DIGGER
DOWNHOLE TOOLS

PRODUCT CATALOGUE

Cementing & Casing Accessories

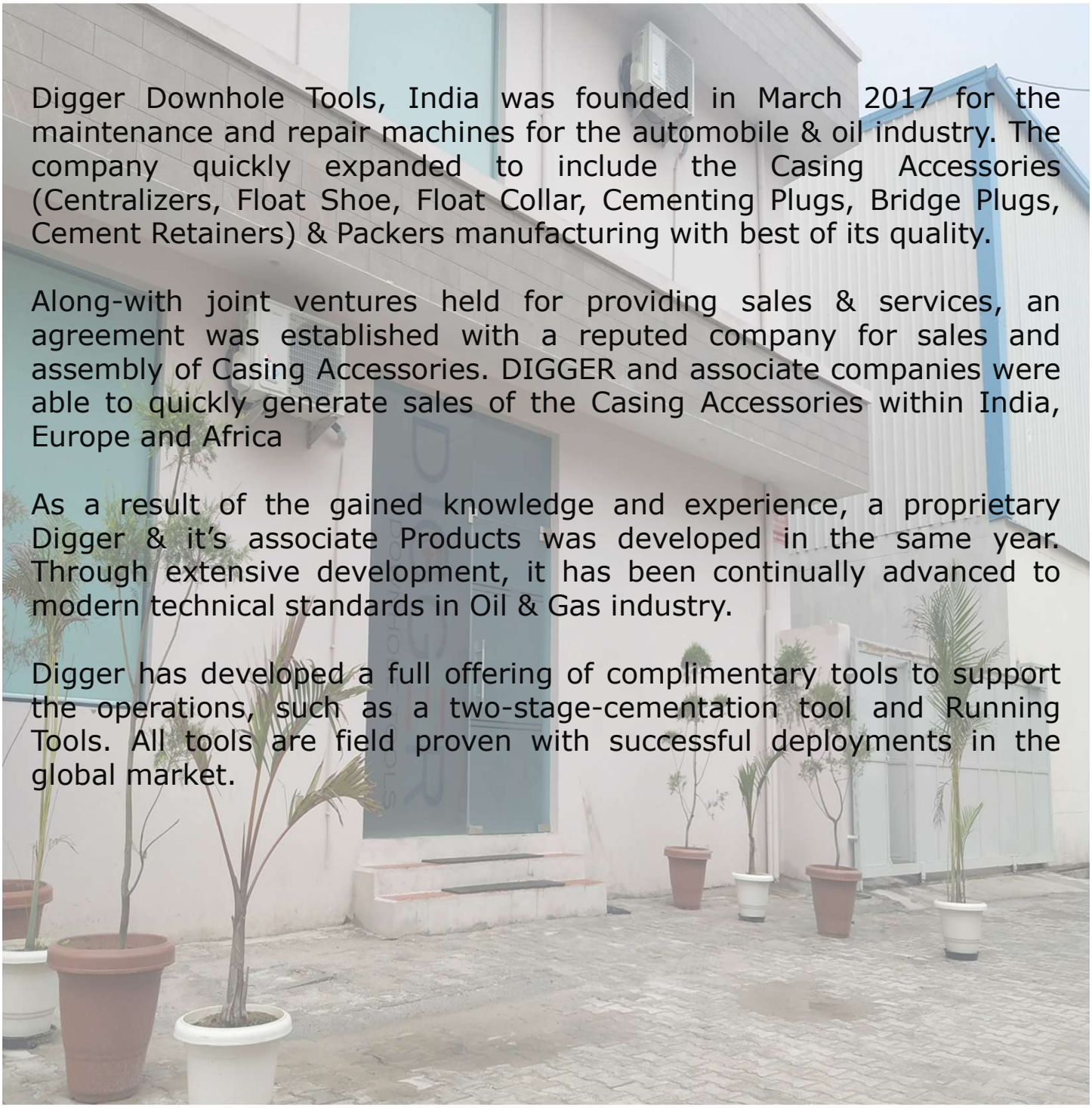
(Drill-more With Dig-lizers)

Centralizers | Floating Equipment | Bridge Plugs | Cementing Plugs | Stage Cementing Tools

www.diggerdownholetools.com sales@diggerdownholetools.com

ABOUT US

DIGGER
DOWNHOLE TOOLS



Digger Downhole Tools, India was founded in March 2017 for the maintenance and repair machines for the automobile & oil industry. The company quickly expanded to include the Casing Accessories (Centralizers, Float Shoe, Float Collar, Cementing Plugs, Bridge Plugs, Cement Retainers) & Packers manufacturing with best of its quality.

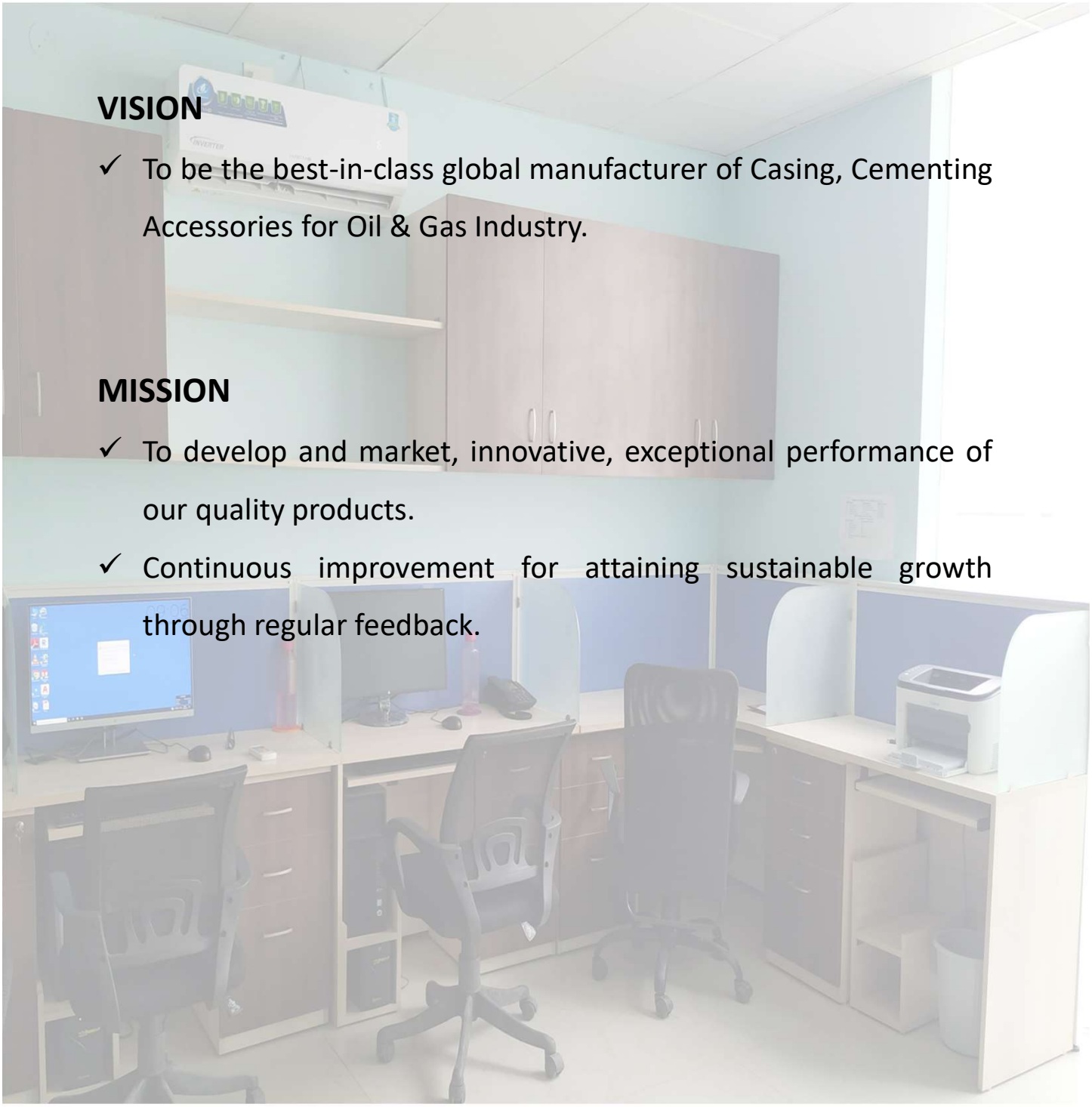
Along-with joint ventures held for providing sales & services, an agreement was established with a reputed company for sales and assembly of Casing Accessories. DIGGER and associate companies were able to quickly generate sales of the Casing Accessories within India, Europe and Africa

As a result of the gained knowledge and experience, a proprietary Digger & it's associate Products was developed in the same year. Through extensive development, it has been continually advanced to modern technical standards in Oil & Gas industry.

Digger has developed a full offering of complimentary tools to support the operations, such as a two-stage-cementation tool and Running Tools. All tools are field proven with successful deployments in the global market.

VISION & MISSION

DIGGER DOWNHOLE TOOLS



VISION

- ✓ To be the best-in-class global manufacturer of Casing, Cementing Accessories for Oil & Gas Industry.

MISSION

- ✓ To develop and market, innovative, exceptional performance of our quality products.
- ✓ Continuous improvement for attaining sustainable growth through regular feedback.

SYSTEM CERTIFICATIONS

DIGGER DOWNHOLE TOOLS

CERTIFICATE OF REGISTRATION

This Certificate has been awarded to

Digger Downhole Tools Private Limited

57-58 KM Stone, NH-48, Delhi – Jaipur Highway, Industrial Area Binola, PO – Bhorakalan , District – Gurugram – 122413, Haryana (INDIA)

In recognition of the organization's Management System which complies with

ISO 9001:2015 (QMS)

The scope of activities covered by this certificate is defined below

Design, Manufacture, Repairing and Servicing of Oilfield Drilling, Cementing & Casing Accessories for Oil & Gas Wells and Engineering Solution for Automobile Industry

SYNDICATE OF INTERNATIONAL SYSTEM CERTIFICATIONS

Certificate Number: SISINDQ04401941
Date of Issue of Original Certificate: 22.04.2019
Date of Issue of latest certificate: 22.04.2019
Expiry Date: 21.04.2020
Re-certification Due on: 22.03.2022

Managing Director

Note: This certificate is valid only if produced with the continuation letter after the surveillance is carried out successfully.

The Organization's documentation and implementation has been reviewed and found to comply with the relevant standard rules. This certificate of Registration is based on the evaluation of the mentioned scope given above. Organization is responsible for maintaining the responsibilities of the relevant standard rules. Any significant changes in the scope of this certification or standard referred above render this certificate invalid. This is an accredited certificate issued by SIS Certifications Pvt. Ltd. sanctioned for issue by International Accreditation Services , 3060 Saturn Street Suite 100 Brea, California 92821-1732, USA.

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Issue No.: 01

ACCREDITED

IAF

ISO 9001

OHSAS 18001

CERTIFICATE OF REGISTRATION

This Certificate has been awarded to

Digger Downhole Tools Private Limited

57-58 KM Stone, NH-48, Delhi – Jaipur Highway, Industrial Area Binola, PO – Bhorakalan , District – Gurugram – 122413, Haryana (INDIA)

In recognition of the organization's Management System which complies with

OHSAS 18001:2007 (OH&S)

The scope of activities covered by this certificate is defined below

Design, Manufacture, Repairing and Servicing of Oilfield Drilling, Cementing & Casing Accessories for Oil & Gas Wells and Engineering Solution for Automobile Industry

SYNDICATE OF INTERNATIONAL SYSTEM CERTIFICATIONS

Certificate Number: SISINDO04401911
Date of Issue of Original Certificate: 22.04.2019
Date of Issue of latest certificate: 22.04.2019
Expiry Date: 21.04.2020
Re-certification Due on: 11.03.2021

Managing Director

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Issue No.: 01

ACCREDITED

IAF

OHSAS 18001

ISO 14001

CERTIFICATE OF REGISTRATION

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In recognition of the organization's Management System which complies with

ISO 14001:2015 (EMS)

The scope of activities covered by this certificate is defined below

Design, Manufacture, Repairing and Servicing of Oilfield Drilling, Cementing & Casing Accessories for Oil & Gas Wells and Engineering Solution for Automobile Industry

SYNDICATE OF INTERNATIONAL SYSTEM CERTIFICATIONS

Certificate Number: SISINDE04401915
Date of Issue of Original Certificate: 22.04.2019
Date of Issue of latest certificate: 22.04.2019
Expiry Date: 21.04.2020
Re-certification Due on: 22.03.2022

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PRODUCT CERTIFICATIONS

DIGGER DOWNHOLE TOOLS

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57-58 KM Stone, NH-48, Delhi – Jaipur Highway, Industrial Area Binola,
PO – Bhorakalan , District – Gurugram – 122413, Haryana (INDIA)

In recognition of the organization's Management System which complies with

ISO 10427-3:2003
(Petroleum and Natural Gas Industries)

The scope of activities covered by this certificate is defined below

Equipment for Well Cementing – Part-3: Performance Testing of Cementing Float Equipment

