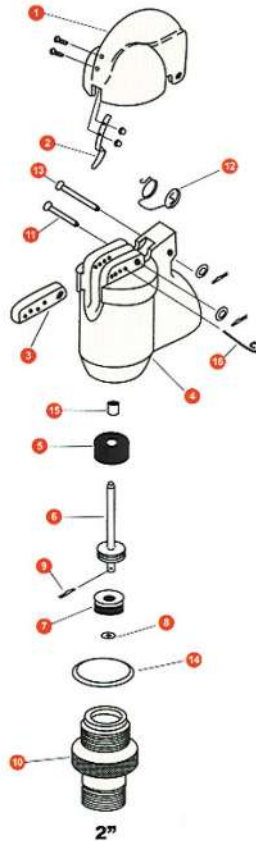




2"

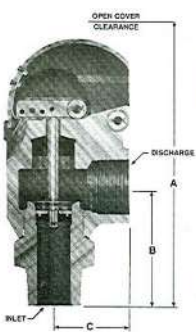


3"



Ref. No.	MATERIAL & DESCRIPTION	PRESSURE & SIZE		
		2" 1000	2" 2750	2" 5000
1	COVER ALUM.	2368		
2	LATCH SPRING W/SCREWS & NUTS	1720		
3	SHEAR BAR SST-17-4 PH	17064	17065	
4	BODY	17063-002	17062-002	
5	CUSHION BUNA-N	2372		
6	STEM SST-17-4 PH	1927-003	1238-003	2373-003
7	SEAL BUNA-N	2929	1240	1568
8	WASHER SST-18-8	5884-0131316		
9	COTTER PIN SST	5421-09312		
10	SUB STEEL-C1213	12379-002	2930-002	2374-002
	SUB SST-303	12379-003	2930-003	2374-003
11	PIN, SHEAR BAR STEEL-4140	5418-37517		
12	COVER SPRING SPRING STEEL	2375		
13	PIN, COVER STEEL-4140	5418-37537		
14	GASKET COPPER	2931		
15	BUSHING BRONZE	17027		
16	SHEAR PIN KIT CONTROLLED STEEL WIRE (COLOR)	17458	17459	
		10 (#6)	10 (#10)	COPPER

Ref. No.	MATERIAL & DESCRIPTION	PRESSURE & SIZE		
		3" 4000	3" 5000	3" 7500
1	COVER TEN Z. ALLOY	2937		
2	LATCH SPRING W/SCREWS & NUTS	1720		
3	SHEAR BAR 17-4 PH-SST	NEW PIN 17067 OLD PIN 2672		
4	BODY	2084		
5	CUSHION BUNA-N	2939		
6	STEM 17-4 PH-SST	2942	1622	1623
7	SEAL BUNA-N	2945	1242	1243
8	WASHER SST-18-8	5884-0191913		
9	COTTER PIN	5421-09312		
10	SUB C1213 STEEL	2952	2953	NA
	SUB 303 SST	2949	2950	2951
11	PIN, SHEAR BAR STEEL-4140	NEW PIN 5418-37527 OLD PIN 5418-43735		
12	PIN, COVER STEEL-4140	2093		
13	GASKET COPPER	2954		
14	BUSHING BRONZE	17028		
15	SPRING PIN	5448-25025		
16	SHEAR PIN KIT CONTROLLED STEEL WIRE	2955		
		INCLUDES 10 OF EA. SIZE		
	COLOR	2955-30	2955-40	2955-50
		2955-60	2955-50	2955-60

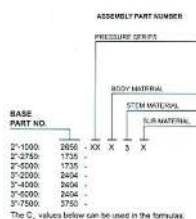


VALVE PRESSURE SETTINGS

VALVE SIZE	SHEAR PIN NUMBER (ONE ONLY)	SETTINGS (PSI)
2"-1000	#6	400, 500, 600, 1000
	#10	1250, 1750, 2250, 2750
	#15	2300, 3000, 4100, 5000
3"-4000	#30	2400
	#40	3100
	#50	3800
	#60	4500
3"-5000	#30	2500
	#40	3200
	#50	4100
3"-7500	#30	5000
	#40	5400
	#50	6120
	#60	6750

DIMENSION	SIZE	2"-1000	3"-4000	3"-5000	3"-7500
A	11	15-3/8			
B	4-3/4	6-7/8			
C	3-3/8	4-5/8			
THREADS		2" API LP	3" API LP		
WEIGHTS		25 Lbs.	35 Lbs.		

VALVE SIZE	C _v	SHEAR PIN NUMBER	PIN DIAMETER (IN) ± .002
2"-1000	92	#6	.1130
2"-2750	52	#10	.1483
2"-5000	25	#15	.2070
3"-2000	130	#40	.2253
3"-4000	66	#50	.2437
3"-5000	56	#60	.2625



$$Q = C_v \sqrt{\frac{\Delta P (R.34)}{D}}$$

$$\Delta P = \left(\frac{Q}{C_v} \right)^2 (R.34)$$

Q = Gallons per minute of flow through valve.
 ΔP = Pounds per square inch pressure drop across the valve.
 D = Density of fluid in pounds per gallon.

2 PIECE VALVES

The Global Two Piece Kelly Valve is a manually operated ball valve with a positive 90 degree rotation. The Two Piece Kelly Valve is located above and below the Kelly to close off the flow of fluid through the bore of the drill string. The Two Piece Kelly Valve on the lower end of the Kelly can also be used as a mud saver by closing the valve before breaking a tool joint connection. Global Two Piece Kelly Valves are manufactured to API Specification 7 requirements for rotary drilling equipment.



ONE PIECE VALVE

The Global One Piece Kelly Valve is an alternative to the Two Piece Valve where working space is limited. The One Piece Kelly Valve construction eliminates the service connection that is used on the Two Piece Valve. One Piece Kelly Valves are available as Upper and Lower Kelly Valves. They can also be used as a mud saver by closing the One Piece Valve on the lower end of the Kelly before breaking a tool joint connection.



TOP DRIVE VALVES

Global Top Drive Valves are interchangeable with the valves used in most top drive systems.

The Top Drive Valves have pressure ratings up to 15,000 psi working pressure and are available in single and dual stem configurations. These valves are made from high quality materials to meet the hook loads and torques used in today's deepwater operations.



INSIDE BLOW OUT PREVENTOR VALVES

Global inside Blowout Preventer (IBOP) is used to provide shutoff of backflow during periods when the drill string is open. The valve is held with the dart in the open position to allow stabbing during backflow. After stabbing the flow is shut off by turning the release handle. The stab body is removed and the drill string can be reconnected to re-establish pressure stabilization. The valve can then be removed and returned to its ready state or it can be left in the drill string to ensure downward flow only.





ANCHOR TYPE WEIGHT INDICATOR

Anchor Type Weight Indicator System is designed to give accurate readings of hook load and weight on bit. The system is designed to work with all major dead line anchors using a tension or compression loadcell. The system includes 12" or 16" indicator, dial set, hose, and loadcell. The system is available in box mount or panel mount styles. Metric equivalents in Kgs and DaN.

MODEL 30G

- For Loads to 30,000 lbs.
- 4, 6, and 8 Lines Strung
- Uses 16.1 Sq. In. Anchor Type Compression Loadcell
- 12" Indicator with Target Pointer

MODEL 40FS

- For Loads to 40,000 lbs.
- 4, 6, 8, and 10 Lines Strung
- Uses 16.1 Sq. In. Anchor Type Compression Loadcell or 16.1 Sq. In. FS Tension Loadcell
- 12" Indicator

MODEL 50D

- For Loads to 50,000 lbs.
- 6, 8, 10, and 12 Lines Strung
- Uses 36.767 Sq. In. Anchor Type Compression Loadcell or 36.767 Sq. In. Bronze Tension Loadcell
- 16" Indicator

MODEL 75E

- For Loads to 75,000 lbs.
- 6, 8, 10, and 12 Lines Strung
- Uses 50 Sq. In. Anchor Type Compression Loadcell or 36.767 Sq. In. Bronze Tension Loadcell
- 16" Indicator

MODEL 100EB

- For Loads to 100,000 lbs.
- 8, 10, 12, and 14 Lines Strung
- Uses 50 Sq. In. Anchor Type Compression Loadcell or 36.767 Sq. In. Bronze Tension Loadcell
- 16" Indicator



MODEL 125

- For Loads to 125,000 lbs.
- 10, 12, 14, and 16 Lines Strung
- Uses 50 Sq. In. Anchor Type Compression Loadcell
- 16" Indicator

MODEL 150

- For Loads to 150,000 lbs.
- 10, 12, 14, and 16 Lines Strung
- Uses 50 Sq. In. Anchor Type Compression Loadcell
- 16" Indicator

MODEL 200

- For Loads to 200,000 lbs.
- 10, 12, 14, and 16 Lines Strung
- Uses 50 Sq. In. Anchor Type Compression Loadcell
- 16" Indicator

ORDERING SPECIFICATIONS:

- Single Line Load
- Number of Lines Strung
- Type of Deadline Anchor
- Size of Wireline
- Length of Hose

AUTOMATIC DRILLER

State-of-the-art driller automatically maintains optimum weight on bit. The Satellite Automatic Driller has proven to be the most reliable Auto Driller on the market. By sensing deadline tension and automatically adjusting the weight on bit you are assured of a constant weight on bit which allows for maximum ROP's. This automatic driller has proven to reduce driller fatigue while raising the ROP's even in the most difficult drilling conditions.



SATELLITE AUTO DRILLER FEATURES:

- High speed-Low Speed gear unit for various rates of penetration.
- Doghouse control unit is hydraulically activated and receives the weight signal directly from the rig's weight indicator or deadline anchor sensor.
- Crown Oilfield Instrumentation's Auto-Driller

components include:

- o Deadline tension sensor.
- o Controller assembly.
- o Air motor.
- o Two Speed differential gear assembly.
- o Drum rotation sensor.
- o Flex shaft.

BENEFITS:

- Automatic driller has been designed to work in the harshest of environments.
- Reduced Driller fatigue.
- Unit is operated pneumatically using rig air pressure.
- High-Low Speed gear unit allows exceptional control in all drilling conditions and formations.
- Easy to adjust and maintain weight on bit control maintains constant penetration rate.

TO ORDER SPECIFY:

- Draw works Make and Model.
- Rated depth of rig.
- Distance from drum sensor to High-Low speed gear unit.
- Weight indicator Make and Model.



BULK TANK WEIGHT INDICATOR

Bulk Tank Weight Indicator System is designed to give accurate readings for weighing of drilling muds, chemicals, and cement on land and offshore rigs. The system includes 6", 8-1/2", 12", or 18" bulk tank indicator with standard 25 ft. hose and compression loadcell or tension loadcell.

FEATURES:

- 6", 8-1/2", 12", or 18" dial face with colorful custom logos
- Standard capacities up to 300,000 lbs for a 2:1 load distribution and 450,000 lbs for a 3:1 load distribution
- Adjustable rotating dial for easy tare adjustments
- Metric equivalents in Kg, DaN, tons, and metric tons are available

ADVANTAGES:

- Easily visible dial face allows clear viewing from long distances
- Easy installation, no external power source is needed



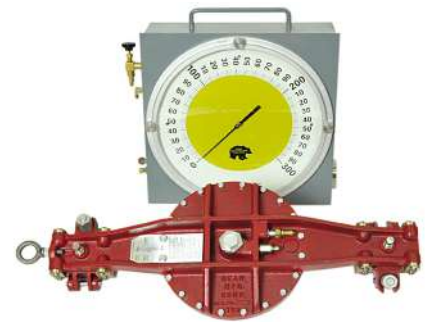
- Fluid filled indicator reduces shock, vibration, and corrosion
- Adjustable damper allows for smooth pointer movement under intense situations
- The system is easy to service in the field by your own maintenance personnel

ORDERING SPECIFICATIONS:

- Capacity of Indicator
- Ratio of Tank
- Length of Hose

BEAR WEIGHT INDICATOR

The Bear Weight Indicator employs the use of a pneumatic strain gauge diaphragm which hooks up to a large 16" gauge face enclosed in a metal box. By using the diaphragm assembly, this unit can be used in place of anchor style weight indicators at a much lower cost. Another advantage is that this weight indicator uses air as opposed to hydraulic fluid and thus eliminates oil leaks, air bubble traps in line, and changing outside temperatures. This provides a much more reliable weight reading no matter what the circumstances are.



CIRCULAR CHART RECORDERS

12" circular chart recorders are built to operate in the most rugged of climates. Similar to Martin Decker chart recorders, they have proven to be extremely dependable and are available in numerous configurations. Recorders come in either truck mount configurations or portable configurations to meet your every demand. All recorders are available with various clock options and pressure ranges. Dual Pen recorders are capable of recording two pressure inputs simultaneously.

FEATURES:

- Comes in Truck Mount or Portable variations.
- Available in 1 or 2 pen versions.
- Can be calibrated for use up to 15000 p.s.i.
- Highly accurate, calibrated to within +- 1% of full scale accuracy.
- Available in English or Metric versions.
- Gauges built into base upon request.
- Comes complete with 1 box of charts, hand pump and 1 quart of Crown Oilfield Instrumentation all weather Instrument Fluid.
- High pressure hose and disconnects available.
- Optional rubber cup type diaphragm protector, 1:1 piston isolator available. Sensors come complete with 2" 1502 type wing nut.

BENEFITS:

- Industry standard design allows operators to stock one line of recorder charts and expendables.



- Recorder design allows replacement with no modification to mounting boxes or additional operator training.
- Portable model uses standard 6" fluid filled gauge.

TO ORDER SPECIFY:

- Pressure range or capacity to be recorded.
- Portable or truck mount.
- Number of pens required.
- English or Metric.
- Gauges required in base, yes or no.
- Sensor requirements.
- Hose requirements.



COMPOUND POINTER PRESSURE GAUGE SYSTEMS



Compound Pressure Gauge systems are designed to provide a quick, accurate display of pump pressure. Main applications are for hydrostatic testing, down hole cementing operations and high pressure fracturing. A 360 degree sweep dial makes one full rotation while the 4:1 Vernier needle makes 4 full rotations so even the smallest pressure changes can be seen.

The system consists of a 6-inch Pressure Gauge, a Gauge Protector, and a Hydraulic Hose.

