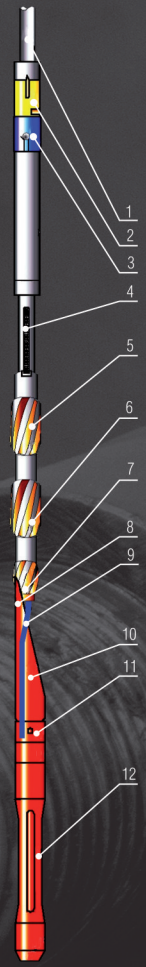
DDS Group of Companies

DRILLING INNOVATION LLC

Effectiveness tested by Customer

Whipstock KLEN

One trip whipstock for window - cutting in cased or open hole



1 Drill pipe

2 UBHO

3 Overflow valve/DIV valve

4 HWDP with Filter

5 Reaming Mill No.1

6 Reaming Mill No.2

7 Start mill

8 Shearing bolt

9 Hydraulic system

10 Whip face

11 Hinge connector

12 Hydraulic anchor

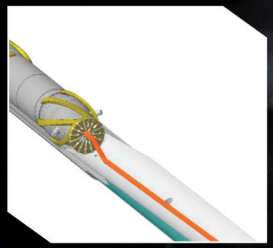
Whipstock KLEN with Hydraulic anchor system for

window - cutting in cased or open hole

Advantages

- Whipstock with hydraulic anchor is the simplest and the most cost - effective type of Whipstock KLEN line products;
- The main and lateral wellbore designs can be vertical, directional or horizontal;
- Whipstock KLEN with hydraulic anchor system offers more efficient production of the reservoirs;

- The whole anchor surface is used for the most reliable and efficient whipstock setting.
- Whipstock KLEN with hydraulic anchor system is much more efficient than analogues and min 15% cost - effective.



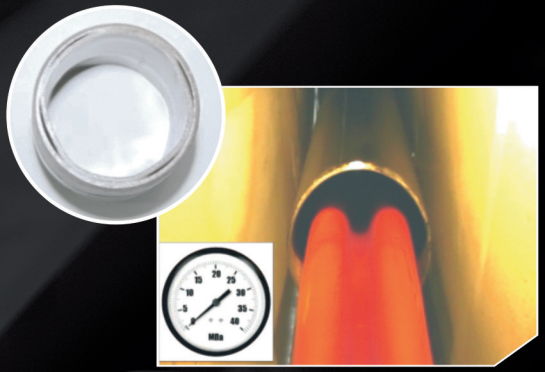
Wedge angle $2{,}5^0 - 3^0$

Whipstock set

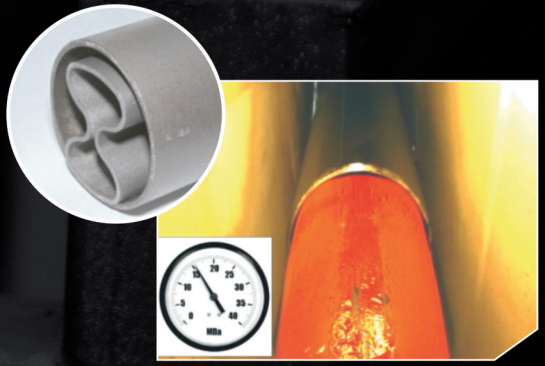
Hydraulic anchor

- Low cost
- 100% setting in any depth.
- No need the cement bridge for anchor setting
- 1 m of profiled anchor can withstand to 154 Klbs = 70t of axial load

Anchor is made from profiled pipe.
The length is 3-4 m



Profiled pipe (anchor) before expanding



Profiled pipe (anchor) after expanding

Hydraulic anchor

Setting the Anchor as follow:

- Connect Kelly/Top drive with drill pipe.
- Start pumping with drill pump. Increase the pressure slowly up to 1000 psi and hold it while 2-3 min.
- Increase the pressure slowly up to 1600 psi and hold it while 2 min.
- Increase the pressure slowly up to 2300 psi and hold it while 5 min.
- The pressure should be gradually reduced to 0 psi smoothly.

- The mill detachment from wedge-deflector. To slacken 6,000 lbf (3,000 kg). To make tighten up to 7 750 lbf ~ 17 000kg, slowly. When breaking of shear bolt occurs, the hook load must be reflected on the weight indicator.
- Hydraulic Anchor settled completely.

Milling system

- All components of a Whipstock triple mill system are made of AISI 3140 steel with tungsten Carbide Mills for fast cutting of all steel grades of casing.

- Used for new and re-entry wells, offers the ability to drain simultaneously multiple reservoirs
- Design of starting mill allows connecting the hydraulic line to the start mill on the rig floor.

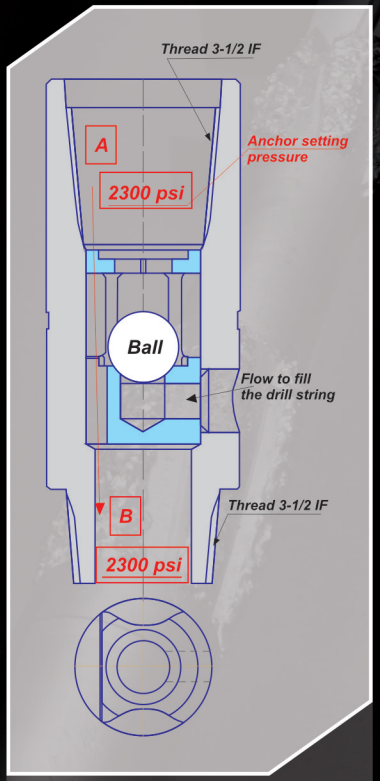
- Withstand up to 5000 psi pressure difference and 300 F temperature.
- Possibility to manufacture any Mill size
- Whindow cutting for One trip
- High speed of milling

WHIPSTOCK
Overflow Valve Operation

- Overflow valve is designed to fill the drill string automatically with fluid from the annulus while Whipstock assembly running and prevent the collapse of the hydraulic anchor.