SYNDICATE OF INTERNATIONAL SYSTEM CERTIFICATIONS

Certificate Number: Pn042019658110B
Date of Issue of Original Certificate: 22.04.2019
Date of Issue of latest certificate: 22.04.2019
Expiry Date: 21.04.2020
Re-certification Due on: 22.03.2022

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Issue No.: 01

ISO 10427-3

CERTIFICATE OF REGISTRATION

This Certificate has been awarded to

Digger Downhole Tools Private Limited
57-58 KM Stone, NH-48, Delhi – Jaipur Highway, Industrial Area Binola,
PO – Bhorakalan , District – Gurugram – 122413, Haryana (INDIA)

In recognition of the organization's Management System which complies with

ISO 10427-1:2001
(Petroleum and Natural Gas Industries)

The scope of activities covered by this certificate is defined below

Equipment for Well Cementing – Part-1: Casing Bow Spring Centralizers

SYNDICATE OF INTERNATIONAL SYSTEM CERTIFICATIONS

Certificate Number: Pn042019658110A
Date of Issue of Original Certificate: 22.04.2019
Date of Issue of latest certificate: 22.04.2019
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Issue No.: 01

ISO 10427-1

ISO 11960

CERTIFICATE OF REGISTRATION

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57-58 KM Stone, NH-48, Delhi – Jaipur Highway, Industrial Area Binola,
PO – Bhorakalan , District – Gurugram – 122413, Haryana (INDIA)

In recognition of the organization's Management System which complies with

ISO 11960:2014
(Petroleum and Natural Gas Industries)

The scope of activities covered by this certificate is defined below

Manufacturer of Accessories at Groups 1, 2, 3, and 4, H40/PSL 1, J55/PSL 3, K55/PSL 3, N80(1)/PSL 2, N80(Q)/PSL 3, R95/PSL 1, M65/PSL 3, L80(1)/PSL3, L80(9Cr)/PSL 3, L80(13Cr)/PSL3, C90/PSL 3, T-95/PSL 3 C110/PSL 1, P110/PSL 3, Q125/PSL 3; Threader

SYNDICATE OF INTERNATIONAL SYSTEM CERTIFICATIONS

Certificate Number: Pn042019658109C
Date of Issue of Original Certificate: 22.04.2019
Date of Issue of latest certificate: 22.04.2019
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Issue No.: 01

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BRIDGE PLUG & CEMENT RETAINER

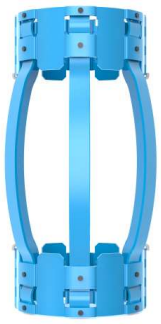
BRIDGE PLUGS, CEMENT RETAINERS & PACKERS

DIGGER DOWNHOLE TOOLS

CASING CENTRALIZERS & STOP COLLARS

HINGED NON WELDED BOW SPRING CENTRALIZER
Model : DR-01

Digger - Non Welded Bow Spring Centralizers are designed for vertical, deviated and horizontal well for enhanced restoring force combined with low starting force ensuring good zone isolation. Bow springs are of high quality alloy steel, hot bent to shape using dies and then heat treated under controlled time cycles for consistent tensile strength and spring characteristics for “spring back” action.



DR-01

HINGED WELDED BOW SPRING CENTRALIZER
Model : DR-02

Digger – Welded Bow Spring Centralizers has more Restoring Force as compare to Non Welded Centralizer. The Centralizers have Bow Spring strongly welded to the End Collar under required temperature and condition with extra low Hydrogen coated Electrodes. Integral hinge folded on the inside stay intact even under extreme stress. The End Collars are designed with a Reinforcing Rib stamped into the End Collar to give maximum structural toughness.

DR-02

Features :

- Extended profile prevents them from hitting against casing collars
- Five standard size Bows can be configured to any hole diameter
- Special zinc Phosphate and powder coating process to prevent from Rust and ensure stocking in the open for a long time.
- These are shipped in half assembled condition for economical in freight and storage costs
- Supplied with stop collar and hinge pin
- Developed to exceeds API 10D standards
- Note : Available in 4 1/2" to 20" sizes. Any special sizes or combination can be made available on request.

HINGED NON WELDED BOW SPRING TURBOLIZER
Model : DR-05

Digger – Non Welded Turbolizer has deflector blade fitted on standard bow spring which creates difference from the standard centralizers. These blades or Fins are specially made of Heat Treated spring steel. The metal fins are installed on the Bows, to help induce turbulence in the cement slurry during pumping operation. Spring action of blades makes them flexible, which minimize damage while moving down hole.

DR-05

HINGED WELDED BOW SPRING TURBOLIZER
Model : DR-06

Digger – Welded Turbolizer has deflector blade fitted on standard bow spring which creates difference from the standard centralizers. The End Collars are designed with a reinforcing Rib stamped into the End Collar to give maximum structural toughness Another special characteristic are built in Stop device on leading End Collar. The metal fins are installed on the bows, to help induce turbulence in the cement slurry during pumping operation. Spring action of blades makes them flexible, which minimize damage while moving down hole.

DR-06

Features :

- These are shipped in half assembled condition for economical in freight and storage costs
- Supplied with stop collar and hinge pin
- Developed to exceeds API 10D standards
- Device improves the cleaning action of Drilling Fluids. Distribute the cement slurry into Well bore irregularities and minimizes channeling.
- Special zinc Phosphate and powder coating process to prevent from Rust and ensure stocking in the open for a long time.

Note : Available in 4 1/2" to 20 " sizes. Any special sizes or combination can be made available on request.

SLIP ON WELDED BOW SPRING TURBOLIZER
Model : DR-07

Digger – slip on Welded Turbolizer has deflector blade fitted on standard bow spring which creates difference from the standard centralizers. These blades or Fins are specially made of Heat Treated spring steel. The metal fins are installed on the Bows, to help induce turbulence in the cement slurry during pumping operation. Spring action of blades makes them flexible, which minimize damage while moving down hole. Collars are specially designed with roll formed peripheral ridges which provide extra rigidity. Slip On Turbolizers are provided for direct installation on pipe by slipping on stop collar and can be provided with Setscrew for elimination of Stop collar.

DR-07

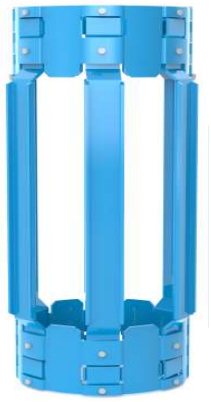
Features :

- Device improves the cleaning action of Drilling Fluids. Distribute the cement slurry into Well bore irregularities and minimizes channeling.
- Special zinc Phosphate and powder coating process to prevent from Rust and ensure stocking in the open for a long time.
- Developed to exceeds API 10D standards.

Note : Available in 4 1/2" to 20 " sizes. Any special sizes or combination can be made available on request.

HINGED NON WELDED POSITIVE BOW CENTRALIZER
Model : DR-08

Digger – Non welded positive Centralizers are uniquely designed with flat bottom U profile of different depths. The Centralizers significantly reduce frictional drag while being used in deviated holes. They provide almost 100% Stand Off when run inside a cased hole. They are supplied 1/4" or 6 mm less than the inside diameter of the hole size in which Centralizer is to be run. This design eliminates weak (brittle) spots passage. The flat U profile is fitted in self-locking retaining lips for firm and positive hold.



DR-08

Features :

- Special zinc Phosphate and powder coating process to prevent from Rust and ensure stocking in the open for a long time.
- These are shipped in half assembled condition for economical in freight and storage costs .
- Supplied with stop collar and hinge pin
- Developed to exceeds API 10TR 5 standards

Note : Available in 4 1/2" to 20 " sizes. Any special sizes or combination can be made available on request.

SINGLE PIECE BOW SPRING CENTRALIZER
Model : DR-12

Digger–Single Piece Welded Bow Spring Centralizer is integrated steel flexible Centralizer used to centralizer casing during the cementing stage of oil wells. Single Piece Centralizers is designed for tight tolerance applications. It performs very well in open hole as well as in cased hole.

DR-12

Features :

- Used in vertical, deviated and horizontal wells
- Low start and running forces
- Flexible and High restoring force
- Developed to have good stand-off
- Developed to meet or exceed API 10D standards
- A low friction coefficient, which means minimal torque losses and reduced drag.
- Enhanced rotation and reciprocation during cementing due to optimized centralization.

Note : Available in 4 1/2" to 20 " sizes. Any special sizes or combination can be made available on request.

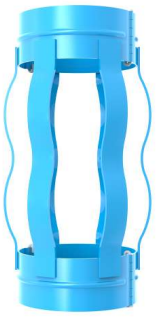
HINGED NON WELDED SEMI RIGID BOW SPRING CENTRALIZER
Model : DR-13

Digger –Semi Rigid Centralizers are designed to pass through tight spots and doglegs. This device ensures high efficiency in casing jobs on Deviated and Horizontal wells. This Design makes these Centralizers act as a rigid centralizer under high side loads. The construction is with Hinges and a Non Welded Bow.

DR-13

HINGED WELDED SEMI RIGID BOW SPRING CENTRALIZER
Model : DR-14

Digger – Hinged Welded Semi Rigid Centralizer ensures high efficiency in casing. Welded Centralizer has more Restoring Force as compare to Non Weld Centralizer. The Centralizers have double crested Bow Spring strongly welded to the End Collar under required temperature and condition with extra low Hydrogen coated Electrodes, which assures ultimate strength and uniformity in every weld. Integral hinge folded on the inside stay intact even under extreme stress. The End Collars are designed with a reinforcing Rib stamped into the End Collar to give maximum structural toughness.



DR-14

Features :

- It has high Restoring force and high Stand Off with low Running Force.
- Special zinc Phosphate and powder coating process to prevent from Rust and ensure stocking in the open for a long time.
- These are shipped in half assembled condition for economical in freight and storage costs
- Supplied with stop collar and hinge pin
- Developed to exceeds API 10D standards

Note : Available in 4 1/2" to 20" sizes. Any special sizes or combination can be made available on request.

HINGED WELDED CEMENT BASKET
Model : DR-17

Digger – Hinged Welded Cement Basket is designed with Flexible Bow Springs, heat-treated under controlled conditions for maximum strength and uniformity are welded to slip-on collars and overlapping metal fins for flexibility and strength to support long columns of cement during primary cementing operations it is easily installed by sliding it over the pin end of a casing joint, prior to make-up of the joint.

SLIP ON CEMENT BASKET
Model : DR-18

Digger– Hinged Welded Cement Basket is designed with Flexible Bow Springs, heat-treated under controlled conditions for maximum strength. The circulation is not restricted whenever in the process of running casing, during lifting and lowering or in the half way.

DR-17

DR-18

Features :

- Special zinc Phosphate and powder coating process to prevent from Rust and ensure stocking in the open for a long time.
- Its design allows cement to flow in an upward direction, yet helps to prevent it from falling downward.
- Developed to exceeds API 10D standards

Note : Available in 4 1/2" to 20 " sizes. Any special sizes or combination can be made available on request.

OPEN TOP CEMENT BASKET
Model : DR-19

Digger – Open Top Cement Baskets consists of heavy duty liners concentrated to staves and fabricated using high strength, flexible steel bows that are mounted on the steel slip-on end collar. The baskets are not duplicated and occasionally allow traveling the length of the joint to allow pipe movement. The cement basket has better ability to adapt to the bore hole and can accommodate larger than nominal hole sizes.

DR-19

Features :

- Special zinc Phosphate and powder coating process to prevent from Rust and ensure stocking in the open for a long time.
- Its design allows cement to flow in an upward direction, yet helps to prevent it from falling downward.
- Developed to exceeds API 10D standards

Note : Available in 4 1/2" to 20 " sizes. Any special sizes or combination can be made available on request.

STAND OFF BAND SPIRAL HEAVY DUTY
Model : DR-22

Digger – Slip On Stand Off Band rigid centralizer is designed.
To provide a positive stand off the for both cased and open Holes. The angled fins provide increased turbulent flow. These Slip On Stand Band is require where close tolerance between the casing and the hole is being encountered. Mainly it's designed for the liner applications.

Design of the stand off band allow for reciprocation and rotation during cementing and can be installed between Set Screw Stop Collar these Stand Off Band undergo a special Phosphate coating process to prevent from Rust then coated with special Polyester Powder. These are available in sizes ranging from 4 1/2'' to 20''

DR-22

Features :

- It helps for proper distribution of cement around the casing during the cementing.
- It also help to reduce the friction for inserting the casing in wellbore.
- It helps to improve strength of cement bond by evenly distributing the cement

Note : Available in 4 1/2" to 13 3/8" sizes. Any special sizes or combination can be made available on request.

ROLLER LD TYPE CENTRALIZER
Model : DR-55

DR-55

Digger - Roller Centralizer is a complete mechanical friction-reduction solution designed for extended-reach wells. It reduces torque, drag, casing wear, tool-joint wear and differential sticking while also improving directional control, ROP and hole cleaning. In Low Drag Roller Centralizer, all rollers are arranged in horizontal direction. This kind of arrangement of rollers efficiently reduces dragging force.

Note : Available in 4 1/2" to 20 " sizes. Any special sizes or combination can be made available on request.