FEATURES:

- Standard capacities of;
- 4000, 8000, 12000, and 16000 psi
- 40 mPa, 80 mPa, 120 mPa,
- 400, 800 and 1200 kg/cm²
- Diaphragm Rubber Gauge Protector comes complete with 2" NPT 1502 wing nut
- Optional 1:1 Piston Separator comes complete with 2" NPT 1502 wing nut
- Operational temperature ranges of -50° to +150° F (-45° to +65° C)

BENEFITS:

- 6" dial face for easy viewing
- Rugged, accurate and dependable for years of trouble free service
- Flexible mounting design makes this gauge perfect for use on oilwell pumping trucks
- Full 360 degree pointer sweep indicates the smallest pressure changes
- Operator-adjustable damper allows for more accurate readings under extreme conditions
- Gauge is fluid filled
- Standard capacities up to 16000 psi
- Available in English or Metric
- Available in box mount design or panel mount design
- Vernier pointer offers for indicating the smallest pressure changes
- Operator adjustable dampener to allow full control of gauge sensitivity
- Accuracy rate of +/- 1 percent of full capacity
- Available with diaphragm protector or 1:1 piston isolator sensor
- Measurements can be easily recorded on a Crown Oilfield Instrumentation hydraulic circular chart recorder

TO ORDER SPECIFY:

- Required capacity
- Hose length
- Gauge mounting (Box mount or Panel Mount)

COMPRESSION LOAD CELLS



Compression load cells are designed to indicate accurate readings by transmitting the applied compression load to a connected indicator. Our compression load cell is available in many sizes and is used in many different applications in the oil and gas industry. Each compression load cell we offer meets the highest standards in accuracy and durability.

HYDRAULIC LOAD CELLS

Hydraulic load cells are built with a long lasting diaphragm that eliminates friction and leaks commonly found in less sophisticated hydraulic sensors. Because hydraulic load cells require no electricity to operate, they are far better suited for use in outdoor environments, where the elements can affect accuracy and dependability.

OUR COMPRESSION LOAD CELLS FEATURE:

- Compact Design
- High Or Low Capacity
- Metal Foil Strain Gauges
- Durable Design
- Wide Operating Temperature Range

DRILLING RECORDER



Drilling Recorder System is designed to monitor up to 7 drilling functions. The system is completely mechanical, needs no electrical power to operate, and is easily connected to existing instrumentation through the use of quick disconnects. The system is portable, durable, and easily operated and maintained by onsite personnel. The system includes recorder, recorder stand, box of charts, 2 derrick pulleys, dog house pulley, retriever for rate of penetration function, hydraulic and air hoses, air valve, E/P transducers for RPM/SPM function, mounting plate, filter regulator, hook ups for rotary torque, and diaphragm protector for pump pressure function.

ORDERING SPECIFICATIONS:

- Number of Functions
- Description of Functions
- Pump Pressure Capacity
- Type of Weight Indicator
- Type of Rotary Table (Chain Driven or Top Drive)



Here to meet your Drilling
Instrumentation needs



INSTRUMENTATION

CRANE LOAD/WEIGHT INDICATOR



Crane Weight System is designed for use with deadline applications to indicate crane load for gantry, pedestal, derrick, barge, and locomotive type cranes. The system is ideal for construction, dockside, offshore drilling, material replenishment, and salvage operations, and helps prevent buckled booms and costly and dangerous crane accidents. The system includes 6" or 8-1/2" indicator with bracket, boom hose, whip hoses, tension cylinder or tension load cell, and clevis with pins. The convenient mounting design allows the gauge to be mounted inside or outside of the cab within plain view of the crane operator.

FEATURES:

- 6" or 8-1/2" dial face with colorful custom logos
- Standard single line load capacities up to 30,000 lbs
- Multi-scales for multiple parts line reeving and metric equivalents in kgs, DaN, tons, and metric tons are available
- Available with piston type tension cylinder or diaphragm type tension loadcell
- Standard pin sizes range from 1-1/4" to 2"

ADVANTAGES:

- Easily readable dial eliminates time consuming and difficult calculations
- Easily mounted inside or outside of the cab
- Fluid filled indicator reduces shock, vibration, and corrosion
- The tension cylinder includes a fully machined stainless steel piston rod that gives added protection against harsh saltwater environments, ensuring a long service life and minimum maintenance
- Accurate readings help ensure safe lifting operations

ORDERING SPECIFICATIONS:

- Capacity of Indicator
- Size of Indicator
- Parts Line of Crane
- Type of Loadcell
- Length of Hoses
- Size of Pin Holes

DEADLINE ANCHORS



Deadline anchors with pull capacities from 30,000 to 150,000 pounds. Constructed with top-quality steel and proof-tested to 150% of rated capacity, Hercules Deadline Anchors are highly accurate, super-strong anchors of exceptional reliability. Each Hercules deadline anchor is for use with Weight Indicators and Load Sensors.

DEADLINE ANCHOR FEATURES:

- Left-hand models available.
- Models available to handle wireline sizes from 5/8 inches to 1-7/8 inches.
- Deadline pull capacities from 30,000 to 150,000 pounds.
- Deadline anchor models available in a variety of sizes — from lightweight models for mounting on wheel-mounted rigs and on helicopter rigs — to models designed for 2-million-pound drilling masts.
- Super Grip (SG) Series Anchors tightly grip plastic-filled wire rope — as well as accommodating standard wire rope.

BENEFITS OF OUR DEADLINE ANCHORS:

- Center-point mounted drums ensure optimum accuracy.
- Smooth, machine-grooved drum surface extends cable life.
- Heavy-duty, high-grade structural steel construction with tapered roller anti-friction bearings and heat-treated alloy shaft provides a super strong anchor with exceptional durability.
- Proof-testing to 150% of rated capacity ensures superior reliability.
- Durable bronze wireline clamp inserts provide tight cable grip without damage to the line.
- Easy to install and service.

WHEN ORDERING DEADLINE ANCHORS, PLEASE SPECIFY:

- Size of rig
- Derrick capacity in pounds
- Right or left hand model
- Size of drilling wireline
- Number of lines strung

PROXIMITY SENSOR SYSTEM

Proximity Sensor System is designed to eliminate the need for belt driven generators on tachometer systems. The system uses durable proximity sensors which are mounted permanently on the mud pump. Signals received from the sensors are processed, then outputted to the electric meters, pump stroke counters, and recorders. The standard system includes outputs for digital or battery operated pump stroke counters, 3 electric meters, and 3 functions of a drilling recorder.

ORDERING SPECIFICATIONS:

- Functions to be Monitored
- Lengths of Cable
- Types of Measuring Devices Needed





DEFLECTION TYPE WEIGHT INDICATOR



This style of weight indicator has been a favorite for small drilling and workover rigs because of its versatility and compact size.

Each deflection weight indicator is shipped with 10 dials so moving it from rig to rig is easy and by simply changing a dial you can switch between drill line size and number of lines strung. Each Weight Indicator system consists of a Gauge, Deadline Diaphragm connected by a Hydraulic Hose and a C-Clamp to attach the diaphragm to the drill line. The deadline diaphragm works on a deflection principle, the tighter the drill line gets the more force is applied to the diaphragm which converts the deflection to hydraulic pressure and sends that pressure to the 12" gauge which displays weight. The whole weight indicator system fits into the steel case for convenient, compact storage. Built-in handles make the entire system easy to transport.

FEATURES:

- 12-inch gauge comes standard
- Complete set of 10 dials included from 2-lines 7/8" to 8-lines 1 1/4"
- Weight Indicator has two pointers, one for weight and the other for sensitivity which is a 6:1 ratio and ideal for work such as setting packers and bridge plugs
- Standard model comes in a compact box. Larger box available with space for 5-6" gauges and one circular recorder
- 48,000-pound maximum single-line load with 1" drill line
- 25-foot heavy duty hose standard. Other lengths available upon request
- Circular recorder (optional) can record weight
- Available in English, Metric and SI Metric

BENEFITS:

- Ready for immediate use out of the crate. Each system is assembled, calibrated and tested before shipping. System is shipped as a sealed unit from our facility with Crown Oilfield Instrumentation All Weather Instrument Fluid.
- Two adjustable dampers, one for weight and one for sensitivity allow the operator to have full control of the desired sensitivity.
- Versatile mounting options allows the weight indicator to be mounted just about anywhere on the drill floor but the diaphragm and Indicator gauge should be mounted at roughly the same height.

TO ORDER SPECIFY:

- Dial reading required, English, Metric (kg) or SI Metric (daN)
- Number of Lines strung
- Size of drilling line
- Mast Capacity
- Hose length is different from standard (25' standard)

DIGITAL MUD PUMP STROKE COUNTER

Our Pump Stroke Counter System monitors and displays the number of strokes and stroke rate on mud pumps. The system is available in configurations to monitor 1, 2, or 3 mud pumps. The standard system includes digital pump stroke counter, cable assembly, and limit switch with mounting clamp. Optional proximity sensors are also available.



PUMP STROKE COUNTER SPECIFICATIONS:

- Dimensions: 8"Lx8"Wx4"D (20.3x20.3x10.2 cm)
- Weight: 5Lbs (2.27 Kg)
- Case Material: Stainless Steel
- Front Panel Control: Power on/off, pump count clear (2-push buttons)
- Stroke Rate Range: 8 to 240 Strokes Per Minute (SPM)
- Total Accumulated Strokes: 9999 Strokes (Counter will then roll over to zero)
- Battery: 3.6 Volt Lithium Power Cell
- Battery Life: 5 years continuous operation under normal usage
- External power: none required
- Display: Liquid crystal display for total strokes & SPM
- Time Base: Quartz crystal oscillator
- Pump Switch: Any "dry" contact, open collector or pulsed voltage inputs. For open collectors, the maximum permissive voltage presented at the connector is +/- 3.6V. For pulsed voltages, the voltage range is +/-25VDC. The input is ESD protected to +/- 15kv for harsh industrial environments.
- Operating & Storage temperatures -40° C to = 75° C

PUMP STROKE COUNTER ORDERING SPECIFICATIONS:

- Number of Pumps to be Monitored
- Length of Cable

RPM/SPM METER

5" Tachometer System is designed to give accurate readings of rotary table speed with an RPM meter or to give accurate readings of pump speed coming directly from the mud pump with an SPM meter. The system is driven by a generator which is either explosion proof or non-explosion proof. The system includes 5" meter, bracket, 3-conductor cable with electric disconnects, and generator with base, pulley, and v-belt. The system is available in box mount or panel mount styles

ORDERING SPECIFICATIONS:

- Capacity of Meter
- Type of Meter
- Type of Generator
- Length of Cable
- Style of Meter





HYDRAULIC ROTARY TORQUE SYSTEM

Hydraulic Rotary Torque System is designed for rigs that use a chain driven rotary table. The system displays a relative indication of rotary torque to alert drillers of changes in the drilling parameters to help avoid twist offs.

The system consists of a 6" fluid-filled gauge in either a box mount (damper attached to gauge) or Panel Mount (remote damper), Idler assemble with rubber wheel or chain sprocket, hydraulic hoses and disconnects as well as a recharge kit that consists of a hand pump and all Weather Instrument Fluid.

BENEFITS:

- Provides early warning of impending over-torque situations and helps with decisions regarding bits and torque patterns.
- System has been in use world wide for many years and has proven to reduce torque problems such as twist offs.

FEATURES:

- Rugged 6" Fluid Filled gauge can be box mounted or panel mounted.
- Gauge readings are all relative indications of torque only.
- Adjustable dial so gauge can be re-zeroed as pipe weight increases.

TO ORDER SPECIFY:

- Gauge reading 500 or 100 points.
- Hose Length.
- Box or panel mount.
- Rubber wheel or chain sprocket (specify chain size).
- Length of hose.



MINI, OR "MIDGET" WEIGHT INDICATOR SYSTEMS ARE IDEAL FOR SMALL WORK OVER RIGS

Mini Weight Indicators come mounted in a sturdy box for ease of transport. The Mini Weight Indicator Systems provide accurate weight indications for small work over rigs. Each system comes complete with a 6" fluid filled gauge with built in damper assembly, heavy duty steel box, standard 25 feet of high pressure hose, load cell, hand pump and one quart of all weather instrument fluid.

FEATURES:

- 6" dial face on gauge allows clear viewing from long distance
- Rugged design over years of service has proven this gauge to be accurate and dependable in extreme conditions
- Accurate measurements in extreme conditions — operational in ambient temperature range of -50° to 150° F (-45° to 65° C)
- Accuracy as shipped from the shop of $\pm 1/2$ of 1 percent of full scale capacity
- Mini Weight Indicator System is provided with a 6.53 sq. inch piston type load cell which has a working capacity of 25,000 pounds single line load. Non-Spin model available upon request.
- Super Mini Weight Indicator System comes with a 16.1 sq. inch diaphragm type tension load cell which has a working capacity of 30,000 pounds single line load
- Available in English, Metric, or dual scale divisions
- System is shipped pre-charged with instrument fluid from the shop and no additional assemble is required

TO ORDER SPECIFY:

- Single Line Load
- Derrick capacity
- Size of drilling line
- Number of lines strung in blocks
- Required hose length (25-foot standard)
- Dial scale required
- Style of load cell





PRESSURE DEBOOSTERS

Our pressure deboosters are built using top quality materials, ensuring durability and long life. Each pressure deboosters is made here in the U.S., and is highly accurate - delivering an accuracy rate of $\pm 2\%$ of full scale. Our deboosters are ideal for use with our pressure gauges, transducers, and recorders, which are calibrated for use with pressure deboosters. Our pressure deboosters are available in a variety of models, so you can choose the perfect solution for any job.

PRESSURE DEBOOSTERS & PRESSURE REDUCTION SENDING UNITS (PRSU'S)

The 4:1 pressure deboosters enables accurate readings from pressure gauges, transducers, and recorders. Crown's 4:1 pressure deboosters is designed to also serve this purpose while reducing line pressure by a ratio of 4:1. This allows the operator at the panel to see only 25% of the actual pressure seen at the manifold.

ABOUT OUR PRESSURE DEBOOSTERS:

- 4:1 pressure deboosters are designed to reduce line pressure by a ratio of 4:1. This allows the operator at the panel to be exposed to a 1/4 of the actual pressure that is seen at the manifold. Gauges are calibrated at 1/4 of the line pressure to reflect actual pressures
- Models available for working pressures of 10,000 psi, 15,000 psi and 20,000 psi.
- Available with 1502 or 2202 union and subs for standard or H2S service
- Highly accurate delivers an accuracy rate of 2 percent of full-scale capacity
- Provided completely with union and separator boot
- Designed for use with all standard pressure gauges that are calibrated for use with 4:1 deboosters

PRESSURE DEBOOSTER SPECIFICATIONS:

- Reduces line pressure by a ratio of 4:1 (75%).
- Models available for a range of maximum incoming working pressures (psi):
- Enables transmission of pressure readings over a distance of up to 100 feet
- Operating temperature range:
 - o -35 to +150 degrees F
 - o -37 to + 65 degrees C



TYPE D & F PRESSURE GAUGES

Type D gauges are designed to provide a quick, accurate display of pump pressure. Main applications are for standpipes and to be mounted on mud pumps. This style of gauge has been in service for many years and has proven to be a tough, dependable and reliable way to monitor pump pressure.

FEATURES:

- Standard capacities of:
 - o 1,000 p.s.i., 3,000 p.s.i. 5,000 p.s.i and 6,000 p.s.i.
 - o 70 Bar, 210 Bar 350 and 420 Bar
 - o 2" Nuted version available
 - o Operational temperature ranges of -50° to +150° F (-45° to +65°C)

BENEFITS:

- 5" dial face for easy viewing
- Rugged, accurate and dependable for years of trouble free service
- 2" NPT female thread
- Built in dampening
- Gauge is fluid filled for extra dampening
- Available in English or Metric

TO ORDER SPECIFY:

- Pressure Range
- Dial Capacity
- Gauge mounting (Box mount or Panel Mount) Heavy Duty Stand Pipe that are proven to be tough, dependable and accurate.
- Stand Pipe Gauges provide a quick, accurate display of pump pressure. Main applications are for standpipes and to be mounted on mud pumps. This style of gauge has been in service for many years and has proven to be a tough, dependable and reliable way to monitor pump pressure.
- Model F Gauge for capacities up to 20,000 PSI
- Model D Gauge for capacities up to 6,000 PSI





SINGLE POINTER PRESSURE GAUGE SYSTEM

Gauge provides quick, accurate check of mud pump operation. Single Pointer Pressure Gauge systems monitor mud pump operations to accurately and efficiently detect potential problems. This 6" gauge has proven itself to be the most cost effective way to monitor pressure. Gauge comes in Box mount or Panel mount configurations. The system consists of a 6" Pressure Gauge, a Gauge Protector (Rubber diaphragm type or Piston Separator type) a hydraulic Hose and hand pump.

FEATURES:

- Standard capacities include:
 - 3,000 p.s.i., 5,000 p.s.i., 6,000 p.s.i., 10,000 p.s.i., 15,000 p.s.i.
 - 7,000 kPa, 14,000 kPa, 21,000 kPa, 35,000 kPa, 42,000 kPa, 70,000 kPa
 - Also available in MPa, and BAR capacities
 - Gauge Protector comes complete with a 2" - 1502 wing nut

BENEFITS:

- 6" dial face on gauge allows clear viewing from long distance
- Rugged design over years of service has proven this gauge to be accurate and dependable in extreme conditions.
- Flexibility of mounting design allows gauge to be mounted in a drillers console, bracket mount or panel mounted in a pumping truck.
- 360 degree calibration allows operator to view the smallest pressure changes.
- Damper allows operator to adjust gauge sensitivity to ensure accurate readings in all kinds of pumping conditions.
- Fluid filled to protect the gauge from rig vibrations and frosting in winter.



TO ORDER SPECIFY:

- Application
- Required capacity
- Gauge mounting
- English or Metric divisions
- Diaphragm protector, 1:1 piston isolator or 4:1 de booster
- Hose length
- Single pointer or dual pointer (compound) gauge

WIRELINE WEIGHT INDICATORS ARE SIMPLE TO OPERATE, LOW MAINTENANCE, AND GIVE ACCURATE READINGS FOR YOUR PROTECTION OF DOWNHOLE TOOLS.

Our Wireline Weight Indicator protects your downhole tool investment by accurately monitoring the line tension to alert the operator of impending problems. These wireline weight indicators are hydraulically operated and come complete with a 6" fluid filled gauge, tension load cell (Sized for the application), hydraulic hose, hand pump and 1 quart of all Weather Instrument Fluid.

WIRELINE WEIGHT INDICATOR FEATURES:

- 6" Fluid filled gauge with dial faces available in pounds, kilograms, decanewtons, or dual scale
- Available in Box Mount or Panel Mount variations.
- Damper system allows operator to increase or decrease sensitivity easily to monitor the minutest changes.
- Each system is calibrated in our shop and is shipped precharged and ready to use.
- Calibration and line pull certificates are sent with the system.
- Available in the following capacities: 1000, 2000, 3000, 4000, 5000, 6000, and 10,000 pounds. Additional configurations available upon request.

BENEFITS OF OUR WIRELINE WEIGHT INDICATOR:

- Extremely close calibration tolerances ensure the operator of reliable readings to protect your tools while in the hole.
- Designed to operate in the harshest of climates, rated to work in temperatures of -31° to 122° F (-35° to 50° C).
- Systems come in many standard variations and are configurable to many other needs.
- Simple to use allowing the operator to focus attention to downhole conditions.
- Tension cells are quickly repairable in the field or shop.

TO ORDER WIRELINE WEIGHT INDICATORS, PLEASE SPECIFY:

- System Capacity required
- Dial Reading, English, Metric or dual scale
- Hose length





TENSION LOAD CELLS

Tension Load cells are designed to indicate accurate readings by transmitting the applied tension load to an indicator. The Tension Loadcell is available in many sizes and is used in many applications. Otherwise known as tension transducers, tension load cells are a style of transducer because they can convert sensed mechanical force into usable electrical signals for measurement in various applications which include mechanical testing, continuous system monitoring and as components of other measurement devices.

OUR TENSION LOAD CELLS FEATURE:

- Precision Accuracy
- Compact Design
- Wide Tension Capacity Range
- Durable Construction

To order please specify load cell size, size of pin holes, and the application the tension load cell is needed for.



TONG TORQUE/LINE PULL SYSTEM

Tong Torque measurement systems accurately indicate torque applied to oilfield tubulars during make up and breakout operations, thereby reducing under and over Torquing which can cause tubular failure. Each tong torque system consists of a hydraulic load cell (tension or compression type), hose assembly, 6" fluid filled gauge with damper assembly and recharge kit consisting of hand pump, and 1 quart of all weather instrument fluid. The two main types of Tong Torque Systems are:

TONG LINE PULL GAUGES

Indicates make-up or break-out torque (in pounds of line pull) for tool joints, drill collars, and drill string components. This type of system is used in applications where there are more than one set of tongs being used with different handle lengths. A 6" fluid-filled gauge reads directly in pounds of line pull which works in conjunction with a load cell that is connected directly to the tong handle. As each joint is made up, line pull is converted to a hydraulic pressure signal within the cylinder and sent to the gauge via a rubber hose, the gauge displays this signal as pounds of line pull. To determine the actual torque being applied you multiply the gauge reading by the tong handle length in feet. The gauge comes complete with a target pointer that the driller sets to a corresponding torque requirement. A large variety of systems are available with up to 30,000 pounds of single line pull. English, Metric, or dual scale systems are available.

TONG TORQUE GAUGES

Indicates torque in foot pounds applied to each joint when using power tongs to run oilfield tubulars. These systems are available for all makes and models of power tongs and come with either compression or tension type load cells that provide an accurate check of make up torque for all oilfield tubulars. Dual scale variations are also available. Rugged, simple load cell designs guarantee extra long life and ease of maintenance.

Tong Torque Systems consist of a Tension or Compression Load Cell, 6" fluid filled Gauge, 5' hydraulic hose (additional hose lengths available), fluid hand pump and 1 quart of all weather instrument fluid.

CTP SERIES:

- Indicates make-up or breakout torque (in pounds of line pull) for all oilfield tubulars.
- 6" fluid filled gauge..
- Operator adjustable target pointer that the driller sets to a corresponding torque requirement.
- Models and variations are available to work with

all manual tongs.

- Capacity ranges from 10,000 pounds to 30,000 pounds of line pull. English, metric and dual scale dial readings available. Customer logo on dial available.

CTT SERIES:

- Indicates torque in foot pounds applied to each joint when using power tongs to run oilfield tubulars.
- Models available for all makes and models of power tongs.
- Tension or Compression style load cells available for use in all power tong configurations.
- Wide variety of capacities available to suit all applications and tong configurations.
- English, Metric or dual scale variations available.

BENEFITS:

- Systems designed and built for the rugged requirements of the oilfield. Load Cell's are designed to ensure a long service life with minimum maintenance.
- 6" Fluid filled gauge has years of proven reliability and ease of maintenance.
- Target pointer on gauge helps operator maintain accurate torque.
- Box mount or panel mount configurations available.

TO ORDER TONG TORQUE OR TONG LINE PULL SYSTEMS SPECIFY:

- Tong make and model as well as dial capacity and scale required.
- Box Mount or Panel Mount.
- Hose length required if different than standard (5' for CTT series standard and 25' for CTP series standard).
- Tension or compression type load cell.



ANNULAR BOPS

DRILLING SERVICES offers remanufactured GK, GL and MSP annular BOPs that operate with only two moving components - the piston and packing element. GL annular preventers are utilized both offshore and on land-based rigs. The secondary chamber of a GL acts as a secondary closing chamber to increase reliability and safety. GK annular preventers are typically utilized for land-based rigs but may be used offshore as well. The GK has many of the same features of the GL with few parts



COMPACT ANNULAR BLOWOUT PREVENTERS (BOP)

COMPACT annular-type BOPs seal reliably on almost any size drill pipe, tool joints, drill collars, kelly, casing or wireline. The sealing element lasts and retains its ability to return to the fully opened position. Available in bolted cover, they are lightweight and provide positive pressure control for stripping drill pipe.



RAM STYLE BOPS - LWS BOP

LWS ram-style BOPs offer field-proven reliability to seal around drill pipe and across open hole. Compared to other ram preventers they feature a low overall height so minimum space is required. Single and double-cavity models are available; doubles save space and weight by combining two ram compartments into one unitized body.



RAM STYLE BOPS - TYPE U BOP

Type U Blowout Preventers feature the widest range of sizes and are the most widely used style of BOP. Well-bore pressure acts on the pressure-energized BOP to increase the sealing force and maintain the seal in the event of hydraulic pressure loss. Available in singles or doubles, they can be configured with a manual or hydraulic operating system.

When shearing force is required, type U BOPs can be supplied with shear bonnets and tandem boosters.



RAM BLOCKS

DRILLING SERVICES carries a large inventory of Type U/LWS ram blocks to fit a wide variety of tubing, drill pipe, and casing sizes. All rams are suitable for H2S and meet NACE specifications. Variable Bore Rams can be used to seal on a range of pipe sizes. We carry both large and small bore. Shear rams cut the pipe in the hole, and bend the lower section of pipe to close off the rams and seal. Shear rams can also be used as blind rams during normal drilling applications.



HYDRIL BOP SPARES

DRILLING SERVICES has the most complete inventory of standard accessories to fit all major blowout preventers. The main accessories are:

Hydril Ram Assembly

- Blind Ram
- Pipe Ram
- Blind shear Ram
- Tubing Ram
- Casing Ram
- Variable Ram
- Casing shear Ram
- Wireline shear Ram
- Fixed bore Ram



HYDRIL ANNULAR PACKING UNITS

Every Hydril packing unit is factory-tested in a BOP/ Diverter at full pressure on pipe and 50 percent of pressure on open hole. Every unit is marked with our Genuine Hydril Certified Test Label, and certifications of additional testing are also provided.

Some of the packing units offered are GK, GL, GX, FS/FSP/MSP.

OTHER ACCESSORIES

For Ram BOP:

- Ram Assembly
- Packer and Seal Kit
- Spare Parts Kit(Ram, Packer, Seal Kit)

For Annular BOP:

- Packing Element and Seal Kit
- Spare Parts Kit(Packing Element, Seal Kit)

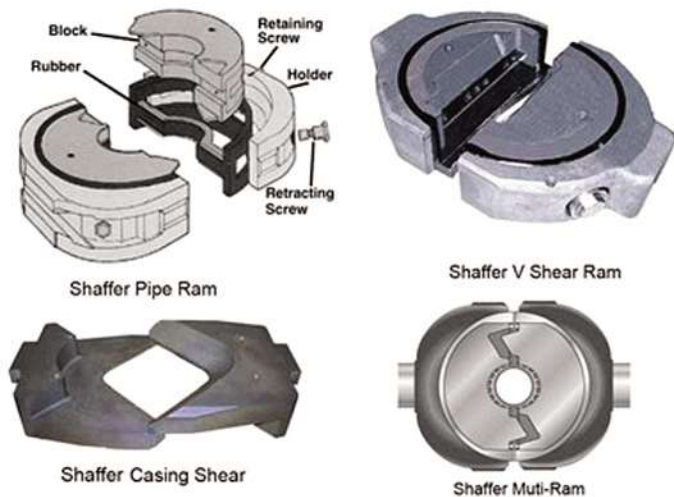


SHAFFER BOP SPARES

DRILLING SERVICES has the most complete inventory of standard accessories to fit all major blowout preventers. The main accessories are:

Shaffer Ram Assembly

- Pipe Rams
- Blind Rams/ Shear Rams
- Type 72 Shear Rams (Bind or CSO Rams)
- Type V Shear Rams
- CS Shear Rams
- Casing Shear Rams
- Multi-Rams



SHAFFER BOP SPARES CONT.

Shaffer Annular Packing Units (Packing Elements)



OTHER ACCESSORIES FOR RAM BOP:

- Ram Assembly
- Packer and Seal Kit
- Spare Parts Kit(Ram, Packer, Seal Kit)
For Annular BOP
- Packing Element and Seal Kit
- Spare Parts Kit(Packing Element, Seal Kit)

DSAs

DRILLING SERVICES stocks a wide variety of Double Studed Adapters (DSA). Most sizes and pressure rating configurations are in stock for immediate shipment. When the required size and pressure combination is not in stock, they can be manufactured or re-manufactured to fit virtually any combination. Typically, B7 all-thread studs are installed with grade 2H nuts, but tapped-end and plated studs can be installed when specified at the time of order.