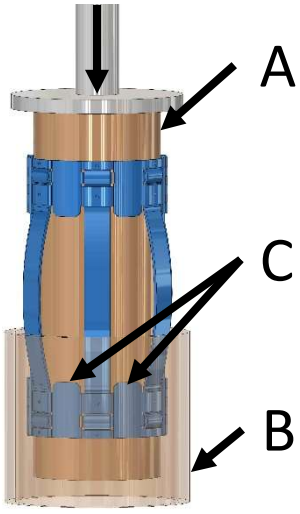
ROLLER LT TYPE CENTRALIZER
Model : DR-56

DR-56

Digger - Roller Centralizer is a complete mechanical friction-reduction solution designed for extended-reach wells. It reduces torque, drag, casing wear, tool-joint wear and differential sticking while also improving directional control, ROP and hole cleaning. In Low Drag Roller Centralizer, all rollers are arranged in vertical direction. This kind of arrangement of rollers efficiently reduces dragging force.

Note : Available in 4 1/2" to 20 " sizes. Any special sizes or combination can be made available on request.

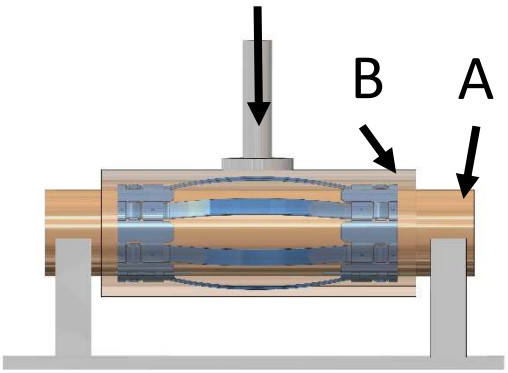
STARTING FORCE TEST

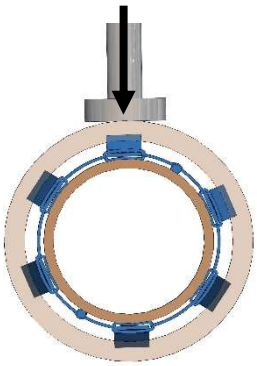


A new fully assembled centralizer is installed over four equally spaced hinges [C on the inner pipe(A)]. The test assembly is held within 5 degrees of the vertical. With the centralizer resting on the edge of the outer pipe B, load is applied on the inner pipe to pull the centralizer into the outer pipe B. Starting force equal to maximum force required to start the centralizer inside pipe B. the starting force should be less than the weight of 40ft. (12.2 meters) of the medium weight casing.

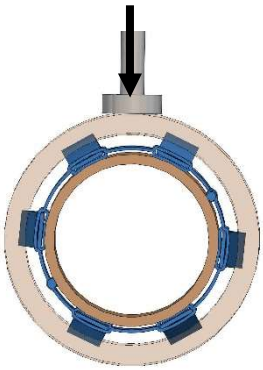
RESTORTING FORCE TEST

Restoring force is the force exerted by a centralizer against the casing keep it away from the bore hole wall. The test is performed with pipe A and pipe B with in 5 degrees of the horizontal. External force is applied to the outer pipe B which is transferred to the centralizer. Load is then applied and load deflection reading are recorded for 3 times when the minimum restoring force has been obtained Each spring is tested and the final load deflection curve is prepared using the arithmetic average of the force reading at corresponding deflection. Restoring force is determined from the curve at 67% stand off ratio. Field experience shows that stand off values 75-90% are adequate even in horizontal wells.





Test Position 1



Test Position 2

SPECIFICATION GUIDE – CASING CENTRALIZERS

CASING DIAMETER (In.)	MEDIUM LINEAR MASS CASING (lb/ft)	MIN. RESTORING FORCE AT 67% STANDOFF RATIO (lbf)	MAX. STARING FORCE (lbf)
3 ½*	9.91*	396	396
4*	11.34*	454	454
4 ½	11.6	464	465
5	13.0	520	520
5 ½	15.5	620	620
6 5/8	24.0	960	960
7	26.0	1040	1040
7 5/8	26.4	1056	1056
8 5/8	36.0	1440	1440
9 5/8	40.0	1600	1600
10 ¾	51.0	1020	2040
11 ¾	54.0	1080	2160
13 3/8	61.0	1220	2440
16	65.0	1300	2600
18 5/8	87.5	1750	3500
20	94.0	1880	3760
* Linear size and plain-end weight			

HINGED SPIRAL NAIL STOP COLLAR
Model : DR-57

DR-57

Digger - Hinged Spiral Nail types has internal grooves onto which the specially designed Spiral nail fasten onto the casing pipe. Collars are hinged at two places 180 degrees apart and one spiral nail in each half is driven between collar and the casing. It can be latched on the casing pipe without having to be slipped on. These are most effective where low annular clearance is encountered.

The spiral nail gives a firm grip to the stop collar and when tested as per API 10D-2 Specifications they provide high holding force.

Note : Available in 4 1/2" to 20 " sizes. Any special sizes or combination can be made available on request.

HINGED BOLTED STOP COLLAR
Model : DR-58

DR-58

Digger - Hinged Bolted types has cross bolt locking system with one go locking for easy installation. This is a single piece collar and the set crews are provided on the outer circle of the periphery which is meant for installing and is directly installed on the pipe by slipping on the casing without any hassle. It is fabricated using ductile iron therefore it has a good impact and fatigue capability. These kinds of collars are used in place where high axial loads are expected.

The bolt lock gives a firm grip to the stop collar and when tested as per API 10D-2 Specifications they provide high holding force.

Note : Available in 4 1/2" to 20 " sizes. Any special sizes or combination can be made available on request.

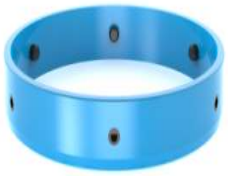
HINGED SET SCREW STOP COLLAR
Model : DR-59

DR-59

Digger - Hinged Set Screw are made up of two pieces and hinged at the two ends making it 180 degrees apart. The gripping force is applied by one of the row of Set screw which tightens the collar to the casing firmly. They can be fastened on to the casing pipe and much easy to install. They are most effective in conditions where there is low annual clearance. The screw lock gives a firm grip to the stop collar and when tested as per API 10D-2 Specifications they provide high holding force.

Note : Available in 4 1/2" to 20 " sizes. Any special sizes or combination can be made available on request.

SLIP ON SET SCREW STOP COLLAR
Model : DR-60



DR-60

Digger - Slip on Set Screw Stop Collar is of one-piece high strength corrosion resistant alloy collar and the gripping force is applied by one row of Set Screws. The outside ends of these collar are generally tapered to a degree which helps to hold the centralizer and avoid the ends to hit the Bows or Vanes when the centralizers are placed over them.

Note : Available in 4 1/2" to 20 " sizes. Any special sizes or combination can be made available on request.

SLIP ON SET SCREW STOP COLLAR SINGLE SIDE BEVELLED
Model : DR-61

DR-61

Digger - Slip on Set Screw Stop Collar single side beveled is of one-piece high strength corrosion resistant alloy collar and the gripping force is applied by one row of Set Screws. The outside ends of these collar are generally tapered to a degree which helps to hold the centralizer and avoid the ends to hit the Bows or Vanes when the centralizers are placed over them.

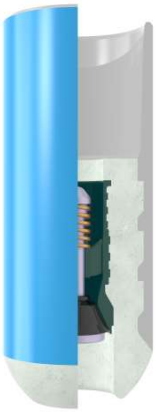
Note : Available in 4 1/2" to 20 " sizes. Any special sizes or combination can be made available on request.

DIGGER DOWNHOLE TOOLS

FLOAT SHOE
&
FLOAT COLLAR

CONVENTIONAL SINGLE & DOUBLE VALVE FLOAT SHOE
Model : DR-CFS-1 & DR-CFS-2

Float Shoe is a cylindrical steel section with a rounded nose which guides the casing toward the that is attached to the bottom of the casing string towards the center of the hole. It contains a check valve to permit fluid to pass downward but not upward through the casing.



DR-CFS-1

DR-CFS-2

Features :

- Fast Drill Out.
- Internal Parts are PDC drillable.
- Float Shoe is available in all API grade material.
- Float shoe can be furnished in API threads as well as in Premium threads.
- Jet port/Nose configuration is available upon request. Digger offers Side Jet Ports, Down Jet Ports and Up Jet Ports.
- Valve is tested as per API RP 10F Category III C.
- Float Shoe is available in Single and Double valve Configuration.
- Maximum Back Pressure rating: 5000 psi @400°F.
- Tubing Float Shoe for high pressure up to 10000 PSI.
- Float Shoe is available in different
- type of nose as per the application.
- Chip breaker features are in all type of aluminum nose as well as Phenolic nose.

SINGLE & DOUBLE VALVE FLOAT SHOE WITH DOWN JET PORTS
Model : DR-DJFS-1 & DR-DJFS-2

DR-DJFS-2

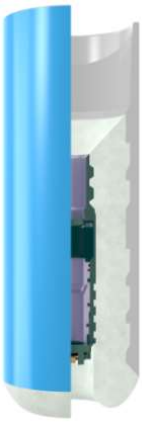
This design ensures positive sealing in vertical, deviated & horizontal well. They have a back-pressure valve that prevents fluids from entering the casing while the pipe is lowered into hole and prevents cement from flowing back into the casing after displacement, while enabling circulation down through casing. Double Valve helps maximum protection against back flow of cement. There are three down-jet ports located below float valve in side of the float shoe shell to help to increase cement bonding strength due to swirl effect by cementing. Sometimes, it provides landing point for cementing plugs when Collar is not used. It is available with Down-jet, Up-jet & Side-jet ports as well.

Features :

- Down-jet ports increase bonding strength of cement.
- Provide passage of fluid with added assurance that flow will not be interrupted when casing rests at bottom.
- Easy PDC drillable.
- Cost effective.
- Maximum protection against back flow of cement.

Note: It is available in Single & Double Valve design.

DIFFERENTIAL FILL-UP FLOAT SHOE
Model : DR-DFS



DR-DFS

Differential fill-up Float Shoe allows 90% casing fill-up during run-in, reducing surge pressures caused by the piston effect of running in restricted I.D. Use of differential shoe provides additional buoyancy by allowing only 81% casing fill-up further enhancing works efficiency.

Circulating can be established at any time while running in. Dropping a ball converts the differential valve to a regular back-pressure valve. When collar and shoe are run together, dropping one ball converts both units. After allowing sufficient time for ball to reach the equipment conversion can be achieve by applying approximately 600-800 psi of pump pressure (adjustable).

Features :

- 90% casing fill-up during run in.
- Reduce surge pressure.

STAB IN SINGLE & DOUBLE VALVE FLOAT SHOE
Model : DR-SIFS-1 & DR-SIFS-2

DR-SIFS-1

Digger Stab-in Float Shoes are provided with features where the drill pipe is stabbed directly into the float shoe. Stab in float shoe resists high temperature, good sealing and drill ability, convenient connection. This kind of shoe is used for inner string cementing operations. Stab-in cementing is an improved method for cementing large diameter casing. It improves displacement accuracy, and cement volume and net rig time. Digger provide Single as well as with Double Valve Stab-in Float Shoe.

Features :

- Reduced cement volume, rig time for cementing operations.
- Use of Drill Pipe Dart instead of large dia. cementing plugs.
- Cementing pressure confined to Drill pipe as in squeeze cementing jobs.

Note: It is available in Single & Double Valve design.

STAB IN LATCH FLOAT SHOE
Model : DR-SILFS-1

DR-SILFS-1

These Float Shoes are provided with latch in profile & allow the drill pipe to be stabbed directly into the float shoe. These float shoe resists high temperature, good sealing and drill ability, convenient connection. This kind of shoe is used for inner string cementing operations. Stab-in cementing is an improved method for cementing large diameter casing. It improves displacement accuracy, and cement volume and net rig time. Digger provide Single as well as with Double Valve Stab-in Latch Float Shoe.

Features :

- Receptacle has ratcheting left hand threads to lock the stringer into the float equipment.
- Drill pipe and stringer can be easily pulled out of the float equipment when cement job is completed.
- Recommended when reciprocation of the casing is required.
- Stab-in Latch-in Stinger required.
- PDC drillable.

Note: It is available in Single & Double Valve design.

SINGLE & DOUBLE VALVE REAMER SHOE
Model : DR-RS-1 & DR-RS-2

Reamer Shoe is a cylindrical steel section with an eccentric nose which guides the casing toward the that is attached to the bottom of the casing string towards the centre of the hole. It contains a check valve to permit fluid to pass downward but not upward through the casing. Reamer shoe is the single and double valve available.

DR-RS-1

Features :

- Carbide spiral vanes and diamond shapes structure provides full-bore coverage in rotating and reciprocating applications, which provides easy passage to total depth.
- The eccentric nose can climb ledges and negotiate other well bore obstructions while the cutting structure reams out tight spots.
- Reamer shoe enables both rotating and reciprocating reaming action while running casing
- and liners.
- Flow ports provide full-bore coverage while rotating and reaming, and they prevent channeling while cement is pumped.
- All internal parts and standard aluminum alloy nose are PDC drillable.
- Reamer Shoe is available in all API grade material.
- Reamer shoe can be furnished in API threads as well as in Premium threads.
- Reamer Shoe is available in Single
- and Double valve Configuration.
- Maximum Back Pressure rating: 5000 psi @400°F.
- Reamer shoe is available in welded design as well as single piece design.

Types of Nose :

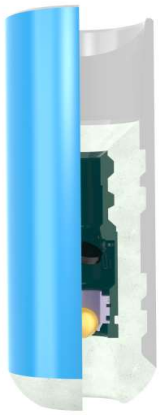
Bullet Nose

Spade Nose

Eccentric Nose

Phenolic Nose

AUTO FILL FLOAT SHOE
Model : DR-AFFS



DR-AFFS

Differential fill-up Float Shoe allows 90% casing fill-up during run-in, reducing surge pressures caused by the piston effect of running in restricted I.D. Use of differential shoe provides additional buoyancy by allowing only 81% casing fill-up further enhancing works efficiency.

Circulating can be established at any time while running in. Dropping a ball converts the differential valve to a regular back-pressure valve. When collar and shoe are run together, dropping one ball converts both units. After allowing sufficient time for ball to reach the equipment conversion can be achieve by applying approximately 600-800 psi of pump pressure (adjustable).

Features :

- 90% casing fill-up during run in.
- Reduce surge pressure.

AUTO FILL FLOAT COLLAR
Model : DR-AFFC

DR-AFFC

Auto fill float collar permits the casing to fill automatically while being run into the hole. The valve is always in open position, allowing maximum filling of the casing as it running in the well bore. This is especially effective on liner job and sensitive hole conditions.

Features :

- Casing can be automatically filled up during running-in
- Casing can be circulated at any time at low rates, without having to convert the valve from the fill-up to the back-pressure mode.
- It can be provided in conventional as well as with non rotating profile.
- PDC Drillable.

CONVENTIONAL SINGLE & DOUBLE VALVE FLOAT COLLAR
Model : DR-CFC-1 & DR-CFC-2

Float Collar is a cylindrical steel section with box and pin threads. Float Collar generally uses one string above the Float Shoe. It contains a check valve to permit fluid to pass downward but not upward through the casing and provides a flat landing surface for cementing plugs.

DR-CFC-1

DR-CFC-2

Features :

- Fast Drill Out.
- Internal Parts are PDC drillable.
- Float Collar is available in all API grade material.
- Float Collar can be furnished in API threads as well as in Premium threads.
- Float Collar can be furnished with non rotating feature.
- Valve is tested as per API RP 10F Category III C.
- Maximum Back Pressure rating 5000 psi @400°F.
- Tubing Float Collar for high pressure up to 10000 PSI.
- Orifice float collar for Tie-back application.
- Ball Catcher/Ball Deflector is avail able upon request.
- Flat surface provides platform to bump the bottom plug.
- Baffle plate float collar is available upon request.
- Inner String float collar is available for larger size casing.

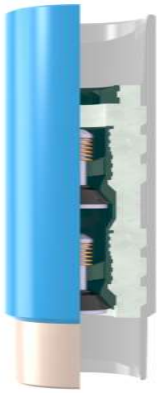
NON-ROTATITING SINGLE & DOUBLE VALVE FLOAT COLLAR
Model : DR-NRFC-1 & DR-NRFC-2

DR-NRFC-1

Non-Rotating Float Collar attaches to one or two casing joints above Float Shoe and they are use to stop slurry from flowing back. Float collar also serves as the backbone of casing equipment used during primary cementing operations. Also it provides a landing point for casing wiper plugs, reinforces the lower end of the casing string, and ensures greater accuracy of cement slurry displacement. Non-rotating insert helps to engage the connecting plugs in it and locks the rotation when PDC drill bit is used.

Features :

- PDC Drillable.
- Inverted Poppet valve has greater strength.
- Can withstand high temperatures & pressure.
- Non-Metallic parts prevent damage to PDC Drill Bit.
- Controlled buoyancy- regulated by filling casing cum surface.



DR-NRFC-2

DIFFERENTIAL FILL-UP FLOAT COLLAR
Model : DR-DFC

DR-DFC

Differential fill-up Float Collar allows 90% casing fill-up during run-in, reducing surge pressures caused by the piston effect of running in restricted I.D. Use of differential collar provides additional buoyancy by allowing only 81% casing fill-up further enhancing works efficiency.

Circulating can be established at any time while running in. Dropping a ball converts the differential valve to a regular back-pressure valve. When collar and shoe are run together, dropping one ball converts both units. After allowing sufficient time for ball to reach the equipment conversion can be achieve by applying approximately 600-800 psi of pump pressure (adjustable).

Features :

- 90% casing fill-up during run in.
- Reduce surge pressure.

STAB IN SINGLE & DOUBLE VALVE FLOAT COLLAR
Model : DR-SIFC-1 & DR-SIFC-2

Digger Stab-in Float Collars are provided with features where the drill pipe is attached to Stab-in stinger or directly stab into the float collar. It resists high temperature, good sealing and drill-out ability & convenient connection. This kind of collars is used for inner string cementing operations. Stab-in cementing is an improved method for cementing large diameter casing. It can also improve displacement accuracy, and cement volume and net rig time. Digger provide Single as well as with double valve Stab-in Float Collar.

DR-SIFC-1

Features :

- Reduced cement volume, rig time for cementing operations.
- Use of Drill Pipe Dart instead of large dia. cementing plugs.
- Cementing pressure confined to Drill pipe as in squeeze cementing jobs.

Note: It is available in Single & Double Valve design.

DR-SIFC-2

STAB IN LATCH FLOAT COLLAR
Model : DR-SILFC-1

DR-SILFC-1

These Float Shoes are provided with latch in profile & allow the drill pipe to be stabbed directly into the float shoe. These float shoe resists high temperature, good sealing and drill ability, convenient connection. This kind of shoe is used for inner string cementing operations. Stab-in cementing is an improved method for cementing large diameter casing. It improves displacement accuracy, and cement volume and net rig time. Digger provide Single as well as with Double Valve Stab-in Latch Float Shoe..

Features :

- Receptacle has ratcheting left hand threads to lock the stringer into the float equipment.
- Drill pipe and stringer can be easily pulled out of the float equipment when cement job is completed.
- Recommended when reciprocation of the casing is required.
- Stab-in Latch-in Stinger required.
- PDC drillable.

CEMENT GUIDE SHOE
Model : DR-CGS

Guide Shoe is a cylindrical steel section with a rounded nose which guides the casing toward the that is attached to the bottom of the casing string towards the center of the hole.

DR-CGS

Features :

- Guide Shoe is available in all API grade material.
- Guide shoe can be furnished in API threads as well as in Premium threads.
- Jet port configuration is available upon request. Digger offers Side Jet Ports, Down Jet Ports and Up Jet Ports.

Types of Jet Float Shoes :

Down Jet
Float Shoe

Side Jet
Float Shoe

Up Jet
Float Shoe

SPECIFICATION GUIDE- FLOAT EQUIPMENT

SIZE (in.)	WEIGHT (PPF)	OD (in.)	ID (in.)
4 ½	9.5-13.5	5.250	4.281
5	15-18	5.800	4.406
5 ½	14-17	6.300	4.969
5 ½	20-26	6.300	4.750
7	17-26	7.875	6.453
7	29-38	7.875	6.125
9 5/8	36-43.5	10.625	8.906
9 5/8	47-53.5	10.625	8.656
13 3/8	48-61	14.375	12.715
13 3/8	68-72	14.375	12.415
16	55-65	17.000	15.312
16	75-109	17.000	15.031
18 5/8	87.5-94.5	20.000	17.843
20	94-133	21.000	19.125

STAB IN STINGER & STAB IN LATCH STINGER
Model : DR-SIS & DR-SILS

Digger Stab-in Latch Stinger is used for cementing large diameter casings lowered on drill pipe. The string presents special cementing consideration due to high displacement volume of large diameter casing. Problem with high displacement are overcome by using Stab in Cementing Equipment to allow cementing through drill pipe.

DR-SIS

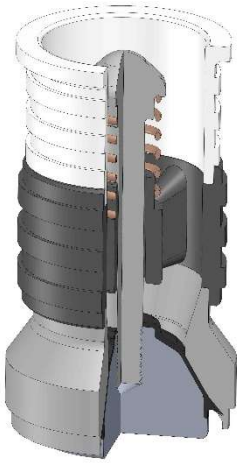
DR-SILS

Features :

- Small diameter inner string off drill pipe is used to displace cement which minimizes displacement volume behind cement and there by reduces contamination and save time.
- Drill out of cement inside large casing is minimized by controlling cement top with displacement fluid in drill pipe and Poppet valve in Stab in Shoe.
- Reduce cement volume conventional displacement requires calculation of excess cement factor, whereas with stab-in methods excess cement need be no greater than the volume of the drill pipe. No large plugs are needed. Flow ports provide full-bore coverage while rotating and reaming, and they prevent channeling while cement is pumped.
- Protect casing cementing pressures are confined to the drill pipe as in a squeeze job

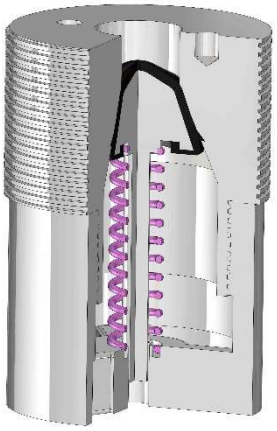
Available sizes 3 1/2” to 6 5/8” and any special sizes can be custom made as required.

FLOAT VALVE (NRV)

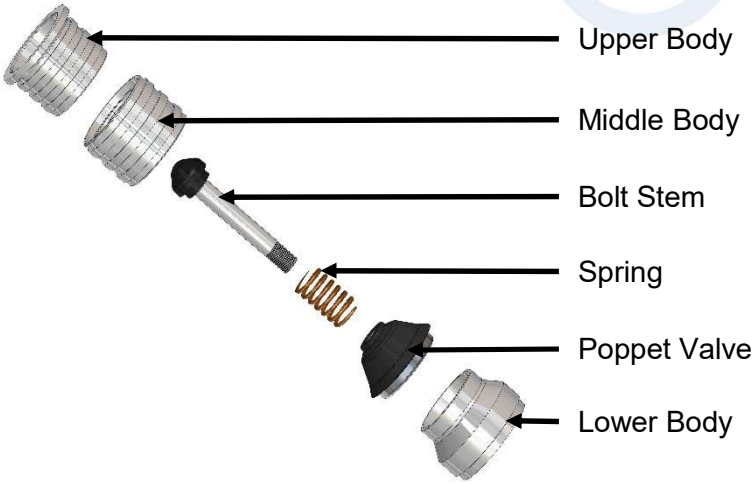


FLOAT VALVE
(for Casing)

A Float Valve is a valve that is used to prevent backflow during a drilling operation in an oil field. Backflow is a fantastic mechanism that regulates the flow of fluid.



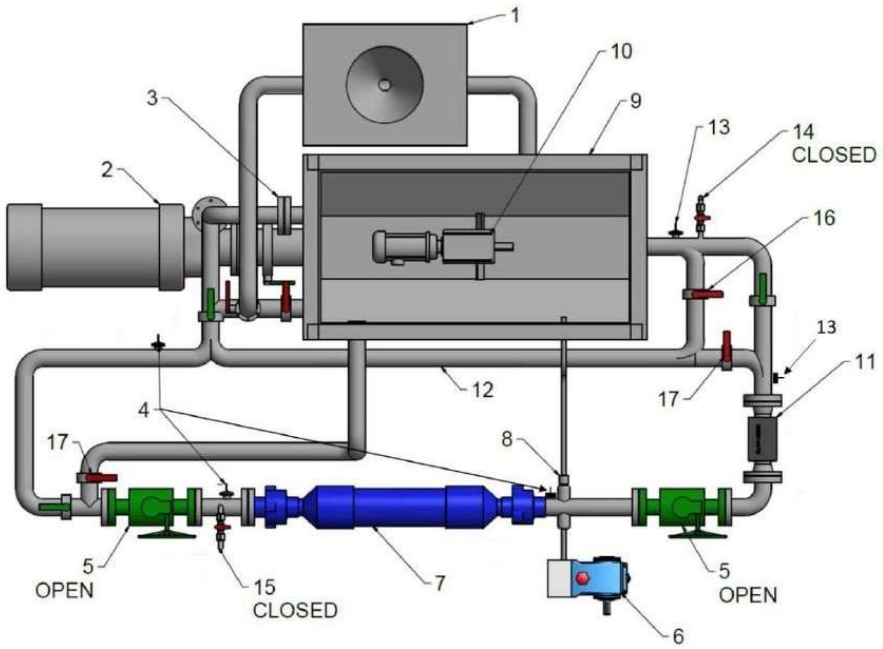
FLOAT VALVE
(for Tubing)



Features :

- High flow phenolic float valve
- 5,000 PSI fitted as standard in all float equipment
- 10,000 PSI aluminum valve for more challenging applications
- Standard 5,000 PSI & high pressure 10,000 PSI
- Single & double valves available