SPOOLS

DRILLING SERVICES manufactures Adapter Spools, Spacer Spools, Drilling Spools, Riser and Diverter Spools in accordance with API 16A requirements. Each spool can be specially manufactured to meet height requirement needs, number of outlets and orientation and can be fabricated with hub or flanged connections. Each spool is drift-tested to ensure that access to the well-bore is not restricted. Spools are typically manufactured using API 75K, 4130 Material that meets NACE MR0175 requirements for H2S Service.



CHOKES

Adjustable and positive chokes and all are suitable for H2S environments. Adjustable chokes are available in flanged ends and positive chokes are available in flanged or threaded ends; both feature standard bore sizes from 1-13/16" thru 4-1/16", in working pressures of 5,000 psi through 15,000 psi.



CHOKE AND KILL MANIFOLDS



DRILLING SERVICES can manufacture a choke and kill manifold to meet your specific requirements, from simple low pressure to extreme sour gas service. The manifold can be designed with any number of fixed chokes, manually adjustable chokes and automatic chokes with a working pressure of 3,000, 5,000, 10,000 or 15,000 psi.

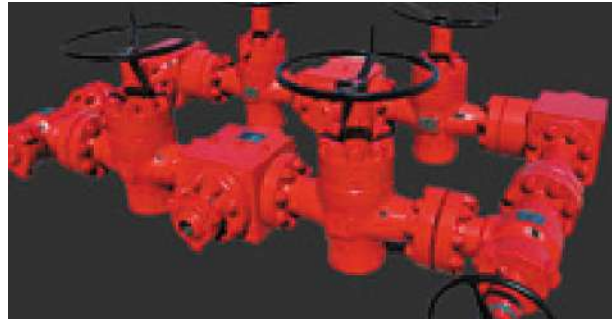


All flow fittings are suitable to H2S service as defined by NACE MRO175, even if not specifically requested. Fittings include buffer chambers, spools, crosses and tees. In addition, all components are manufactured in accordance with API spec 6A and the choke manifold assembly is manufactured in accordance with API spec 16C. Consequently, replacement parts can be purchased anywhere in the world if needed.



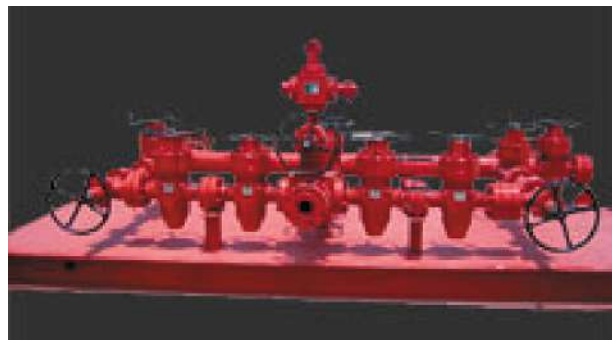
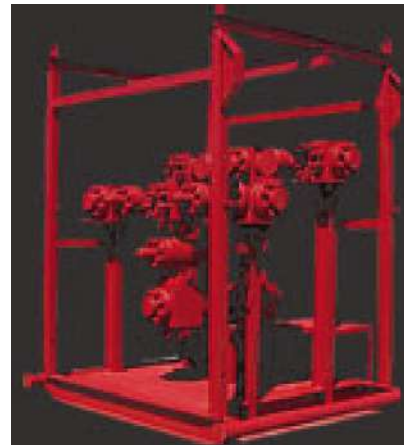
All components, including the items described in this paragraph, meet H2S specifications and all welded components receive post-weld heat treatment in accordance with approved procedures.

Welding is performed by qualified personnel, in accordance with qualified procedures. All welds are full penetration welds and conform to ASME Section VIII. All welds receive visual, magnetic particle and ultrasonic inspection to ensure the utmost quality and performance.



Telescoping and non-telescoping skids can be fabricated to fit your manifold assembly. Safety rails can be ordered to conform to safety requirements. The choke manifold is mounted to the skid using custom-manufactured u-bolts to provide strong gripping power. U-bolts, together with a strong I-beam base, provide the strength needed to maintain the correct orientation of your assembly. The u-bolt base beneath the buffer tank is also slotted to allow the buffer tank to be pulled straight back without lifting the buffer tank out of any pipe-style saddles. This enables you to remove the buffer tank with out any lifting equipment, greatly reducing down time.

DRILLING SERVICES will provide the customer with a complete data book. It contains the following:
A copy of the current API license, certificate of conformance, work order, inspection forms containing dimensional information, inspection authorities, pressure testing information, drift testing information, assembly authority, and hardness testing information. Heat treat charts and certificates are provided for each buffer tank and all welded items. Copies of hydrostatic test charts are also supplied. Material test reports, welding procedures, heat treat procedures and other possible requirements can be supplied if requested at the time of order.



CHECK VALVES

Check Valves are unidirectional, feature flanged-end connections, H2STrim (DD and EE) and are designed for use in P-U temperature ranges. They feature easy parts replacement, readily available replacement parts and can be repaired in the field without special tooling. Check Valves are used for elevated or subzero temperatures and/or high-pressure service. Check valves are available in sizes ranging from 2 1/16" 10,000psi to 3 1/16" 10,000 psi.



GATE VALVES

MANUAL GATE VALVES

DRILLING SERVICES stocks both new and re-manufactured manual gate valves in common bore sizes and pressure ranges. A wide range of body and trim materials are also available to meet various operating conditions. All valves meet API 6A specifications and NACE MR0175 requirements to satisfy your service needs.



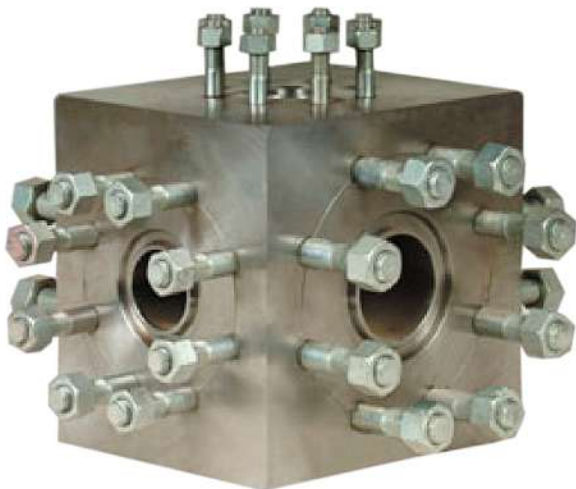
HYDRAULIC GATE VALVES

Hydraulic gate valves are available with a manual closing and locking screw and the cylinder head allows the piston to cover the exhaust port before the end of the stroke. This arrangement provides enough damping to protect the valve from shock loading. Both our manual and hydraulic valves meet API 6A specifications and NACE MR0175 requirements to satisfy your sour service needs.



TEES AND CROSSES

DRILLING SERVICES stocks a large inventory of API 6A tees and crosses from 2 1/16" to 4 1/16" with maximum service pressure ratings ranging from 2,000 psi to 15,000 psi. Common configurations include ells, tees, 4-way, 5-way and 6-way crosses. Custom sizes and configurations are also available.

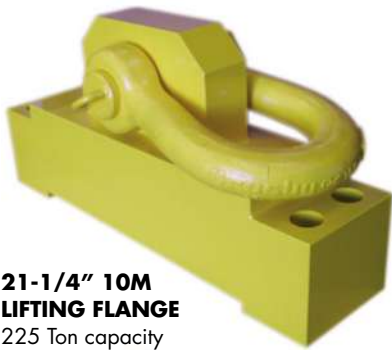


FLANGES

Our inventory of loose connectors includes common sizes of blind, target, threaded, weld-neck and adapter flanges. Specialty flanges can be fabricated to your specifications. All flanges conform to API 6A specifications.



LIFTING PRODUCTS



21-1/4" 10M LIFTING FLANGE
225 Ton capacity

TYPICAL CAPACITY
7-1/2 to 200 Tons



SAFETY HOIST RING

For attachment to spools and adapters.

Typically 2 used specify capacity and thread required



FOUR BOLT LIFT PLATE
For snubbing BOP's typical application 4-1/16" nominal size capacity 18 Tons



LIFTING FLANGE WITH TEST PORT

LIFTING HUB

For use with lifting shackle. Typical capacity 7-1/2 to 200 Tons



CHOKE AND KILL HOSE

Choke and Kill hose and coflex style choke hoses are fire resistant and covered in heavy duty stainless steel armor covering. Choke and Kill hoses are made in lengths up to 150' and in pressure ranges from 5,000 psi and up to 10,000 PSI WP with end connections available suited for H2S service and each hose comes with certificate package, hydrostatic test certificates and crated ready for export to your location. Call or email with any questions about our choke and kill, coflex style choke hoses.

See below for specs and data on the Choke & Kill hoses we supply.

5,000 PSI W.P \ 10,000 PSI TEST Choke and Kill hose

7,500 PSI W.P \ 15,000 PSI TEST Choke and Kill hose

10,000 PSI W.P \ 15,000 PSI TEST Choke and Kill hose

FEATURES

- .031 Wall on Armor

CONSTRUCTION

- Reinforcement: Two or four high strength steel cables
- Cover: Ozone, petroleum and abrasion resistant
- Thermal Blanket: 1500°F continuous rating, non-flammable and non-conductive
- Inner Tube: Petroleum resistant for oil based drilling fluids
- End Fittings: API Male nipples, threaded or butt weld hammer unions, unbolt, API flanges and other special connections.
- Certification: API 7K, API 16C Available
- Maximum Length: 110 feet
- Operating Temperatures: -22°F to 200°F (-30°C to 93°C)
- Option: Available with Stainless Steel armor and fire protection
- End Connection: Good for H2S service.



BOP CONTROL HOSE



HIGH PRESSURE TEST UNIT

High pressure test units from working pressure of 5,000 to 30,000 PSI.

These units can be used on site for hydrostatic testing of the BOP Stacks, Kill and Choke lines, Well Heads and any other item requiring hydrostatic pressure testing.



The following styles of test units are available:

- Portable Trolley Mounted Test Units
- Skid Mounted without Tank
- Skid Mounted with Tank (Self Contained Test Units)
- BOP Control Unit Mounted Test Units

All test units consist of the following:

- Air Operated Hydraulic Pumps
- Check, Needle and Air Shut-off Valves
- Relief Valve with Rupture Disk
- Air Pressure Regulator
- Air Lubricators and Filters

PUP JOINTS & CROSSOVERS

- Pup Joints & Integral Union Connections supplied with Integral, threaded or welded joints.
- Sizes from 1" to 4"
- Pressure ratings 6,000 PSI to 12,000 PSI
- All integral products are manufactured from forged steel which meets ASTM and /or AISI Standards



STEEL HOSE ASSEMBLIES

Used for a variety of high pressure, well service applications

- Utilize swivel joint & hammer union end connections for fast and pressure tight make-up and break-out operations.
- Made to withstand cold working pressures up to 15,000 PSI for standard service and 10,000 PSI for sour service.
- Our steel hose assemblies eliminate the need for exact alignment when installing and facilitate the routing of lines around fixed objects and simplify folding, transporting and storage of equipment.



SWIVEL JOINTS



FEATURES

- Proper rotation and movement without sacrificing strength and integrity of the steel.
- Streamlined bore minimizes flow restrictions, turbulence and pressure drop.
- Long-sweep swivel joints have extra-long radius elbows for better flow characteristics.
- Manufactured specifically for high pressure applications.

- Dual and tri-race ball bearing swivel joints are matched to load capacities & service conditions.
- All ball races are either flame hardened / carburized & hardened or snap-in stainless steel.
- All swivel joints are field repairable. Easy to use repair kits are available.
- Short radius Swivel joint styles or configurations are available.
- End connections are threaded, integral wing union, beveled for welding or flanged.
- Sizes available 1" to 3" furnished with high Nitrile packing and brass or stainless steel Seal ring.
- All joints are specially heat-treated & inspected for controlled hardness.
- All materials meet ASTM and/or AISI standards.

RING JOINT GASKETS



Ring Joint Gaskets in different solid metal types including soft iron, low carbon steel, stainless steel 304/316/321 and other alloys.

These gaskets are made to withstand high pressure, various temperatures, and are employed where corrosive agents are present.

- Suitable for oil or gas pipeline flanges, pressure vessels
- High speed joint faces, Style R is divided into various types

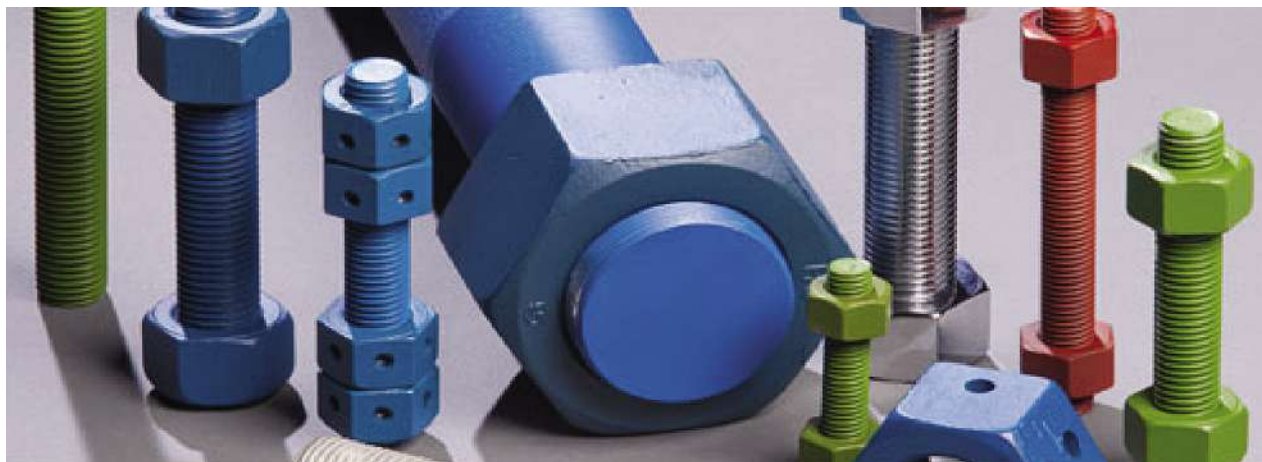
- Style RX is an improvement of style R in pressure resistance
- Suitable for oil or gas pipeline flanges
- Pressure vessels
- High speed joint faces
- Style R is divided into various types
- Style RX is an improvement of style R in pressure resistance.
- Style BX is a gasket with high pressure resistant up to 15,000 PSI
- Made to conform to API 6A & ASME B16.20 standard

R - Oval Type: Standard ring joint gasket with oval cross section and designed for flanges with standard ring joint grooves. Available from R11 to R79 & R92.

R - Octagonal: Standard ring joint gasket with octagonal Type cross section and designed for flanges with standard ring joint grooves. Interchangeable with oval section gaskets on modern octagonal grooved flanges. Available from R11 to R105.

RX -Type: An adaptation of the standard R type gasket and designed to fit the same groove design. It is interchangeable with standard R type gaskets. Available from RX20 to RX215.

BX - Type: Specially designed for very high pressures. All BX gaskets incorporate a pressure balance hole to ensure equalization of pressure which may get trapped in the grooves. It is only suited for API BX flanges and grooves. Available from BX150 to BX303.



DRILLING SERVICES provides a wide range of all-thread stud bolts and nuts used for oilfield, pipeline, refining and petrochemical plant applications - including wellhead, valve and BOP, and pipe flanges. Our products meet international standards and are used in hostile environments including extreme high and low temperatures and corrosive service.



Welcome to SledgeHammer, world of quality Cementing products, with an experience of more than three decades. SledgeHammer providing fastest and economical Cementing products to almost every part of the world. Presently SledgeHammer is one of the world's leading cementing product manufacturer and India's largest Cementing equipment producer. SledgeHammer provides complete Cementing products and Accessories for both offshore and onshore.

Serving the cause of the global oil and gas industry, manufacturing a wide range of cementing equipment conforming to API 10 D specifications under license from the American Petroleum Institute.

SledgeHammer is one of the few API 10D & ISO 9001:2000 certified manufacturer of Cementing products in the world and offers a complete line of both welded and non-welded Bow spring Centralizers, Cementing plugs, Float equipments and other accessories for Oil and Gas Drilling Industry. This product design and manufacturing expertise has been developed by experience, field knowledge & exposure to the technology throughout the world. SledgeHammer products are designed, assembled, tested and inspected by its facility which is equipped with most modern machines like CNC & VMC, Fully Automated Heat treatment Plant for Bow Spring, State of art Press Shop, Complete Machine Shop, Organized Paint Shop.

Above all, SledgeHammer owns Foundry equipped with Electrical Induction Furnace for metal melting which enable SledgeHammer the only company in the world who have manufacturing facility for Both Spring Bows Centralizer and Solid Rigid Centralizer.

With every manufacturing possibilities In-house makes SledgeHammer's product economical and superior in quality with fastest delivery time. SledgeHammer's Quality Management Systems are fully practiced and adhered to as per API Specification Q1, ISO/TS 29001:2003 (Identical) Petroleum and ISO 9001:2000.

SledgeHammer is also equipped with all latest Software & other equipments for testing and quality control like "Centralizer Placement Software" & "Stand off Calculation Software", with fully Computerized Load Testing machine for Starting, Running & Restoring Force testing. Fully equipped Material Testing laboratory. Various Mechanical, Pneumatic & Hydraulically Driven machines for Fitting, assembly and welding of Centralizers.

SledgeHammer has its own design department and fully equipped Tool Room with qualified and trained engineers on the job. Besides in-house testing, on-site testing and regular improvements in products and application is worked upon to give maximum advantage and better results for SledgeHammer's valued customers all over the world.

Standard Straight Bow Centralizer



Hinged Non-Welded
Spring Bow Centralizer
SH01



Hinged Non-Welded
Stainless Steel Centralizer
SS01



Hinged Welded
Bow Spring Centralizer
SH02



Slip on Welded
Bow Spring Centralizer
SH03



Hinged Non-Welded
Bow Spring Tubolizer
SH04



Hinged Welded
Bow Spring Tubolizer
SH05



Slip on Welded
Bow Spring Tubolizer
SH06



Welded Rotating
Centralizer
SH07

Rigid Bow Centralizer



Hinged Non-Welded
Positive Bow Centralizer
SH08



Hinged Non-Welded
Semi Rigid Centralizer
SH09



Hinged Welded
Semi Rigid Centralizer
SH10



Slip on Welded
Semi Rigid Centralizer
SH11



Slip on Welded
Positive Spirolizer
SH12



Slip on Welded
Heavy Duty Positive Spirolizer
SH13



Slip on Welded Heavy Duty
Straight Bow Spirolizer
SH14



Slip on Welded
Cement Basket
SH15

Cementing Plug & Float Equipment



Top & Bottom Cementing Plug Rotating **SH16**
Top & Bottom Cementing Plug Non Rotating **SH17**



Float Shoe
SH18



Float Collar
SH19



Guide Shoe
SH20

Solid Rigid Centralizer



Slip on Stand
Off Band
SOB02



Welded Spiral Vane
Solid Rigid Centralizer (Fix)
DSW03



Aluminium Straight
Vane Solid Rigid Centralizer
DAV02



Aluminium Straight Vane
Solid Rigid Centralizer (Fix)
DAV03



Aluminium Spiral
Vane Solid Rigid Centralizer
DAS02



Aluminium Spiral Vane
Solid Rigid Centralizer (Fix)
DAS03



Steel Spiral Vane
Solid Rigid Centralizer
DSS02



Zinc Spiral Vane
Solid Rigid Centralizer
DZS02



Bronze Alloy Spiral
Vane Solid Rigid Centralizer
DBS02



Steel Twin Blade
Rotating Centralizer
DSR02



Thermo Plastic
Spiral Centralizer
DPS02



Aluminium Rotating
Spiral Vane Centralizer
DAR02

Stop Collars



Hinged Spiral
Nail Stop Collar
SC01



Hinged Bolted
Stop Collar
SC02



Hinged Set Screw
Stop Collar
SC03



Slip on Set Screw
Steel Stop Collar
SC04



Slip on Set Screw
Ductile Iron Stop Collar
SC05

Evaluation System

for Tensile Properties using

Instrumented Indentation Test

ISO/TR 29381
KS B0950
KEPIC MDF A370

Advanced Indentation System 2100



AIS2100 Features

- Non-destructive tensile properties evaluation
- On-site test and analysis
- Testing of welded areas
- Allows regulation of testing conditions
- Applies 'Pre-Qualification' method to construction sites and facilities

Specification

- Size: 180 x 180 x 430 mm
- Weight: 7 kg
- Max. load: 300 kgf (Res.: 5.6 gf)
- Stroke: 40 mm (Res.: 0.1 μ m)
- Loading rate: 0.05 ~ 30 mm/min
- Communication: RS-422
(Wireless - Bluetooth)

AIS2100

AIS2100

Indentation System to Measurement of Tensile Properties using Non-Destructive Method

LCD Panel

For control and monitoring



Power / Communication

Power : 110 ~ 220 V (Free volt.)
Communication: RS-422/Bluetooth

Actuator

Loading rate: 0.05 ~ 30 mm/min
Full stroke: 40 mm



Loadcell

Maximum load: 300 kgf
Load resolution: 5.6 gf

Depth

Linear Scale
Depth resolution: 0.1 μ m



Indenter

Spherical Indenter (Dia. 0.5/1.0 mm)
Vickers Indeter



AIS2100 Design Principle

Designed for applications in laboratories and industrial sites, AIS2100 is small, light and portable, yet guarantees highly accurate measurement.

AIS2100 offers real-time measures of depth over continuous load and immediate on-site evaluation of various properties through AIS2100 software installed on the analyzer computer with load-depth curves. AIS2100 evaluates tensile properties very effectively for specimens that are difficult to manufacture because the test subject is small and has a complicated shape. Moreover, AIS2100 enables uniaxial tensile testing of materials with tensile properties that are unevenly distributed. AIS2100's light weight makes it easily portable for on-site experiments, and it uses a strong adhesive device to prevent Causing damage to subjects of various shapes.

AIS2100 Hardware Features

High Accuracy and Reliability

- Enables tests within various ranges with high resolution using a high-capacity loadcell
- Allows adjustments in 0.1 μ m units using linear scale for accurate testing

Enhanced User Convenience

- USB system connection
- Wired or wireless communication and control modules
- Control and analysis from laptop computer with dedicated software
- Can be operated with portable battery (up to 10 hours)

Convenient and Stronger Adhesive Device

- Wide dovetail slider enables multiple experiments with single installation
- Highly portable for quick and easy installation

AIS2100 Instrumented Indentation Test (IIT)

IIT as domestic standards including KS B0950, KS B0951, and KEPIC MDF A370.

IIT was newly developed in Korea and meets KEPIC code 2007 and ISO/TR 2008 that were established in 2000. Thanks to its ISO/TR certificate, IIT is drawing a great deal of attention from around the world.

Range of Properties Evaluation with IIT

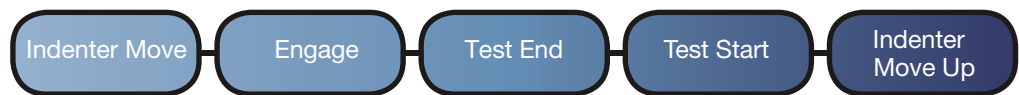
- Applies to metals such as general carbon steel, aluminum alloy, SUS series and high-strength steel
- Classified into four groups (Type 1 ~ Type 4) to enhance the accuracy of results
- Allows on-site testing without damaging the subject, which is inserted with a pressure of approximately 150 μ m
- Simple test preparation and procedures even for novice operators



AIS2100 V3.0 Software

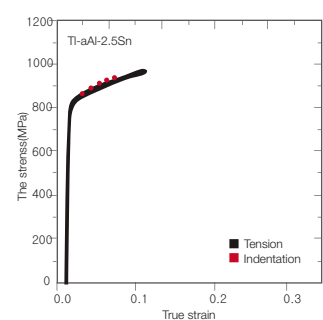
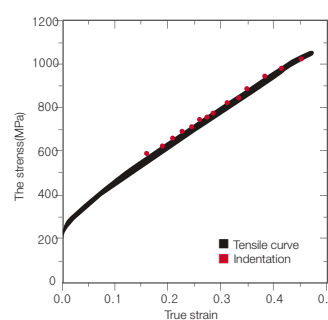
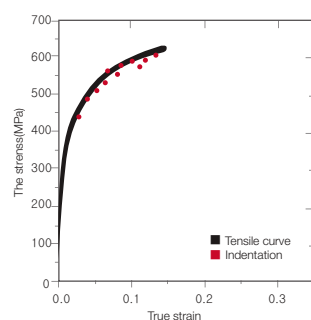
User-friendly Software

- Reduced Test Steps: Existing 6-step test sequence is reduced to 5 steps
- Test procedures are controlled according to a preconfigured sequence, minimizing potential errors that can be caused by an inexperienced user
- Unnecessary options removed: Tautological parts were removed from automatic application of basic and repeated test conditions.



Comprehensive Analysis

- More types of subjects can be analyzed, including BCC-type metals (Type 1), FCC-type metals (Type 2), high-strength materials (Type 3) and user-defined materials (Type 4)
- Some analysis options were removed: Now analysis is performed based on the selection of materials by applying the IIT theory that is necessary to classify materials based on analytical results
- Multi-file analysis: Batch processing of multiple sets of data obtained from repeated tests
- Suggestion of methods for material classification for on-site and novice user: Direct and indirect identification using magnetic method and test data, respectively



All-in-One Software

Includes functions for testing, analysis, database, and creating reports

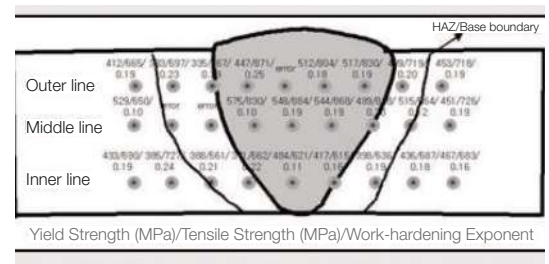
- Facilitates novice users by minimizing the test operation
- Swift on-site operation based on batch processing of multiple sets of test data
- Allows user to create database and write a report regarding test results
- Prompt comparison of test data and analytical results



AIS2100

Advanced Indentation System 2100

Properties Evaluation of Welded Areas



Observing of Objective: Changes of Properties of Welded Parts Location: Korea Gas Safety Corporation
 Subject: API 5L X65 [Pipeline at 30 in] Jig: MPS system

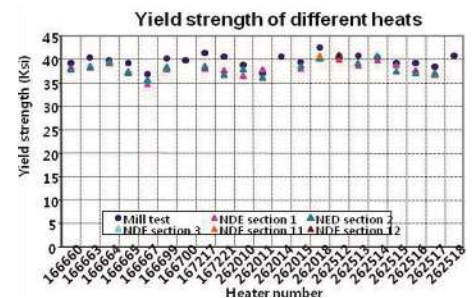
Purpose

To perform tensile properties evaluation of cross-sections of weldment on gas pipelines. The test is conducted to establish optimal welding conditions through evaluating tensile properties of base metal, HAZ, and weld metal by thickness.

Effect

Evaluation of the properties of specific weldment helps establish and apply optimal test conditions at the actual site, adding durability to the structure.

Complete Inspection of Delivered Materials



Objective: primary monitoring of produced pipe Test Location: Casper, WY, US – Shell (August, 2007)
 Subject: 7.625 inch Freeze Tubes Jig: U-block system

Purpose

To apply the indentation test method for quality evaluation of pipes delivered from factory. Since it is impossible to sample all of the pipes, results of the primary monitoring test are compared with the mill sheet using the indentation test method, and faulty pipes undergo close investigation.