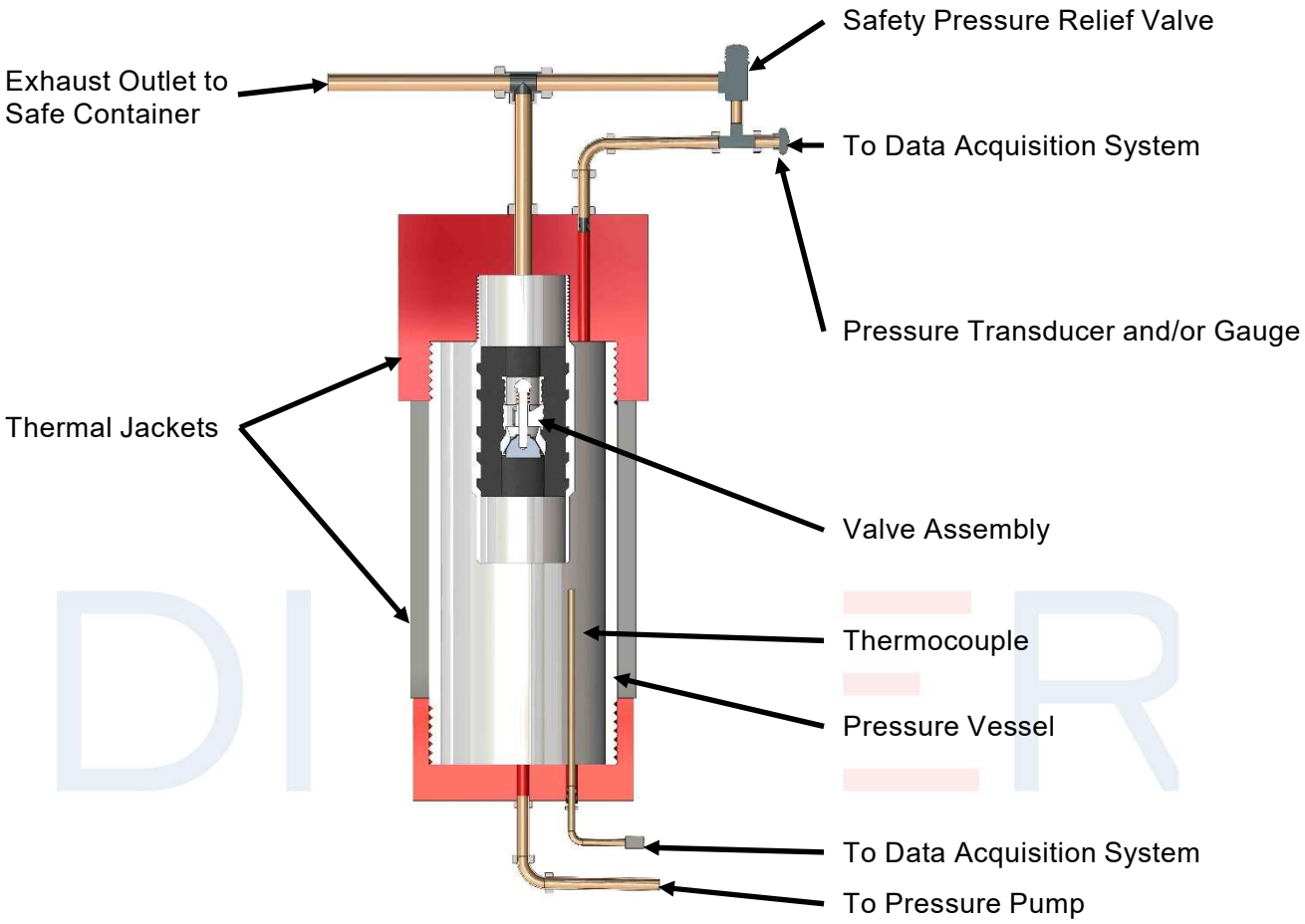
CEMENTING FLOAT EQUIPMENT TESTING
API SPECIFICATION 10F 4TH EDITION, JULY 2018



1. Hopper
2. High Volume Pump
3. LP safety valve/ Repture disc
4. Pressure Transducers
5. HP Large Line valves
6. HP Pump
7. Test Piece
8. HP Safety valve
9. Tank
10. Agitator
11. Flow meter
12. Reverse/ Bypass Flow Line
13. Temperature Transducer
14. LP sample Valve
15. HP Sample Valve
16. Bypass Valve
17. Reverse Flow Valve

The flow durability test system shall be capable of pumping the circulating test fluid through the float equipment at the circulation rate specified for the float equipment casing size range being tested within a tolerance of -0/+0.08 m³/min (-0/+0.5 bbl/min). Flow rate and temperature of the circulating test fluid shall be measured and recorded over the duration of the test.

STATIC HIGH TEMPERATUR/ HIGH PRESSURE CATEGORY RATING



CATEGORY	TEMPERATURE °C (°F)
T200	93 (200)
T300	150 (300)
T350	177 (350)
T400	205 (400)

CATEGORY	PRESSURE kPa (psi)
P1.5	10,300 (1500)
P3	20,700 (3000)
P5	34,500 (5000)
P7.5	51,700 (7500)

CONVENTIONAL TOP & BOTTOM PLUG
Model : DR-TP & DR-BP

Cementing plug is used to separate cement slurry from other fluids, reducing contamination and maintaining expected slurry Performance. Digger provides two types of cementing plug which are generally used on a cementing operation.

- Conventional (Rotating) Type Cementing Top & Bottom Plug
- Non-Rotating Type Cementing Top & Bottom Plug The bottom plug (In Blue/Red) is launched ahead of the cement slurry to minimize contamination by fluids inside the casing prior to cementing. A rupture disk in the plug body ruptures to allow the cement slurry to pass through after the plug reaches the Float Collar.
- The Top Plug (In Black) has a solid body that provides positive indication of contact with the Float Collar and Bottom Plug through an increase in pump pressure.

DR-TP

Features :

- Internal core is available in Phenolic as well as aluminum.
- Oil Resistant.
- Plugs are available in Nitrile, Viton, Aflas and other elastomers.
- Plugs are available in conventional and Non Rotating Design.
- Plugs are PDC drillable.
- One plug can be used in range of PPF for same size of casing.
- Maximum temperature rating 400°F.
- Non Rotating profile reduces the drilling time.

DR-BP

ANTI-ROTATIONAL TOP & BOTTOM CEMENTING PLUG
Model : DR-TP-AR & DR-BP-AR

Digger ANTI-ROTATING CEMENTING PLUG is used with profile float collar. Both the cementing plug- Top cementing plug and bottom cementing plug are manufactured with auto lock profile which on plumbing automatically locks in each other, and restricts rotational of cementing plugs.

DR-TP-AR

These plugs are made of phenolic core integral teeth which eliminates aluminum and large mass of rubber found in conventional cementing plugs. These are no metal parts are used and the plugs are completely PDC drillable. It consist of wiping fins are molded from natural rubber or hydrogenated nitrile (HNBR). They are suitable for standard and high temperature well conditions. After the top plug latches . Into the bottom plug, they provides anti-rotational feature to eliminate rotation during drilling and save drill out time

Note : The plugs available in 3-1/2'' to 30'' size.

DR-BP-AR

COMBINATION OF TOP & BOTTOM CEMENTING PLUG
Model : DR-CTP & DR-CBP

DR-CTP

Cementing plug involves wiping inner diameter of two or more casing string in one wiping action. These plugs allows tapered casing string to be cemented while ensuring efficient wiping of the cement from casing different IDs in the string.
They are designed and tested to withstand 5,000 psi differential pressure. The different sizes of rubber fins which help in wiping on the casing wall as well as assist in displacing the cement in one step. It is made of graded rubber. These plug are completely PDC drillable.

Note : The plugs available in 2-3/8'' to 13.3/8'' size.

DR-CBP

ANTI-ROTATIONAL WIPER TOP & BOTTOM PLUG
Model : DR-CTP-AR & DR-CBP-AR

DR-CTP-AR

Cementing plug involves wiping inner diameter of two or more casing string in one wiping action. These plugs allows tapered casing string to be cemented while ensuring efficient wiping of the cement from casing different IDs in the string.

They are designed and tested to withstand 5,000 psi differential pressure. The different sizes of rubber fins which help in wiping on the casing wall as well as assist in displacing the cement in one step. It is made of graded rubber. These plug are completely PDC drillable.

DR-CBP-AR

Note : The plugs available in 2-3/8'' to 13.3/8'' size.

TOP PLUG & BOTTOM PLUG WITH ALUMINIUM CORE
Model : DR-TP-AL & DR-BP-AL

DR-TP-AL

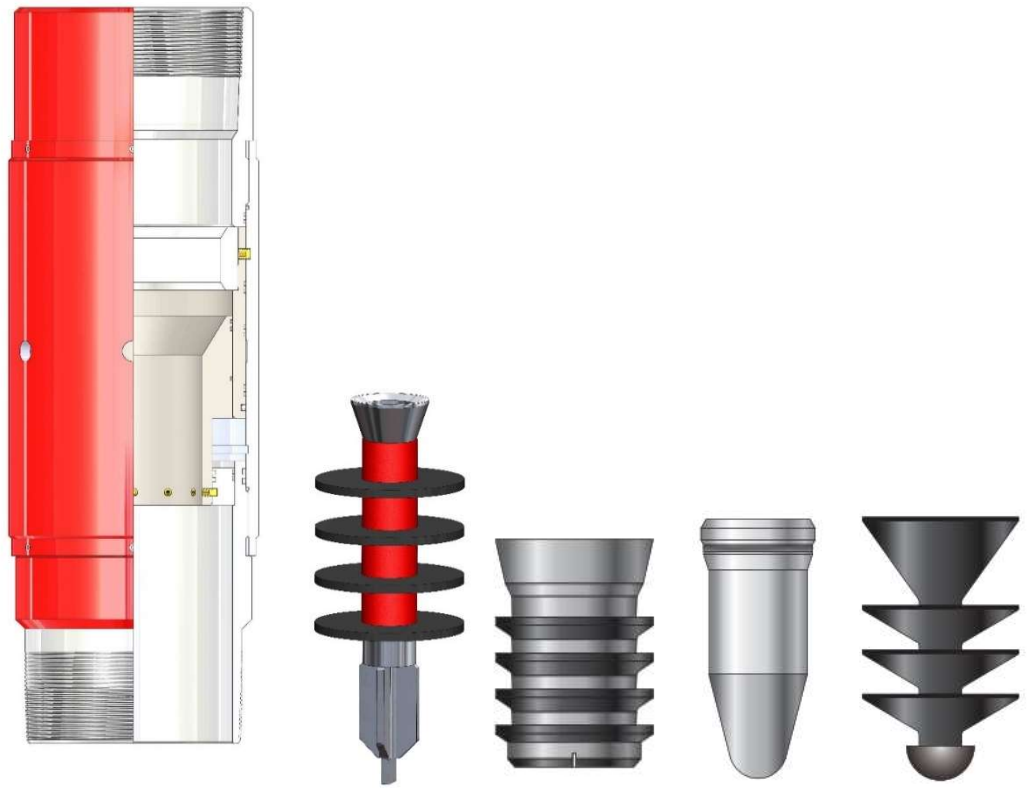
These plug are ideal for use in high temperature well condition. They are made of cast aluminum core and wiping fins are molded from natural rubber or Hydrogenated nitrile (HNBR). These plugs are PDC Drillable. The top plug is manufactured in black natural rubber and the bottom plug in orange with rapture diaphragm at 300 psi differential. Operating range is up to 275°F. Plugs can be ordered in viton.

DR-BP-AL

Note : The plugs available in 16'' to 20'' size.

DIGGER DOWNHOLE TOOLS

STAGE CEMENTING TOOL



HYDRAULIC STAGE CEMENTING TOOL
Model : DR-HSC

Operation Sequence :

- Installation of Digger Baffle Plate (When thread connection is 8RD or Buttress) or Digger Baffle Collar (When thread connection is premium) along with Hydraulically Operated stage cementing tool in the casing string.
- Run the casing string to the bottom
- Establish circulation. Mix and pump first stage cement.
- Launch First Stage Cementing Plug : it lands on Baffle plate or Baffle Collar. It displaces the cement.
- First Stage Cementing Plug seals the ID of Baffle collar.
- Increment of pressure upto opening pressure breaks.
- Down screws, thus opening sleeve is moved downwards.
- As opening sleeve is moved downwards, cementing ports are now in open state.
- Establish circulation. Mix and pump second stage cement.
- Launch Closing Plug, it lands upon closing seat.
- It displaces cement.
- Apply closing pressure, Closing sleeve moves down and main sleeve slips down with it to close cementing ports.

Features:

- Hydraulically Operated Stage Cementing Tool overcomes the drawback of Mechanically Operated Stage Cementing Tool as it can be used in Horizontal wells too.
- Hydraulically Operated Stage Cementing Plug can be converted into mechanically operated stage cementing plug by using a free fall opening plug.
- Adjustable Opening and Closing Pressure.
- It is featured with Anti-rotation features for reducing drilling time.
- No fluid is trapped during any operation.