Effect

Examines large quantities of delivered materials and parts, enabling quality control and cost savings

Advanced Indentation System 3000

AIS3000 Features

- Non-destructive evaluation of residual stress
- Direct test and evaluation at the site
- Simple composition: test equipment and analysis PC
- Automatic test and analysis

Application field

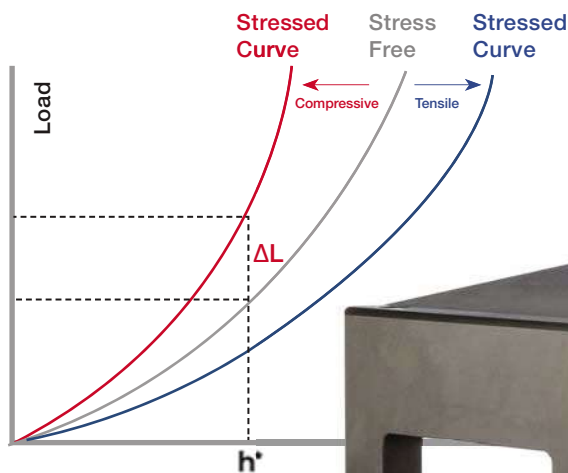
- Power plant
- Oil refinery
- Ship building
- New materials
- Small and thin plate

Specification

- Size: 180 x 180 x 430 mm
- Weight: 7 kg
- Max. load: 300 kgf (Res: 5.6 gf)
- Stroke: 40 mm (Res: 0.1 μ m)
- Loading rate: 0.05 ~ 30 mm/min
- Communication: RS-422
(Wireless - Bluetooth)

Evaluation System for Tensile Properties using Instrumented Indentation Test

ISO/TR 29381
KS B0951
KEPIC MDF A370



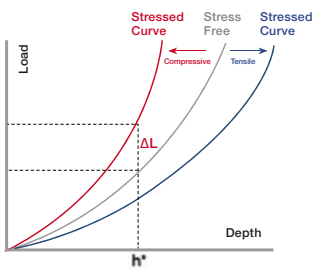
AIS3000

AIS3000 Indentation System for Evaluation of Residual Stress using Non-Destructive Method



AIS3000 Design Principle

By comparing the difference between load-depth curves based on the presence of residual stress, it is possible to measure values with high accuracy and reproducibility. AIS3000 can also measure residual stress without damaging the test material, since it is indented with a depth of less than 100 μm .



Advantages

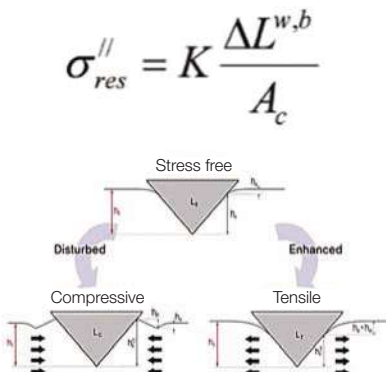
- Confirmation of the results immediately after the test
- Prompt and simple test using a wireless communication module between equipment and computer
- Can be operated on a light portable battery when commercial power supply is not readily available

AIS3000 Technical Skills

AIS3000 applies ISO/TR29381, as well as Korean standards (KS B0950, KS B0951, and KEPIC MDF A370). IIT was newly developed in Korea and meets the Korean Standard of Residual Stress (2005), KEPIC code (2007) and ISO/TR (2008) that were established in 2000. Thanks to its ISO certificate, AIS3000 is drawing a great deal of attention from around the world.

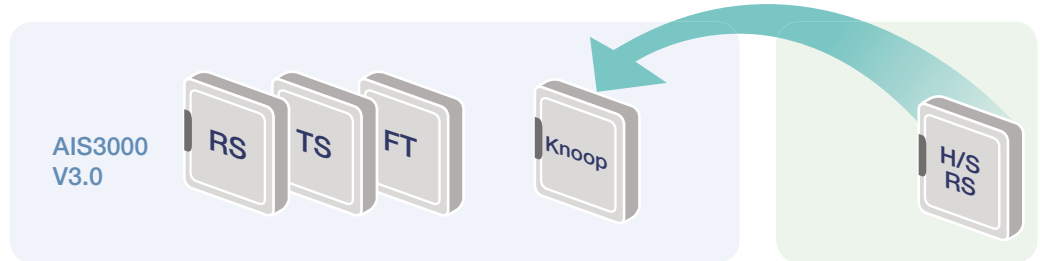
Advantages of IIT

- Allows on-site testing without damaging the subject, which is only indented by approximately 100 μm
- Simple test preparation and procedures even for novice operators



$$\sigma_{res}^{//} = K \frac{\Delta L^{w,b}}{A_c}$$

Advanced Indentation System



AIS3000 Introduction

FRONTICS' AIS3000 V3.0 is software for new device types

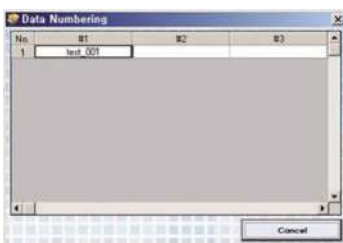
Since the first introduction of AIS2000 V1.0 in 2000, the AIS software has evolved based on user opinions. Then AIS3000 V1.0 was introduced with an analysis module to analyze residual stress and fracture toughness. Our users wanted to evaluate residual stress and composition of multiple items, as well as fracture toughness. Accordingly, we introduced AIS3000 V3.0, which classifies residual stress as a basic analysis item and can add various other items for analysis.



Features of AIS3000 V3.0

AIS3000 V3.0 classifies residual stress as a basic analysis item and evaluates tensile properties, fracture toughness and various other items

- Evaluates various items from a single device
- Minimizes inconvenient maintenance of V2.0 by using independent software for each evaluation item
- New items can be evaluated by adding corresponding software, without purchasing additional equipment



Data Numbering Function

The Project function that was introduced in AIS3000 V2.0 was upgraded in AIS3000 V3.0

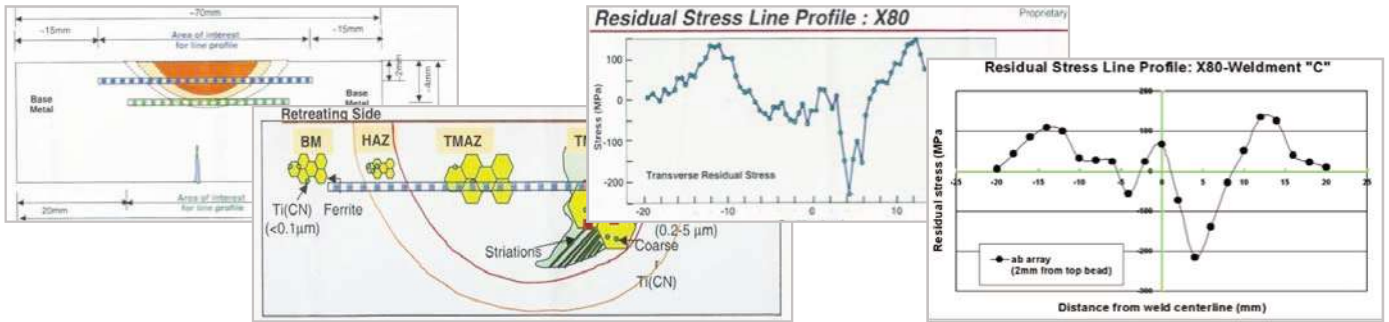
- Enhanced Project function by introducing Data Numbering
- When testing, moving, deleting and copying unnecessary or redundant data
- When analyzing, open the Project and batch processing
- Results of Project analysis can be used for creating databases and writing reports

What is Data Numbering?

Unlike the test plan, locations of preliminary tests, overlapping tests, and unnecessary tests are skipped in the actual test. However if this information is not identified in the software, there is the inconvenience of having to rearrange the analytical results. Data Numbering helps this by arranging the information in a table format.

AIS3000

Advanced Indentation System 3000



Objective: Evaluation of residual stress in accordance with welding method
 Location: ExxonMobil REC (2005) Subject: API X80 steel
 Welding Method: Friction Welding

Purpose

The test evaluates residual stress at a friction-welded area and its perimeter. It was compared with the X-ray diffraction method, a non-destructive test method.

Effect

Optimal test conditions can be achieved by evaluating properties of a specific weldment. Lifetime of a structure at an actual site can be extended by applying optimal conditions.

	Max. Residual stress	Min. Residual stress
X-ray Diffraction	230	150
IIT	215	136

Features

While there was little difference between the two methods in test results, there was a significant difference in terms of measuring time.

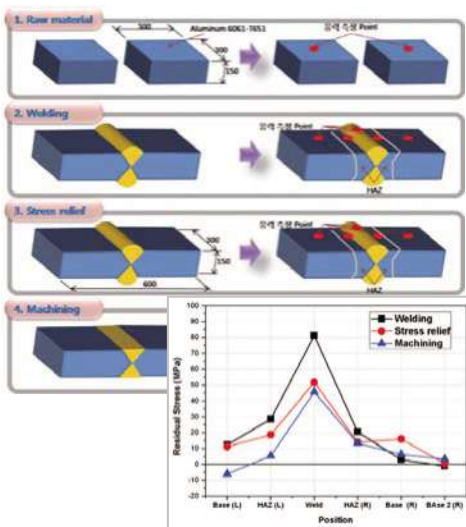
Objective: Evaluation of residual stress in accordance with welding method
 Evaluation location: Ju Seong Eng. (2010. 5) Subject: Al6061-T651

Purpose

It's a test to evaluate changes of residual stress appeared when Al16061-T651 welding material goes through stress relief and surface process stage. As a result of the test, it can be known that lots of residual stress is relieved at the stress relief stage.

Effect

The existing stress relief method is completed in laboratory aspect and can be changed by various effects at a field. To complement these points, the stability of a subject can be obtained by testing promptly at a field.



Evaluation System for Residual Stress using Instrumented Indentation Test

**More Compact,
More Powerful**



Advanced Indentation System 3000 Compact

Compact equipment

- Size: 80 x 80 x 295(h) mm
- Weight: 3.5 kg
- Max. load: 100 kgf (Resolution: 2.5 gf)
- Stroke: 25 mm (Resolution: 0.1 μ m)
- Communication: RS-422 / Bluetooth

Powerful Functions

- Non-destructive residual stress evaluation
- Optional tensile properties device
- Seamless integration with IIT
- Application of ISO / TR29381
- Application of KS B0950 / KS B0951 (Korean standards)
- Application of KEPIC MDF A370 code

Portability

- Simple composition: Test equipment and an analysis PC
- Wireless communication based on a Bluetooth module
- Uses UMPC for convenience and portability
- AIS3000 Mini software for UMPC and a touch-screen module

AIS3000 COMPACT

AIS3000 Compact Indentation System for evaluation of Residual Stress using Non-Destructive Method



More Compact

AIS3000 Compact maximizes portability for on-site applications.

AIS3000 Compact features size and weight 50% less than AIS300, but with enhanced functionality for easy on-site measurement of residual stress and tensile properties. Using the wireless communication module, dedicated UMPC, and lightweight battery, tests can be performed even in small spaces where commercial power supply is not available.

Items

- Residual Stress
- Yield strength
- Tensile strength
- Elastic modulus

Specification

Model	AIS 3000 Compact
Size	80 X 80 X 295 mm
Weight	3.5 kg
Max. load	100 kgf
Load resolution	2.5 gf
Stroke	25 mm
Depth resolution	0.1 um
Operating Temp.	-10 °C ~ 40 °C
Power	220 Vac
Indenter	Vickers indenter Dia.0.5mm spherical indenter
Used	Evaluation of residual stress, Tensile properties





AIS3000 Features

Seamless Integration with Instrumented Indentation Test (IIT)

Instrumented Indentation Test (IIT) is a new technology meeting various standards and certifications, including ISO/TR29381, KS B0950, KS B0951 (Korean standards) and KEPIC MDF A370. Integration of IIT and AIS3000 V3.0 allows various forms of on-site evaluation.



- Evaluation of residual stress and tensile properties using IIT
- Prompt on-site evaluation using a non-destructive method
- Application of AIS3000 V3.0
- Exclusive mini software for AIS Compact
- Convenience and portability by using UMPC



Enhanced On-Site Convenience

Convenience and portability

- 5-inch UMPC
- Ultra-light weight of 400 g
- Simple operation based on a touch screen



Exclusive miniature software (AIS3000 Mini)

- Window-based GUI
- Optimal screen composition for simple operation
- Perfect test data compatibility with existing software

Equipment Organization according to User Demands

- Can be transformed into specific sizes in accordance with test subjects
- Can be manufactured exclusively to be attached to unique shapes



▶ UMPC and site images showing its applications



▶ Independent interface and main frame allow operation in small spaces



▶ Testable exclusively attached to the Rotor Groove

AIS3000 COMPACT

Advanced Indentation System 3000 Compact



Evaluation of residual stress of Natural gas pipeline

Object: Evaluation of residual stress in accordance with ground settlement
Location: Korea Gas Safety Corporation (2009.5) Subject: API X52

Purpose

Stress concentration occurred on city gas pipeline due to ground settlement. The residual stress was evaluated on major parts where stress was concentrated.

Features

AIS3000 Compact was deployed for testing in small spaces with enhanced on-site efficiency using UMPC.



Evaluation of tensile properties of Rotor Groove

Object: Evaluation properties of Rotor groove
Location: Boryung Thermal Power Plant (2009. 8) Subject: Turbine Rotor HP

Purpose

Properties were evaluated on vulnerable groove rotor parts of a power plant. Since it was difficult to deploy ordinary equipment due to the size of the subject, we used AIS3000 Compact to perform evaluation and testing with an exclusive jig manufactured for the specific shape of the subject.

Features

The test results were used for lifespan evaluation according to client's request.



Evaluation of tensile properties of Turbine casing

Object: Evaluation of Properties of Turbine casing
Location: Dangjin Thermal Power Plant (2009. 6) Subject: Turbine Rotor Casing

Purpose

Properties of major parts of a turbine casing were evaluated at a power plant. The tests were conducted based on direct evaluation because there was insufficient space surrounding the turbine casing.

One Touch, Full Automatic Test

Indentation Equipment for Evaluation Tensile Properties

KS B0950
ISO/TR29381
KEPIC MDF A370



Advanced Indentation Tester-U

AIT-U Features

- Non-destructive tensile properties evaluation
- Maximizing human efficiency with the application of automatic/repeated test method
- Convenient operation through LCD touch panel
- Securing of sight using LED lighting
- Automatic transfer of X-Y-Z axis
- Possible to control using Jog shuttle
- Self-checkup and revision system mounted
- Exclusive model for laboratory

Specification

- Size: 600 x 500 x 1400 mm (220 kg)
- Max. load: 200 kgf (Res: 5.6 gf)
- Stroke: 40 mm (Res: 0.1 um)
- Loading rate: 0.05 ~ 30 mm/min
- Communication: RS-422
- Control: LCD Touch panel

Items

- Yield strength
- Tensile strength
- Elastic modulus
- Work hardening component
- Vickers hardness

AIT-U

AIT-U Exclusive Laboratory Test Equipment for Measuring Tensile Properties



Specification

Model	AIT-U	
Size	600 x 500 x 1400 mm(220 kg)	
Max load	200 kgf	
Resolution(load/depth)	5.6 gf/0.1 μm	
Full stroke	40 mm	
Loading rate	0.05~30 mm/min	
Communication	RS422	
Data acquisition rate	100 point/sec	
Power	Adater	AC110~220 V(free voltage)
Analyzing Computer	Basic	LCD touch panel computer
Indenter	Spherical indenter	
	Sharp indenter(Optional)	



New Laboratory Test Equipment

AIT-U (Advanced Indentation Tester-U) is exclusive laboratory test equipment for measuring tensile properties and Vickers hardness. Fully automatic test functions and self-diagnostics allow convenient operation. The AIT-U unit contains the indentation module and the control PC for installation in a limited space.