SPECIFICATION GUIDE :

Casing Size	Max Diameter	Weight	Drill-out I.D	Overall Length	Opening		Closing		Opening Pressure W/Free-fall Device (Psi)
					Pressure(Psi)	Force (L.B.S)	Pressure (Psi)	Force (Lbs)	
5''	6.125	15-18	4.400	29'' (approx)	3000	14.000	1500	25,000	1100
7''	8.275	26-29	6.200	31'' (approx)	2600	28,000	1500	57,000	1000
9 5/8''	11.125	43.5-53.5	8.600	32'' (approx)	2400	50,000	1500	111,000	1000
13 3/8''	15.000	61-72	12.375	35'' (approx)	2100	83000	1500	19500	900

MECHANICAL STAGE CEMENTING TOOL
Model : DR-MSC

Operation Sequence :

- Installation of Digger Baffle Plate (When thread connection is 8RD or Buttress) or Digger Baffle Collar (When thread connection is premium) along with Mechanically Operated stage cementing tool in the casing string.
- Run the casing to the bottom at desired location.
- Location of Cementing Tool depends upon the depth of the well, location of lost circulation zones or weak formations etc.
- Establish circulation. Mix and pump first stage cement.
- Launch First Stage Cementing Plug to displace cement. It sits on Digger Baffle Float Collar.
- Launch Free Fall Opening Plug. It sits on Opening Sleeve.
- Apply Opening Pressure, Opening Seat slips down and cementing ports are opened.
- Establish circulation, Mix and pump second stage cement.
- Launch Closing Plug, it sits on closing seat and displaces the cement.
- Apply closing pressure; closing seat is adjusted to close cementing ports.

Features:

- Mechanically Operated Stage Cementing Tool is designed to be used in vertical wells.
- Opening and closing pressure is adjustable by changing no. of screws.
- Its design is featured such that no hydraulic locking is there during opening and closing phase of the tool.
- Both Opening and Closing Seats consist of anti- rotation features which makes it easier to drill during drilling operation.
- It is a non-welded tool.
- O-ring Seals are provided for prevention of leakage of fluid.
- Snap Ring is provided to lock closing seat in closing position.
- Stage Collar is a proven design that is manufactured in sizes 4 1⁄2" through 20" .

SPECIFICATION GUIDE :

Casing Size	Max Diameter	Weight	Drill-out I.D	Overall Length	Opening		Closing		Opening Pressure W/Free-fall Device (Psi)
					Pressure (Psi)	Force (Lbs)	Pressure (Psi)	Force (Lbs)	
5''	6.125	15-18	4.400	29'' (approx)	3000	14.000	1500	25,000	1100
7''	8.275	26-29	6.200	31'' (approx)	2600	28,000	1500	57,000	1000
9 5/8''	11.125	43.5-53.5	8.600	32'' (approx)	2400	50,000	1500	111,000	1000
13 3/8''	15.000	61-72	12.375	35'' (approx)	2100	83000	1500	19500	900

TWO STAGE THREE PLUG CEMENTING

The standard two stage cementing procedure uses conventional floating equipment, either standard valve or filling float valves on the bottom of the casing string. The rubber baffle plate is installed on top of the float collar. The stage collar is installed in the casing string at the position where second stage cement is to be pumped into the annulus. If a casing packer is being used the stage collar will be located above the packer. The operation of the stage collar is illustrated in sequence.

- Running in and First Stage Cementing, Flexible First Stage Plug will pass through stage collar while displacing first stage cement, landing on Baffle Plate located in Float Collar.
- Second Stage Cement Opening Trip Bomb has landed in and opened Stage Cementing Collar allowing second stage cement to be displaced.
- Second Stage Cement complete, Second Stage Closing / Displacement Plug landed in Stage Collar. Application of pressure will close the Stage Collar Ports. Two Stage Cementing job is complete.

CLOSING PLUG

TRIP PLUG

SHUT OFF PLUG

TWO STAGE FOUR PLUG CEMENTING

Two Stage Wiper plug system is a very effective means of wiping in two stages with liner hanger & ECP Packer. Top Liner Wiper Plug is a flexible type rubber plug, which is assembled with the Top Liner Wiper Plug with the help of shear pins. The plugs have Non-Rotational features, which allow easy PDC drilling after cementing. The Bottom Liner Wiper Plug releases from the Top Liner Wiper Plug by bumping of lower releasing dart and it travels through the Hydraulic Stage.

Cementing Collar without any effect and seats into the BFC Landing Collar. The pressure rises against Bottom Liner Wiper Plug which actuate ECP Packer then opens the ports of the stage tool. The upper dart bump in to Top Liner wiper plug and release the Top Liner Wiper Plug, seats in the closing seat of the hydraulic stage- cementing collar. It closes the ports by shearing the shear pin and shifting the closing sleeve after second stage cementing job.

CLOSING PLUG

TRIP PLUG

SHUT OFF PLUG

BAFFLE PLATE

BY PASS PLUG

SEQUENCE OF OPERATION

Step-1 Stage collar in 'running-in' and first stage cementing position. First stage shut-off plug will pass through stage cementing collar while displacing first stage cement, landing on baffle plate located in float collar.

Step-2 HYDRAULIC opening: Opening sleeve is shifted down by applying hydraulic casing pressure, allowing second stage cement to be displaced through the ports.

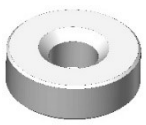
Step 2 MECHANICAL opening: Opening dart is dropped (free-fall), and landed in the opening seat. casing pressure is applied, the opening sleeve is shifted to the open position allowing second stage cement to be displaced through the ports.

Step 3 Once the second stage cement job is complete, the closing plug lands in the stage cementing collar closing seat. Application of casing pressure shears the shear screws and pushes the closing sleeve to the closed and locked position, sealing off the ports. This completes the two stage cement job. (Hydraulic operation works the same, but no opening dart will be present).

BAFFLE COLLAR
Model : DR-BF-P

Baffle Collar is used for landing cementing plugs at specific points in the casing string. It is used when no float collar on shoe is being run and for linear cementing application. It is easily drillable.

BAFFLE PLATE



Baffle Plate is used for landing cementing plugs and is designed to be installed in the center of a casing coupling. These are available in both aluminum and plastic materials, and come in threaded and flush outside diameter configurations. Baffle Plates are available in sizes 4 1⁄2" through 13 3⁄8".

DIGGER DOWNHOLE TOOLS

BRIDGE PLUGS,

CEMENT RETAINERS

&

PACKERS

WIRELINE & MECHANICAL SET BRIDGE PLUG
Model : DR-BP-W & DR-BP-M

DR-BP-W DR-BP-M

These plugs are run and set on Tubing or Drill Pipe. It also incorporates the seal element lock to allow faster, safer run-in. Its materials are also subject to the same stringent specifications and quality control procedures and hence provide improved easy drill feature and are suitable for higher pressure ratings.

It can easily be converted to a Cement Retainer. Its Simple design allows the upper portion of the body and the bridging plug to be drilled out, generating pressure equalization across the tool before drilling out the upper slips.

Changing the upper slip enable the bridge plug to be set mechanically or on a wire line setting tool assembly. It is easily converted to a cement retainer.

Features:

- Choice In Setting - Wireline and mechanical Remove burrs from perforations.
- High Performance - 10,000 psi and 400 deg.F in most.
- Superior Running Characteristics - Increased clearance and locked construction for faster, safer run-in with packing element locked against swab-off forces.
- Body Lock Ring - Traps setting force in element to maintain pack-off during pressure reversals.
- Adaptable - Bridge Plug consist of a basic unit which can easily be converted to mechanical or wireline set or cement retainer.

WIRELINE & MECHANICAL SET CEMENT RETAINER
Model : DR-CR-W & DR-CR-M

DR-CR-W DR-CR-M

Wireline set cement retainer is a high quality tool for squeeze cementing. The sleeve valve is controlled from the surface by simply picking up to close and setting down to open. The valve is automatically closed when the stinger is removed from the retainer. This retainer plug sustains high pressure and temperature. It may be set on a Wireline/ Hydraulic setting tool or mechanically by changing the top slips. It can also converts to a bridge plug by replacing the sliding sleeve by solid plug.

Features:

- Choices of setting by wireline and mechanical.
- High Performance - 10,000 psi and 400 Deg F.
- Enormous annulus clearance for faster & safer run-in.
- With simple kit Cement Retainer easily converted to bridge plug.
- Simple conversion to cement retainer, reducing inventory.
- Body Lock Ring: Traps setting force in element to maintain pack-off during pressure reversals.
- Rotationally locked, cast-iron components enable a fast & easy drill out to save rig time.
- Easily PDC drillable.

SPECIFICATION GUIDE (DR-BP-W/M & DR-CR-W/M) :

Casing / Tubing		Tool		Preferred casing ID Range		Differential
OD (in.)	Wt. (lbs/ft)	Size	Max OD (in.)	Min (in.)	Max (in.)	Pressure (psi)
4-1/2	9.5-16.6	BX1	3.593	3.826	4.090	10,000
5	11.5-20.8	BY1	3.937	4.154	4.560	
5-1/2	26.0-32.3					
	13-23	BX2	4.312	4.580	5.044	
6	18-26	BY2	4.937	5.140	5.552	
7	49.5					
6-5/8	20-32	BX3	5.410	5.595	6.135	
7	32-44					
	17-35	BY3	5.687	6.000	6.538	
7-5/8	45.3					
	20-39	BX4	6.312	6.625	7.125	
7-3/4	46.1					
8-5/8	24-49	BX5	7.125	7.511	8.097	
8-3/4	49.7					
9-5/8	32.3-58.4	BX6	8.125	8.435	9.063	8,000
9-3/4	59.2					
9-7/8	62.8					
10-3/4	60.7-81	BY6	9.000	9.250	9.660	5,000
	32.75-60.7	BX7	9.437	9.660	10.192	
11-3/4	60.0-83.0	BY7	9.937	10.192	10.772	4,000
	42-60	BX8	10.437	10.772	11.150	
13-3/8	85-102	BY8	11.562	11.633	12.159	3,000
	48-80.7	BX9	12	12.175	12.715	
13-1/2	81.4					
13-5/8	88.2					
16	109.0-146.0	BX11	13.915	14.000	14.750	P110 2000 N80 1450
	55.0-84.0	BY11	14.585	14.700	15.400	

HYDRO MECHANICAL BRIDGE PLUG
Model : DR-BP-H-BB

DR-BP-H-BB

Hydro-Mechanical bridge plug is hydraulically actuated and mechanically set. Compact with small OD this tool can withstand high pressure and is designed for easily drill out. It can be used in zone isolation for squeeze cementing, fracturing, and plug and abandonment either temporary or permanent.

Features:

- The setting mechanism and control are contained in the bridge plug eliminating the need for a complex mechanical setting tool.
- Eliminates the expense of wire line setting tool and equipment.
- Full tubing bore is available for unobstructed passage of fluids and wire line run perforating and logging equipment after the plug is set and tubing released.
- Can be run and set in tandem with retrievable production packers or squeeze packers.
- Top equalizing during drill-out without the plug coming up the hole due to pressures contained below the plug.
- Set securely in most casing, including many premium grades.

SNAP LATCH & MECHANICAL SETTING TOOL
Model : DR-SLST & DR-MST

DR-SLST

DR-MST

Snap latch tool is a mechanical setting tool used for setting Bridge Plugs and Cement Retainers. It comprises a snap latch mechanism for setting the tool. By putting the weight on it, it latches in product for setting. This essentially allows the setting tool to function as a snap latch stinger sub which provides an upward stop as the tubing is raised. At this stop the valve is closed but the stinger sub seal is still in the bore of the retainer. At this position in the running string internal pressure test could be carried out. For releasing the tool, up strain and rotate it.

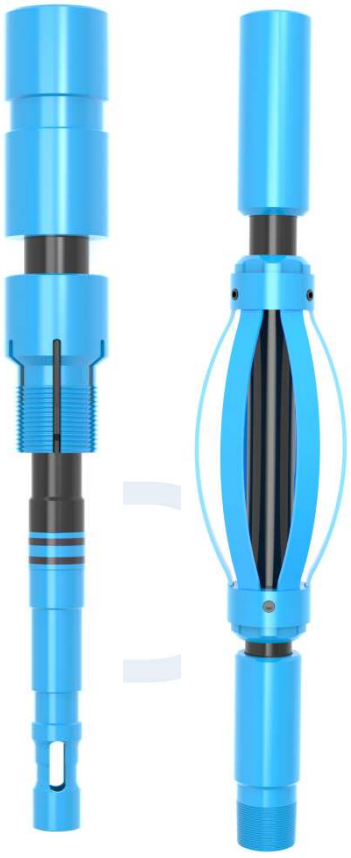
Features:

- One trip system. Mechanically sets tool with rotation and
- Up strain and functions as a stinger for subsequent cementing operations
- Easily converted to set either Cement Retainers or Bridge Plugs.
- Safe run in. Upper slip is securely locked in place and latch is solidly threaded into the body of the retainer
- Snap latch feature latches into the retainer with set down weight and is released with tension.
- Controls retainer valve. The stinger opens the sleeve valve with set down weight and closes it with up strain.
- Tubing pressure test is possible with latch sleeve valve retainers by pulling up to close retainer valve prior to snapping out of retainer.