AIT-U Features

User-friendly hardware

- The control PC is integrated with AIT-U
- Convenient operation from the LCD touch screen panel
- LED lighting provides high visibility
- Automatic transfer functions of X, Y, and Z axes
- Jog shuttle control
- Observation of specimens through the Vision system (Optional)
- Easy to store and requires little space
- High quality exterior design

Convenient software

- Simplified menu design
- Automatic functions for quick test procedures
- Optimized for touch screen application
- Simplified procedures from 'Test' to 'Report' Self-diagnostics system

Advanced Indentation Tester-U



AIT-U Functions

Fully Automatic Test

- System application for increased efficiency in the laboratory environment
- Fully automatic testing using systems and sensors
- A single push of a button starts automatic procedures consisting of tests and analyses, and creating reports
- Automatic/repeated tests on same test subjects (Maximum 99 times)
- Automatic height measurement according to test locations and automatic test condition setting

All-in-One Software (AIT-U V1.0)

- Includes functions for testing, analysis, database, and creating reports
- Acquiring and comparison of real-time test data from load displacement
- Analysis method based on the tensile properties evaluation theory and the indentation test method
- Saves analytical results adjusted to various conditions
- Save and print analytical results adjusted to a report format (Excel file)
- Identification of test locations using the Vision system (Optional)

Self-Inspection System

A series of automatic diagnostic procedures for inspecting and adjusting sensors, and checking equipment status to obtain optimal data

- Load cell calibration
- Laser sensor setting
- Equipment inspection using Spherical indenter
- Equipment inspection using Vickers indenter



Touch Screen System

Allows direct operation without a keyboard or a mouse

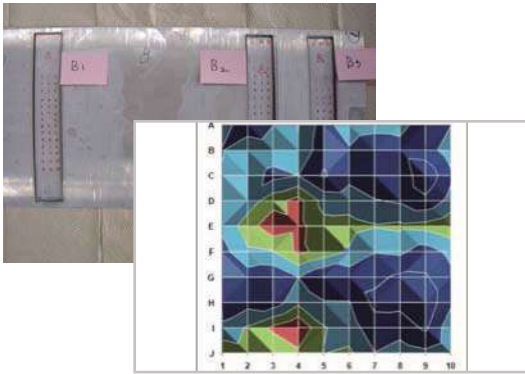
Touch Type: Decompression Type
Touch Screen

LCD size: 15 inch

Resolution: 1024 x 768

AIT-U

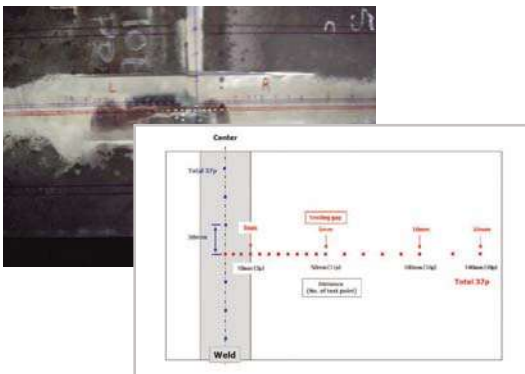
Advanced Indentation Tester-U



Objective: Identification of inclusion within Mg plate
Location: RIST Subject: Mg plate

Purpose

In order to identify the inclusion of newly developed Mg plates, single and multiple series of automatic tests were conducted by easily mapping test subjects



Objective: Evaluation of compatibility of welding part of Cr steel
Location: AlCoa (Australia) Subject: Welding parts of Cr steel

Purpose

Properties evaluation was conducted to assess the compatibility of weldment between two Cr steel plates in V-groove form. Automatic testing was conducted for 37 test locations for one line.



Objective: Evaluation of properties of welding parts of T23 boiler tube
Location: KEPCO Research Institute Subject: Welding parts of T23 boiler tube

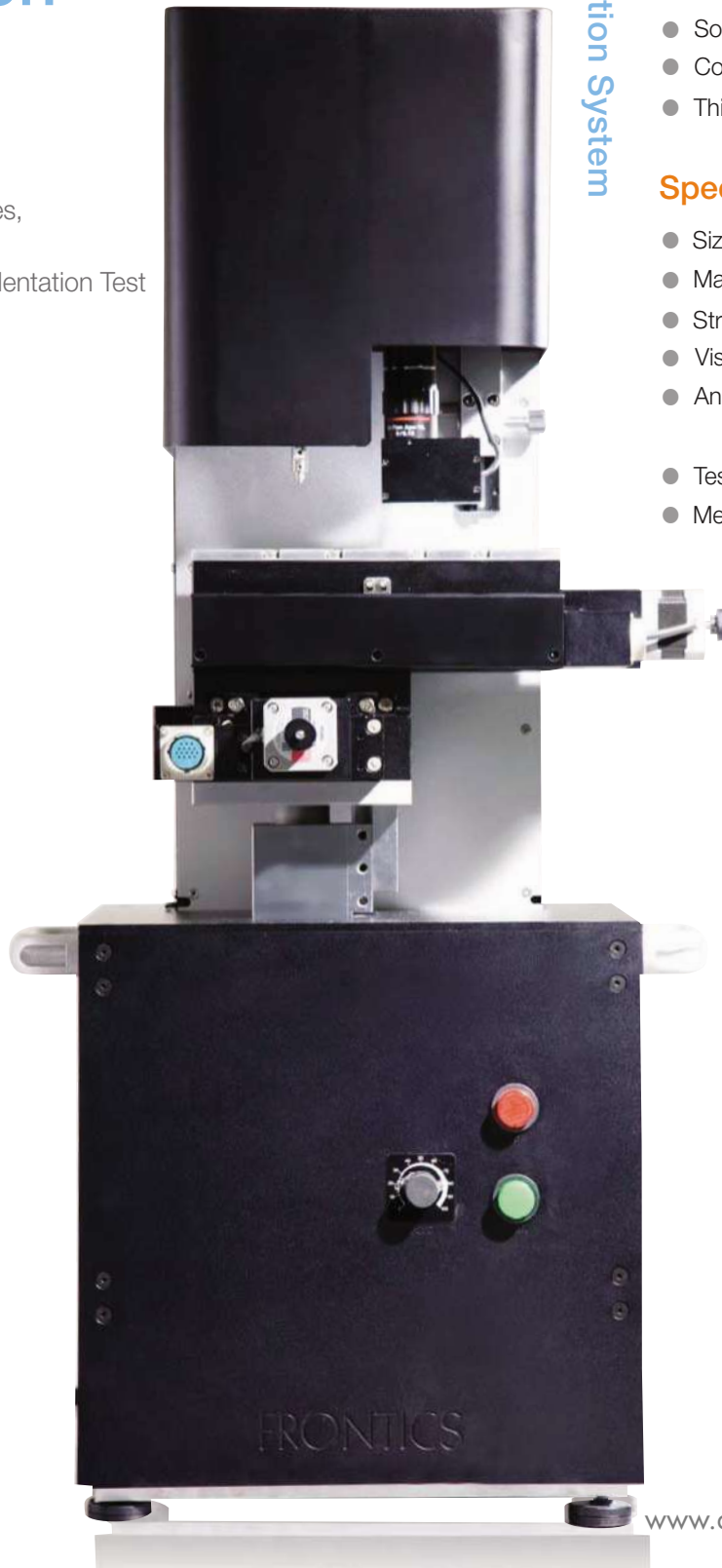
Purpose

The properties evaluation of weldment was conducted for subjects with different heat treatment conditions of over T23 boiler tubes that are widely used at thermal power plants. Automatic testing was conducted for one line, including weldment, because the height of each test location was different.

Micro Advanced Indentation System

Test range: scores of μm
Analysis: Tensile Properties,
Residual stress
Method: Instrumented Indentation Test

ISO/TR 29381
KS B0951
KS B0950
KEPIC MDF A370



Micro Advanced Indentation System

Characteristic

- Evaluation of Residual stress using IIT
- Quantitative analysis
- User-friendly Interface
- Automatic Moving System
- Vision System

Application

- General hard coating layer
- Protective coating layer on glass
- Sol-resistant coating layer
- Coating layer of electronic material
- Thin film

Specification

- Size: 328 X 305 X 900 mm
- Max. load: 2000 gf (Resolution: 10 mgf)
- Stroke: 15 μm (Resolution: 10 nm)
- Vision: X1500, Digital Camera, Image SW
- Analysis: Tensile Properties,
Residual Stress
- Test range: scores of μm
- Method: Instrumented Indentation Test

Micro AIS



Micro AIS

Micro AIS is instrumented indentation test equipment for evaluating residual stress and Vickers hardness of objects in the micrometer range

Micro AIS

Micro AIS evaluates tensile properties and residual stresses of the test subjects of very small dimensions (micrometers), such as fine-welded parts and coated layers. Through the Vision system and automatic stages, the test position can be identified and designated. Moreover, precision test for major parts is made available through automatic and screening tests.

Items

- Micro Vickers Hardness (Max. load 2000 gf)
- Residual Stress
- Yield strength
- Tensile strength
- Elastic modulus

Specification

Model	Micro AIS
Size	328 X 305 X 900 mm
Max. load	2000 gf
Load resolution	0.01 gf (10 mgf)
Depth resolution	0.01 um (10 nm)
Stage	X-Y axis stage, Z axis stage
Operating Temp.	-10 °C ~ 40 °C
Power	220 Vac
Vision	X1500, digital camera, image SW
Indenter	Micro Vickers indenter Dia.0.05mm spherical indenter
Used	Evaluation of residual stress (Micro range)

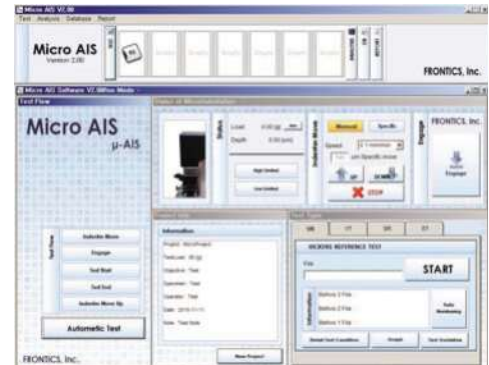




Micro AIS Introduction

Features

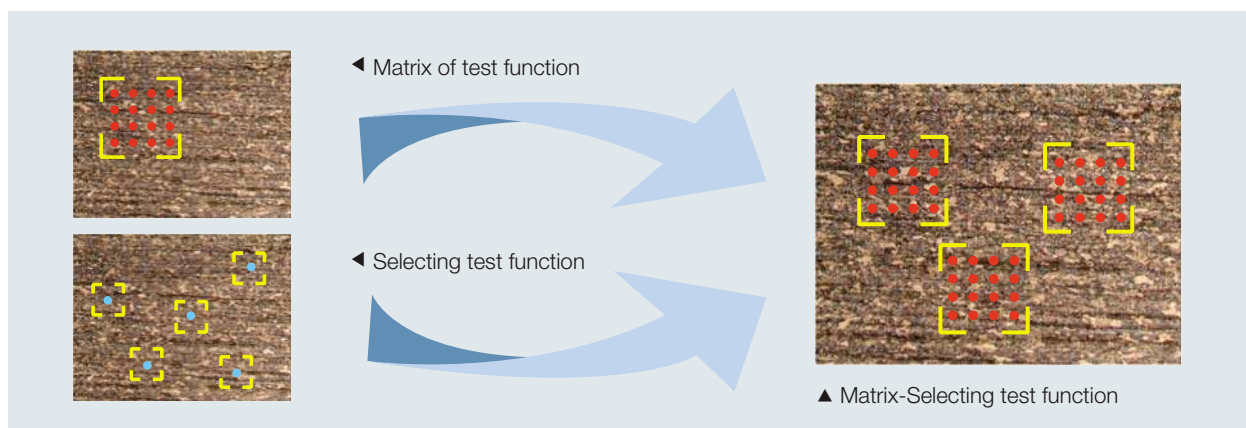
- Perfect implementation of IIT in the micrometer range
 - Application of ISO/TR 29381 in the micrometer range
 - Application of KS B0950 and KS B0951 technology
 - Application of IIT eliminates human errors
- User-Friendly software
 - Easy to use Window-based software
 - Evaluation of the tensile properties and residual stresses is made available immediately after the test
 - User convenience has been enhanced with automatic malfunction checking and data error inspection



Multi-point testing system

Implementation of automated testing based on the Automatic Moving system and the Vision system

- Tests can be automatically completed with an initial setup of test conditions
- Maximum efficiency of personnel and time through repeated testing
- Matrix test function: Test procedures for selected image ranges
- Selecting test function: Test procedures for randomly selected positions
- Matrix-selecting test function: Test procedures for various randomly selected locations in checkerboard format



Automatic moving system

- Enables fine positioning and adjustment
- For precise controlling and automatic testing
 - System: X, Y Stage
 - Resolution: 1 μ m
 - Moving rate: 1 ~ 30 mm/min

Vision system

- Enables fine positioning and adjustment
- For precise controlling and automatic testing
 - Magnification: X150 (Max.: X1200)
 - Max. Distance: 100 mm
 - Saving type: Digital image capture

Micro AIS Micro Indentation Measurement

Failure analysis of fine copper tube

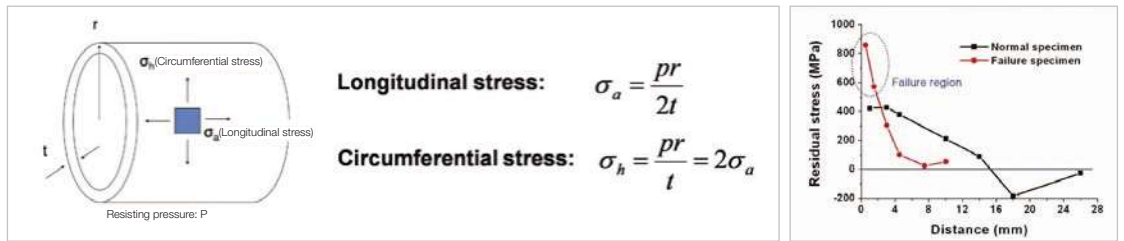


Purpose

The test was designed to evaluate the cause of damage on a refrigerant container and its tube joint part. The cause was identified based on comparison of the damages from the heat generated in the process of silver brazing the container and the tube.