SPECIFICATION GUIDE (DR-SLST & DR-MST):

Casing/Tubing		Tool			Tubing Setting Tools	
OD (in.)	Wt. (lbs/ft)	Size	Seal Bore (in.)	Max OD (in.)	Model	Setting Sleeve OD (in.)
4-1/2	9.5 - 16.6	BX1	1.345	3.593	BX1-BY1	3.594
5	11.5 - 20.8	BY1		3.937		
5-1/2	13 - 23	BX2		4.312	BX2	4.312
6	14 - 26	BY2		4.937	BY2	4.938
	10.5 - 12					
6-5/8	17 - 34	BX3	2.000	5.410	BX3	5.375
7	32 - 44					
	17-35	BY3		5.687	BY3	
7-5/8	20 - 39	BX4		6.312	BX4	6.312
8-5/8	24 - 49	BX5		7.125	BX5	7.125
9-5/8	29.3 - 53.5	BX6		8.125	BX6	8.120
10-3/4	60.7 - 81	BY6		9.000	BY6	8.875
	32.75 - 60.7	BX7		9.437	BX7	9.437
11-3/4	60.0 - 83.0	BY7		9.937	BY7	9.930
	38 - 60	BX8		10.437	BX8	10.438
13-3/8	85 - 102	BY8		11.562	BY8	11.562
	48 - 72	BX9		12.000	BX9	12.000
16	109.0 - 146.0	BX11		13.915	BX11	13.900
	55.0 - 84.0	BY11		14.585	BY11	14.570

STINGER SUB & CONTROL UNIT
Model : DR-SS & DR-CU



DR-SS DR-CU

Digger Stinger Assembly is a tubing conveyed latching seal assembly that is used to operate the sliding valve in a wireline set DR-BP-W cement retainer.

Digger Stinger Sub is connected to Control Unit Assembly may be run with a tubing centralizer or a modified star guide, to provide a centralized entry into the cement retainer.

The Snap-In and Snap-Out collet serves as an indicator. Providing positive control when the work string is picked up to close the solid valve.

The snap out indicator re-engages each time the work string is lowered to open the valve. The snap out indicator helps prevent the seal from pumping out during pumping operations or tubing testing.

The snap out indicator may be removed from the cement retainer by straight pull or by rotation serving additional safety feature.

Features:

- Squeeze cementing.
- Multiple uses by replacing inexpensive redress kit.
- Can also be used with preset Digger DR-BP-M mechanical cement retainer.
- Built in snap out indicator provides positive control when the work string is picked up to closed the inside valve. Re-engages each time the work string is lowered to open slide valve.
- Snap in designed helps prevent seal from pumping out during pumping operations or tubing testing.
- One size operates several sizes of retainers.
- Released by straight pull or rotation.

SPECIFICATION GUIDE (DR-SS & DR-CU):

Casing		Tool	
SIZE (in.)	Weight (lbs/ft.)	Size	Thread spec.
4-1/2	9.5-15.1	BX1	2 3/8 EU
5	11.5-20.8	BY1	
5-1/2	13-23	BX2	
6-5/8	17-32	BX3	2 7/8 EU
7	17-35	BY3	
7-5/8	20-39	BX4	
8-5/8	24-49	BX5	
9-5/8	29.3-58.4	BX6	
10-3/4	32.75-60.7	BX7	
11-3/4	38-60	BX8	
13-3/8	48-80.7	BX9	

HYDRAULIC SET RETRIVABLE PRODUCTION PACKER
Model : DR-HPR-1

DR-HPR-1

The Model DR-HPR-1 Double-Grip Hydrostatic Single String Packer is a retrievable packer set by either the hydrostatic head of the well, tubing pressure, or both and retrieve by straight pull at a specified shear vale. The Model DR-HPR-1 Hydrostatic Packer is set by pressurizing the string to obtain a pressure differential in the packer. Temporary plugging below the packer is necessary. Plugging is typically done with a Pressurization Sub, E-Hydro-Trip Sub, Sliding Sleeve or Landing Nipple used with Blanking Plug or another Hydraulic Setting Device.

Application:

- Production, injection, and zonal isolation.
- Single-string selective completions or dual-string completions with multiple packers.
- Deviated wells or other applications when rotation for installation or removal is not beneficial.

Features:

- Hydraulically activated, hydrostatic-set, low-pressure, rig-pump-capable activation.
- Field-adjustable shear release.
- No tubing manipulation required to set the Packer.
- Operationally simple.
- Triple-seal multi-durometer elements ensure pressure integrity over a wide range of temperatures and conforms easily to casing irregularities.
- Hydraulic Hold-Down Buttons activated by well pressure enables the bidirectional gripping of Packer to withstand high differential pres sure from below the packer.
- Ability to withstand high hydrostatic pressure.
- Setting mechanism ensures sustained pack off force throughout the life of the packer.
- Available in all metallurgical and Elastomers conforming to NACE MR 0175 or H2S, and suitable for standard normal/ H2S, CO2 well services requirements.
- Available in All API & Premium thread connections.

SPECIFICATION GUIDE (DR-HPR-1) :

Casing		Casing ID Size (In.)	Size	Gauge OD of Packer (In)	Min. ID of Packer (In.)	Thread connection
Size (In.)	Weight (lbs/ft)					
5-1/2	13.0-15.5	4.950 - 5.190	DR 45B	4.781	1.995	2-3/8" EU
	15.5-20.0	4.778- 4.950	DR 45A4	4.641		
	20.0-23.0	4.625- 4.778	DR 45A2	4.500		2-3/8" EU
6-5/8	20 - 24	5.921- 6.049	DR 47A2	5.661	2.441	2-3/8" & 2-7/8" EU
	24 - 28	5.791- 5.921	DR 46A4	5.625		
	28 - 32	5.675 - 5.791	DR 45E4	5.484		
7	17.0-20.0	6.456- 6.578	DR 47C2	6.266	1.995 or 2.441	2-7/8" & 3-1/2" EU
	20.0-26.0	6.276- 6.456	DR 47B4	6.078		
	26.0-32.0	6.094- 6.276	DR 47B2	5.968		
	32.0-35.0	5.938- 6.135	DR 47A4	5.812		
9-5/8	40-47	8.681 – 8.835	DR 51A4	8.437	2.992 or 3.958	3-1/2"& 4-1/2" EU
	47-53.5	8.343 - 8.681	DR 51A2	8.281		

MECHANICAL SET SINGLE & DOUBLE GRIP PRODUCTION PACKER
Model : DR-MPP-1 & DR-MPP-2

DR-MPP-1 DR-MPP-2

The DR-MPP-1 & DR-MPP-2 Packer is a Mechanical compression-set production packer intended for a broad range of production applications. It is a compression-set packer, suitable for stimulation and treating applications in a single/double-grip configuration. Applications in which excessive bottom hole pressures have been depleted, a single-grip. version can be used as an economical production packer.

It is set by applying a quarter turn to the right at the packer followed by set down weight. The packer is released by straight pick up to open the large by-pass allowing equalization. After equalization, the packing elements release reducing tendency of swabbing when pulling out of wellbore.

Application:

- Squeeze Cementing.
- Acidizing
- Formation fracturing.
- Well Testing & Servicing.

Features:

- Holds high pressure differentials from above or below.
- The J-slot design allows easy setting and releasing; 1/4 turn right-hand set, and straight pull release.
- Reliable Three-piece, Dual durometer sealing elements provide better pack off Bypass valve is below upper slips so the debris is washed from slips when the valve is opened Benefits.
- Bypass valve opens before upper slips are released.
- Available in material conforming to NACE MR 0175 or H2S, CO2 well Environment services requirements.
- Available in All API & premium thread connections and Elastomers type.

SPECIFICATION GUIDE (DR-MPP-1 & MPP-2) :

Casing				Packer			
Size (In.)	Weight (lbs/ft)	Min. ID (In.)	Max. ID (In.)	SIZE	Nominal ID (In.)	Gage & Guide Ring OD (In.)	Thread Specification Box Up & Pin Down
5-1/2	26	4.408	4.560	DR 43C	1.89	4.250	2-3/8" EU
	20-23	4.670	4.778	DR 45A2	1.995	4.500	2-3/8" EU
				DR 45A2 X 2-3/8	2.375		2-7/8" EU
	15.5-20 14-20	4.778	4.950	DR 45A4	1.995	4.641	2-3/8" EU
	17-20	4.778	4.892	DR 45A4 X 2-3/8	2.375		2-7/8" EU
7	38	5.791	5.921	DR 46A4	2.441	5.588	2-7/8" EU
		5.830	5.937	DR 47A2		5.656	
	32-35	6.004	6.094	DR 46B		5.781	
	26-29	6.184	6.276	DR 47B2	2.441	5.968	2-7/8" EU
				DR 47B2 X 3	3.000		3-1/2" EU
	20-26	6.276	6.456	DR 47B4	2.441	6.078	2-7/8" EU
				DR 47B4 X 3	3.000		3-1/2" EU
	17-20	6.456	6.538	DR 47C2	2.441	6.266	2-7/8" EU
				DR 47C2 X 3	3.000		3-1/2" EU
9-5/8	47-53.5	8.343	8.681	DR 51A2	3.968	8.218	3-1/2" EU
	40-47	8.681	8.835	DR 51A4		8.437	

PUMP OUT PLUG
Model : DR-POP & DR-POP-H

DR-POP

The Pump-Out Plug is installed to the bottom of the tubing string below the Packer to isolate the tubing from the annulus. To remove the plug, drop the Ball and apply pressure the Pump-Out Plug is removed to allow full opening. Also available with blank seat sub. The plug is available with the half Mule Full mule and beveled lower end to aid the re-entry of Slick line/Wireline Entry Tools.

Features :

- Field Adjustable shear screws to achieve desired pressure rating.
- Available in All API material grades.
- Available in material conforming to NACE MR 0175 or H2S, CO2 well Environment services requirements.
- Available in All API & premium thread connections and O-Ring type.
- High chamfered Lower End aid the re-entry of Slickline / Wireline Entry Tools.

DR-POP-H

SPECIFICATION GUIDE (DR-POP & POP-H):

Tubing Size (In.)	Tool OD (In.)	Tool Id after shear the Ball Seat (In.)	Ball Size (In.)	ID of Ball Seat (In.)
2-3/8	3.062	1.937	1 1/4	1.000
2-7/8	3.668	2.375	1 1/2	1.250
3-1/2	4.500	2.937	2 1/2	2.250

NON ELASTOMERIC SLIDING SLEEVE
MODEL: DR-SSD

DR-SSD

The Sliding Sleeve is a Down hole Tool normally screwed into the production tubing, allowing for communication between the tubing and the casing. It is used to selectively produce zones in a multi-zone completion, stimulate and test zones, displace tubing or casing once the wellhead is installed, kill the well by circulation and allows for the circulation of treatment chemicals or agents. The closing sleeve has replaceable, v type upper and lower seals to ensure maximum sealing integrity for extended periods of time down hole. The upper sub is available in selective/Non Selective and Otis (X, XN, R, RN)/Baker (F&R) type Nipple profile machined into it. This feature provides a profile to locate and lock into place various flow control devices which may be required from time to time. The Sliding Sleeve is shift down to open and closes with the B Shifting Tool. The Shifting Tool can be dressed to either release automatically or to shear a pin to release. Downward jarring opens the sleeve and upward jarring closes it. The Sliding Sleeve is designed so that normal wire line operations will not open or close it inadvertently.

SPECIFICATION GUIDE (DR-POP & POP-H):

Seal Bore (inch)	Flow Area [Ports] (sq. inch)	Flow Area [Min ID] (sq. inch)	Max OD (inch)	Threads Connection	Shifting Tool	Pressure Rating (psi)
1.625	0.919	2.073	2.625	2-3/8”	1.625”B”	9,000
1.875	2.355	2.762	3.063	2-3/8”	1.875”B”	
2.313	2.974	4.199	3.668	2-7/8”	2.313”B”	
2.750	7.212	5.940	4.281	3-1/2”	2.750”B”	8,000
2.812		6.211			2.812”B”	
3.312	11.426	8.611	5.680	4-1/2”	3.250”B”	7,500
3.813		11.413			3.813”B”	
4.312	10.598	14.596	6.400	5-1/2”	4.312”B”	6,500
4.562		16.337	7.500		4.562”B”	

SHIFTING TOOL
MODEL: DR-BO

DR-BO

Digger Model “DR-BO” shifting tool is designed to selectively locate and shift most sliding sleeves and/or tubing-conveyed perforating (TCP) disconnect subs. This is accomplished by the tool’s keys engaging the inner sleeve; and, depending on the direction that the tool requires (up or down), the sleeve is shifted

Model BO Shifting Tool

Digger Model “DR-BO” shifting tool is designed to selectively locate and shift sliding sleeves only to the down position. The tool is made selective by the lower locating section

Application:

- Any application where selective actuation of sliding sleeves is needed.
- Actuating disconnect sub applications.
- Wells assisted by sucker-rod pumps.

Features:

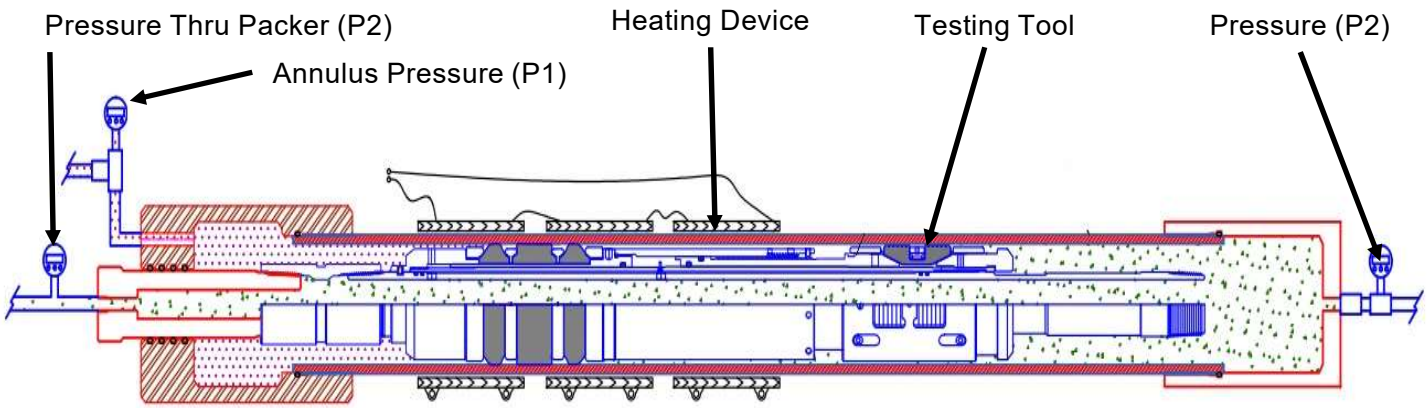
- Selectively locates and shifts most sliding sleeves and/or TCP Disconnect subs.
- The Type “DR-BO” Shifting Tool is used to position the closing sleeve or sliding side doors to the open position or to the closed position

SPECIFICATION GUIDE :

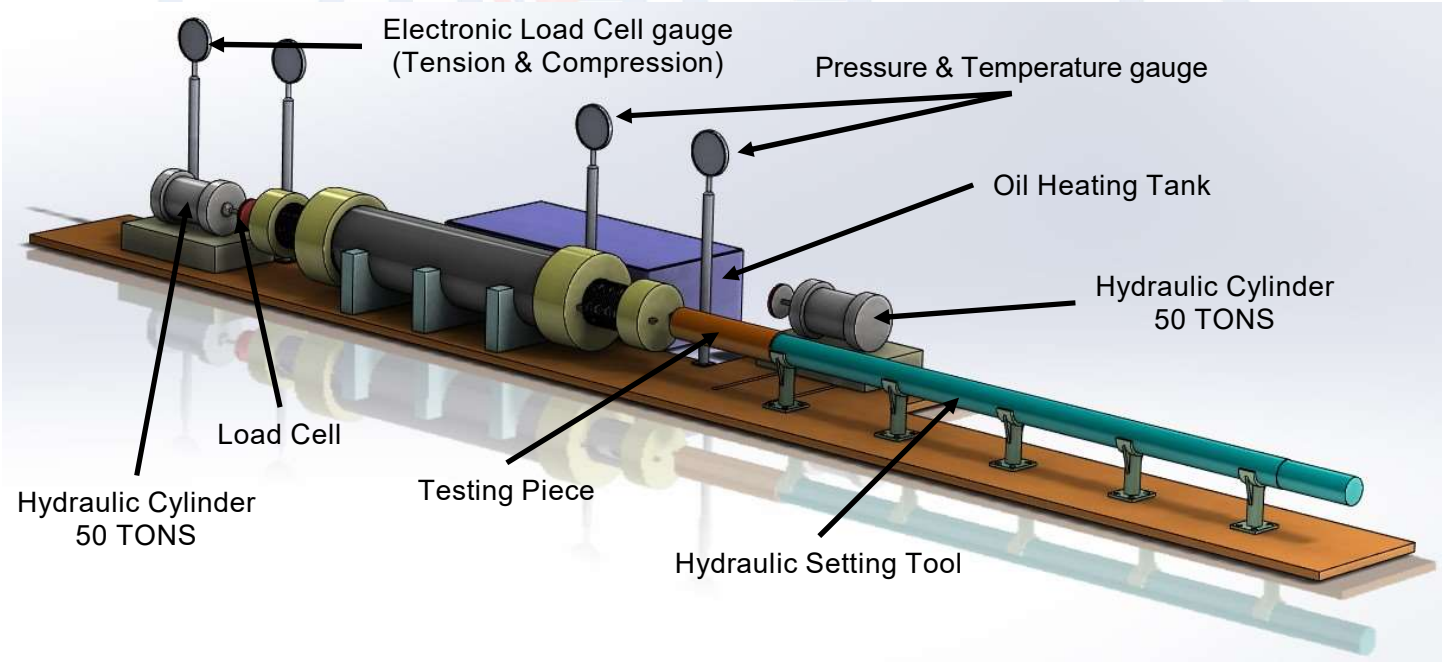
Sliding Side Door ID	Fish Neck Size	ID Keys Expended	OD Keys Retracted	Threads	Overall Length
1.875	1.375	2.11	1.84	15/16-10UN	13.30
2.215	1.375	2.35	1.97	15/16-10UN	13.30
2.313	1.750	2.59	2.16	15/19-10UN	13.94
2.750	2.313	2.9	2.73	1-1/16-10UN	14.19
2.813	2.313	3.01	2.72	1-1/16-10UN	14.19
3.813	3.125	4.09	3.12	1-1/16-10UN	13.88

PACKER TESTING

API V5: Liquid Test



API V3: Liquid + Axial Load + Temp Cycle Test

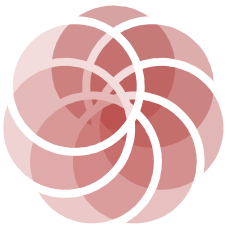


MANUFACTURING FACILITY- THREADING

DIGGER DOWNHOLE TOOLS

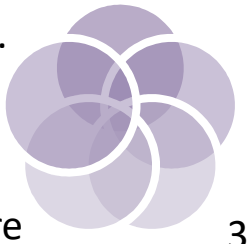
API THREADS

1. EUE
2.BTC
3.STC
4.LTC
5.NUE
6.IF
7.RTJ



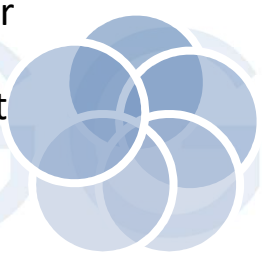
STANDARD THREADS

1.Acme
2.Stub Acme
3.National
4. Square
5. Special. Buttress



OUT SOURCED THREADS

1. VAM
2.Tenaris
3. Fox thread
4. JFE
5. Premium thread as per customers requirement



Activities / Processes performed by Digger;

- ✓ Powder Coating
- ✓ NDT
- ✓ Calibration
- ✓ Heat Treatment
- ✓ Elastomers / Rubber Elements

CROSSOVER SUBS

DIGGER DOWNHOLE TOOLS

A crossover sub is used to crossover from one connection size to another or as the disposable component used to extend the connection life of a more expensive drill stem member.

Types of Crossover subs are:

- box x pin
- box x box
- pin x pin connections.

Crossover Subs are manufactured as per API standard. The connections are protected by a phosphate surface coating.

SPECIFICATION:

- Size and type of upper and lower connections, indicating pin or box
- Cast or pressed-steel thread protectors
- For Reduced Section Subs, add: diameter of reduced section
- Length of reduced section: 8", 12", 18" or 24"
- For Bit Subs, add: float bore size and type if desired

LUBRICATE & COMPOUND

DIGGER DOWNHOLE TOOLS

THREAD COMPOUND:

It is a High Pressure thread compound that reduces the friction in the makeup of casing and tubing

Advantage:

- Wide operational temperature range
- Highly chemical resistant.
- Reduced number of lubricants required
- Highly resistant to oxidation.

THREAD LOCK:

It is commonly used for casing, tubing & drilling joints to prevent accidental detaching of string compound during operation.

Advantage:

- Easy Mixing
- High Lubricity
- Leak Proof Seal
- Withstands high breakout torque

BRASS BALL:

These balls are used in electrical devices, petrochemical industry operation, and consumer products such as appliances. Small diameter balls are often used in valve. Electrical conductivity makes brass balls a good option for electronics application. Also, they have low friction properties. The sizes are available from 1 ¼” to 2 ½”.

Advantage:

- Corrosion Resistance
- Effective Hardness

QUALITY ASSURANCE & QUALITY CONTROL

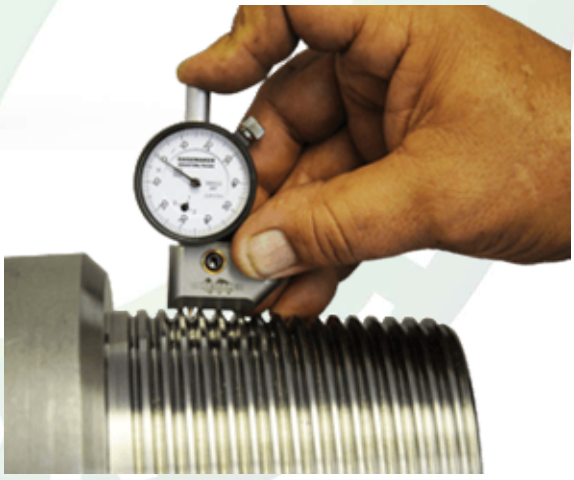
DIGGER DOWNHOLE TOOLS

DIGGER manufacturing facility is accredited with Quality / Industry certifications.

All procedures are well documented with strict control mechanisms , complete traceability and Quality Management System in place as per Latest edition of ISO & API Q1 requirements.

The following are highlights of our QMS:

- ✓ Incoming raw material inspection , In-process inspection
- ✓ Heat treatment where applicable
- ✓ Thread inspection
- ✓ MPI , Load test, Ultrasonic inspection, if applicable
- ✓ Starting, Running and Restoring Force
- ✓ Hydro static pressure testing, if applicable
- ✓ Drift Test, If applicable
- ✓ Final/pre-despatch inspection.



Our HSE vision is Zero Tolerance on HSE Policies

HSE Strategy

✓ Conducting business that protects public and occupational health, environment and employee safety.

✓ Striving to eliminate all accidents and environmental incidents.

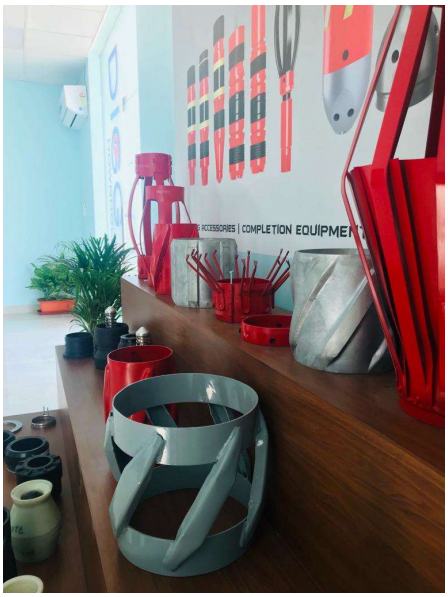
✓ Making HSE considerations a priority in manufacturing

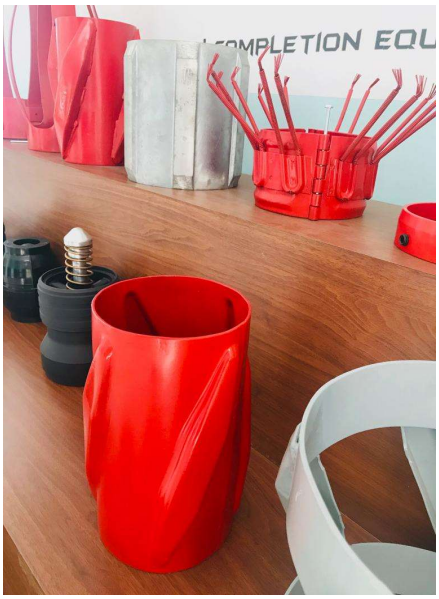
✓ Complying with all HSE laws and regulations.

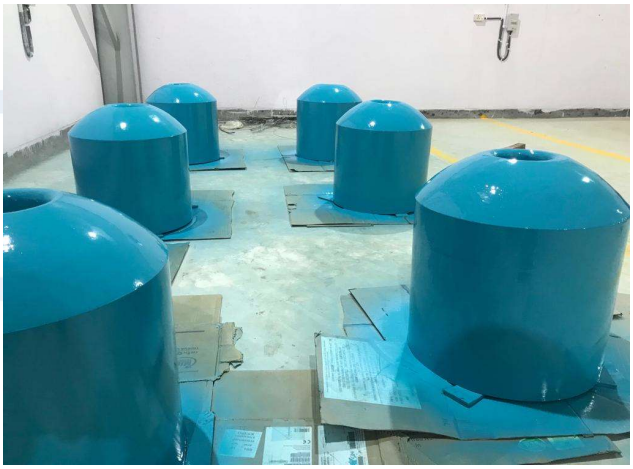
✓ Encouraging constructive communication about managing HSE issues among all employees, and associate vendors.

GALLERY

DIGGER DOWNHOLE TOOLS







GALLERY

DIGGER DOWNHOLE TOOLS

DIGGER
DOWNHOLE TOOLS

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