Results

Test results indicated that the residual stress on the damaged container had sharply increased compared to that of other containers (undamaged ones)



Purpose: Failure analysis of copper fine tube Location: LG Electronics (2006. 4)
Object: Copper fine tube and vessel Welding method: silver brazing

Failure Analysis of PDP Glass

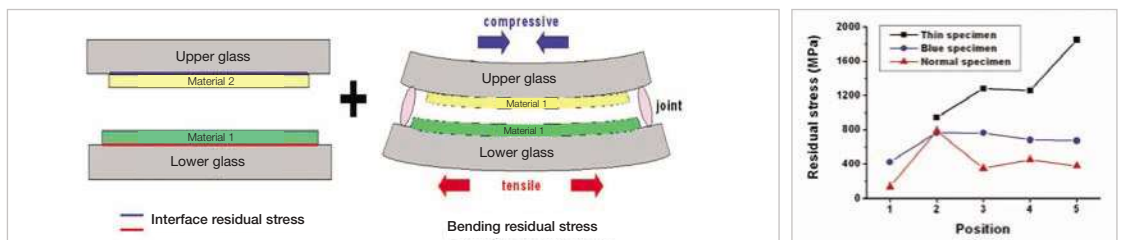


Purpose

The test evaluated the residual stress of the three types of PDP glass manufactured with different processes and thicknesses. The test was intended to yield optimal manufacturing conditions by comparing the residual stress of the glass for which thickness was varied, and another type of PDP glass whose surface was treated to meet commercial quality standards.

Results

Residual stress on both types of PDP glass increased sharply.



Purpose: Evaluation of residual stress of the three kinds of PDP glass
Location: SAMSUNG Electronics (2007. 8) Object: PDP glass

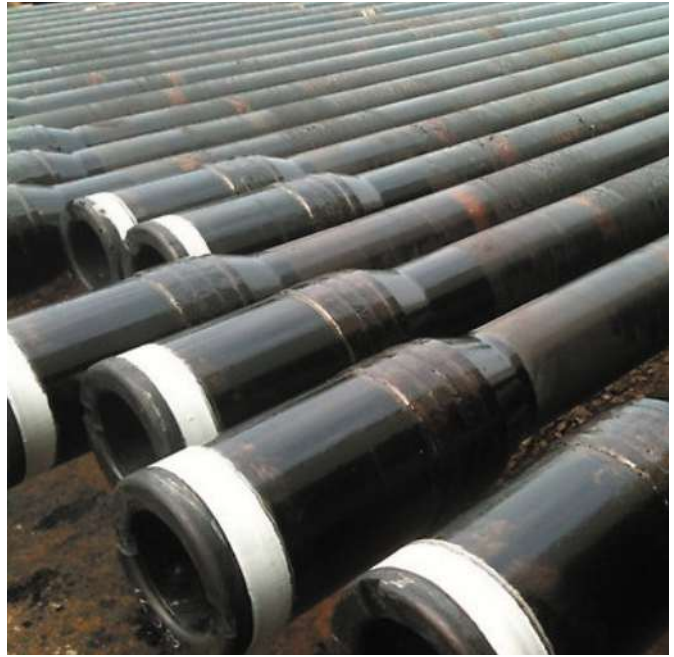
Drilling Services Ltd also specialises in oilfield equipment rental, providing top quality Hole-Openers, Roller-Reamers, Drill Pipe, Tubing, Drill Collars, Drilling Jars, Casing Scrapers and Rotary Subs as well as Casing and Tubular Handling Equipment and Stabilization Products to customers around the world.

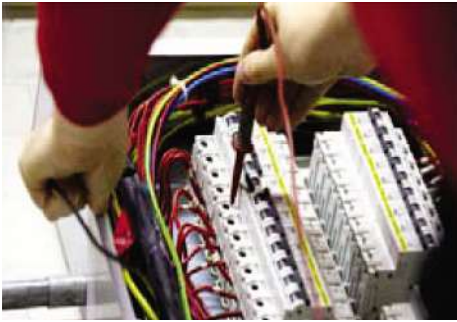
DSL can offer flexible and attractive rental solutions ranging from single items per day to comprehensive equipment packages on long-term contracts.

All our rental equipment is inspected before and after each rental period and full certification is supplied for each package. We also offer a comprehensive refurbishment, inspection, testing and recertification service for client owned flowline equipment.

Whatever your requirements, wherever you are, you may be assured that you will receive a timely response and unrivalled service from a company that is truly committed to delivering customer satisfaction.

If you want to talk through your current or future rental or inspection needs, call us now or email sales@drilling-services.co.uk and a member of our team will get back to you.





ELECTRICAL:

- 1) Inspection and testing of electrical installations, to include earth continuity and insulation resistance measurements,
- 2) Thermal imaging inspections to locate high resistance connections / hot spots and overloads,
- 3) Correct function and operation of all electrical shutdowns,
- 4) Checking of relevant motor full load currents and overload settings,
- 5) Correct operation of electrical braking systems,
- 6) Review of planned maintenance systems,
- 7) Hazardous area equipment inspections and records at the various levels of Visual, Close and Detailed,
- 8) Design, installation and refurbishment of rigs and equipment including: SCR / PCR buildings and complete land rig rewires.



MECHANICAL:

- 1) Equipment inspections including premature failure investigation,
- 2) Procedures, SMS improvement plans,
- 3) Assessment of environmental management, oils, spills, storage and containment,
- 4) Maintenance systems, planned maintenance and proactive maintenance to ensure the efficient and economical running of plant,
- 5) Parts management and logistics,
- 6) Hydraulic and pneumatic inspections,
- 7) Well control equipment assessment and evaluation,
- 8) All rig safety shutdown systems for generators, rig savers and total blackout,
- 9) Oil sampling to help predict failures,
- 10) ATEX, API and IP assessments.
- 11) Maintenance and overhaul of rig equipment including: Drawworks, mud pumps, top drives, swivels etc.

These lists are not exhaustive and other services can be offered as required.



LOOSE EQUIPMENT INSPECTION

Regular inspection or replacement of lifting equipment is vital if potentially serious failures are to be avoided. The harsh conditions of the drilling industry require a robust management system to be in place whereby you can demonstrate that equipment is regularly inspected and /or replaced Drilling Services Limited have long experience of providing loose lifting equipment services. Whether as part of a contract for management of all mechanical handling equipment or as a stand alone service, Drilling Services Limited can provide all types of certified lifting equipment;

- Lifting equipment – chain, lever, wire rope and pneumatic hoists, beam clamps and trolleys, sheave blocks
- Working at Height equipment – inertia reels, harnesses, lanyards
- Accessories – slings (wire and fabric), shackles, eyebolts, crane pendants



Drilling Services Limited can offer various inspection techniques, customised according to our Customer requirements. Our inspection services range from the basic visual inspection & MPI and API Thread Gauging.

Drilling Services Limited prides itself on quality and reliability, from the basic tubular inspection to the more critical inspection areas. Our area of expertise is tubular, rig handling and lifting equipment. All inspection services are provided as per latest API Specifications, also meeting the customer requirements. Tubular Inspection includes inspection of New and Used Oil Country Tubular Goods including Drill Pipes, Heavy Weight Drill Pipes, Drill Collars, Casing, Tubing and Bottom Hole Assembly, Derrick, lifting & handling equipment.

We have highly experienced, qualified Inspectors available, with equipment that is portable and reliable. Inspection Services provided include:

- Visual Pipe Inspection
- Dimensional Inspection of Pipe
- Ultrasonic (UT) wall thickness inspection
- Ultrasonic (UT) Inspection of Upsets and three feet end area
- EMI Inspection
- Visual Thread Inspection
- Tool Joint Dimensional Inspection
- Dimensional Inspection of Rotary Shoulder Connections
- Magnetic Particle Inspection (MPI) of Pipe Body and Upsets
- Dye Penetrant Testing
- API Full Length Drifting
- Hardness Testing
- Thread Gauging
- MPI of Rig Derrick, lifting & handling equipment



THIRD PARTY VENDOR INSPECTION SCOPE

1. Visual inspection

Visual inspection of the material for quality, workmanship, defects and cleanliness of work.

2. Dimensional checks

Carry out checks to ensure that material is dimensionally in accordance with approved drawings.

3. Compliance with specifications and requirements

Processing procedures, processing qualification, coating, marking, material certificates, shop procedures, etc. shall be verified for compliance with specifications, and specific standards.

4. Witnessing

Witness (non) destructive and chemical testing of materials, mechanical test, heat treatment, hydrostatic test, NDT, etc.

5. Verification of documents

Verify, review and approve all documentation required in the purchase orders such as origin certificate, test certificates, examination reports, tally sheet and packing list, etc.

6. Packing and marking inspection

Check of packing and marking to ensure Compliance with specifications and requirements of clients. Shipping marks and tags check is also included.

7. Photograph materials

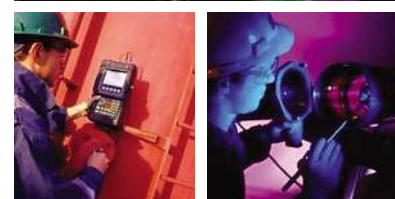
Taking high quality digital photographs of materials and every key procedure of material processing to let the clients visual check their materials themselves.

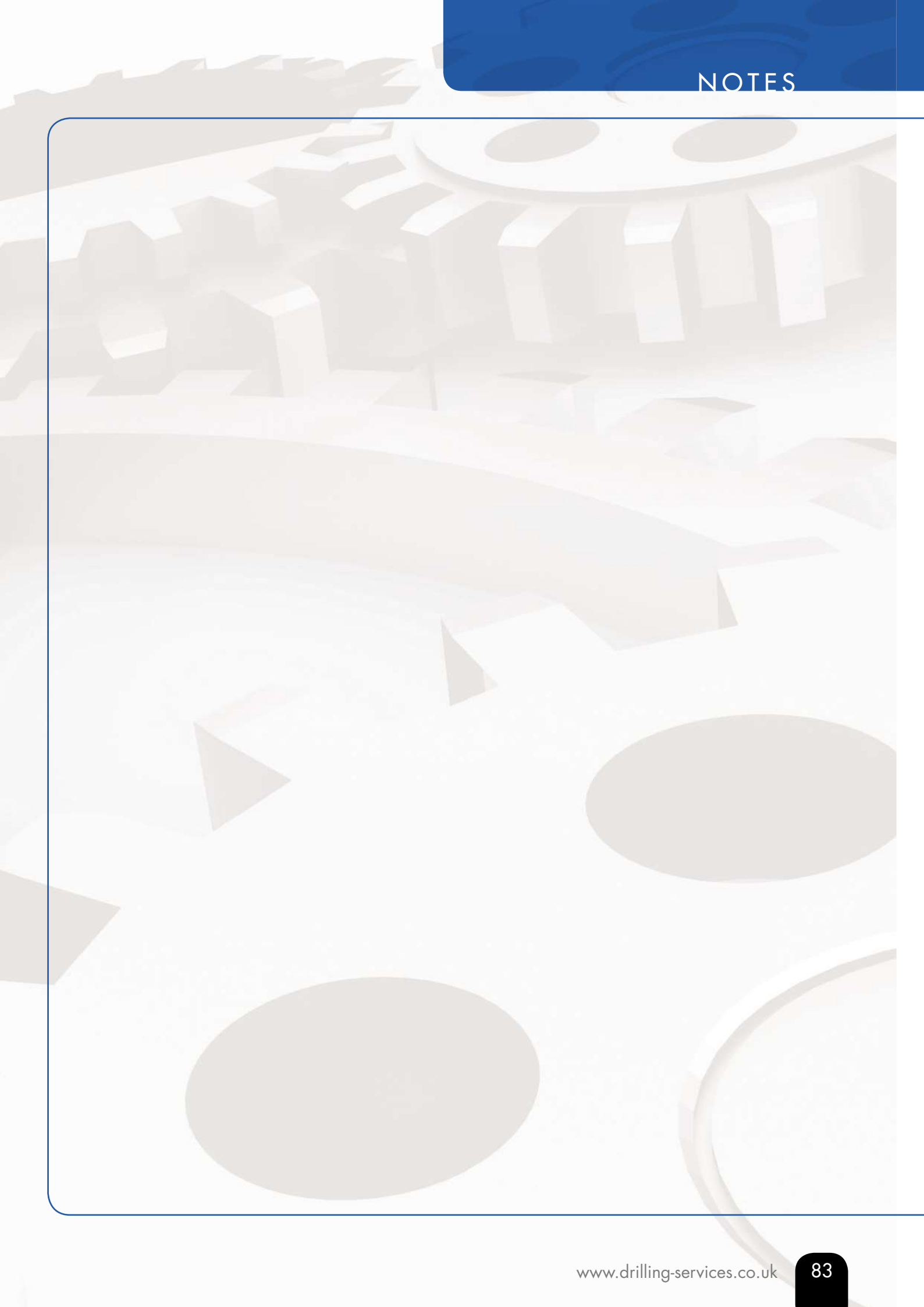
8. Reporting

Submit detailed reports of all services performed and pictures taken during inspection. Inspection activities for each purchase order will be reported separately.

9. Inspection certificate

Issue an inspection certificate immediately after all inspection is completed stating that the equipment or material is in strict accordance with the requirements of the purchase order or rejection announcement.







DSL

Drilling Services Limited

PROFESSIONAL
DRILLING SERVICES
AND EQUIPMENT

Please contact our Sales Team
with your enquiry

Drilling Services Ltd

Foss Farm, 2 Dyke Drove
Bourne, Lincolnshire PE10 0BL

Head Office

+44 (0)1778 392555

Great Yarmouth Office

+44 (0)1493 781966

Fax

+44 (0)1778 392618

Email

sales@drilling-services.co.uk