- The principle of the Overflow valve operation is to give possibility for passing the fluid from the annulus to the drill string.

- Then the fluid is supplied directly to the drill string space through Kelly/top drive. The valve's ball close the channel to annulus and the main flow is going from space A to space B to set the hydraulic anchor.



Whipstock KLEN-HA
application in open hole

Traditional open hole sidetracking tools and methods are time-consuming and expensive.

The process can take up to 24 hours before the actual sidetracking operation begins, and a number of factors can affect the success of the plug-setting operation, including downhole temperature and pressure, wellbore deviation, cement plug depth, quality of cement, cure time, mud additives, etc.

Open hole sidetrack with a hydraulic whipstock eliminates these complications by setting a hydraulic expandable anchor, which enables running, orienting, anchor setting, and drilling a rat hole in one trip.

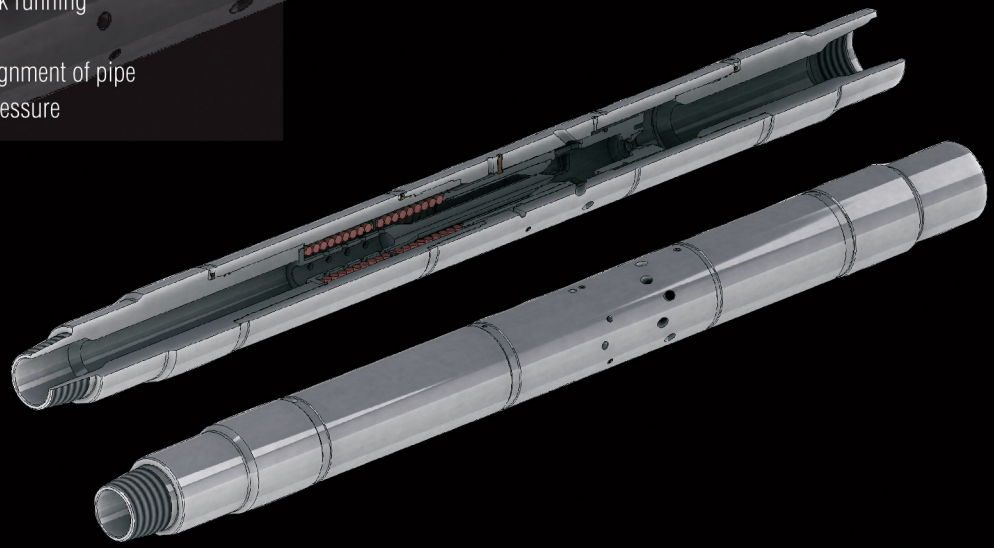
Whipstock KLEN-HA for open hole advantages

- Applicable in any size of open hole up to 12-1/4"
- No need cement plug for anchor setting and no need any additional cost
- One trip Whipstock set
- Availability all the standard sets in the stock
- Engineers can be mobilized to the Rig any time
- Whipstock set KLEN-HA can be used in any inclination (up to 90 degree)

DI Valve for whipstock orientation

Advantages

- Allows to do direct circulation/flushing and orientation by MWD
- Automatic filling the drill string while whipstock running
- Continuous alignment of pipe and annulus pressure



DI Valve for 7" casing
whipstock orientation

- 1st STAGE Orientation by MWD
  The orientation of whipstock is done by way of creating a fluid flow (180-200gpm), meanwhile the Valve stays open, because of fluid flow is not enough for creating of overpressure and cutting of shear pints.

- 2nd STAGE Valve closing
  The cutting of shear pints and closing of valve are done by creating of extra fluid flow (330-350gpm).

- 3rd STAGE The ahchor setting
  The anchor setting is done by creating of pressure (2300 psi) in drill string.

Available sizes
of Whipstock KLEN anchor type

Name	Casing OD, in	Anchor OD, in	Min mills OD, in	Max mills OD, in	Whip length, m
KLEN 5-1/2" (139.7mm)	5-1/2	4,25	4,3	4,7	2,5
KLEN 5-3/4" (146mm)	5-3/4	4,62	4,8	5,0	2,7
KLEN 6-5/8" (168mm)	6-5/8	5,31	5,63	5,8	3,0
KLEN 7" (178mm)	7	5,75	6,0	6,25	3,2
KLEN 7-5/8" (194mm)	7-5/8	6,25	6,3	6,7	3,5
KLEN 8-5/8" (219mm)	8-5/8	7,1	7,3	7,7	3,8
KLEN 9-5/8" (245mm)	9-5/8	8,0	8,5	8,7	4,0
KLEN 10-3/4" (273mm)	10-3/4	9,3	9,45	9,8	4,2
KLEN 12-3/4" (324mm)	12-3/4	11,3	11,4	11,6	5,8
KLEN 13-3/8" (340mm)	13-3/8	11,4	12,25	12,5	6,0

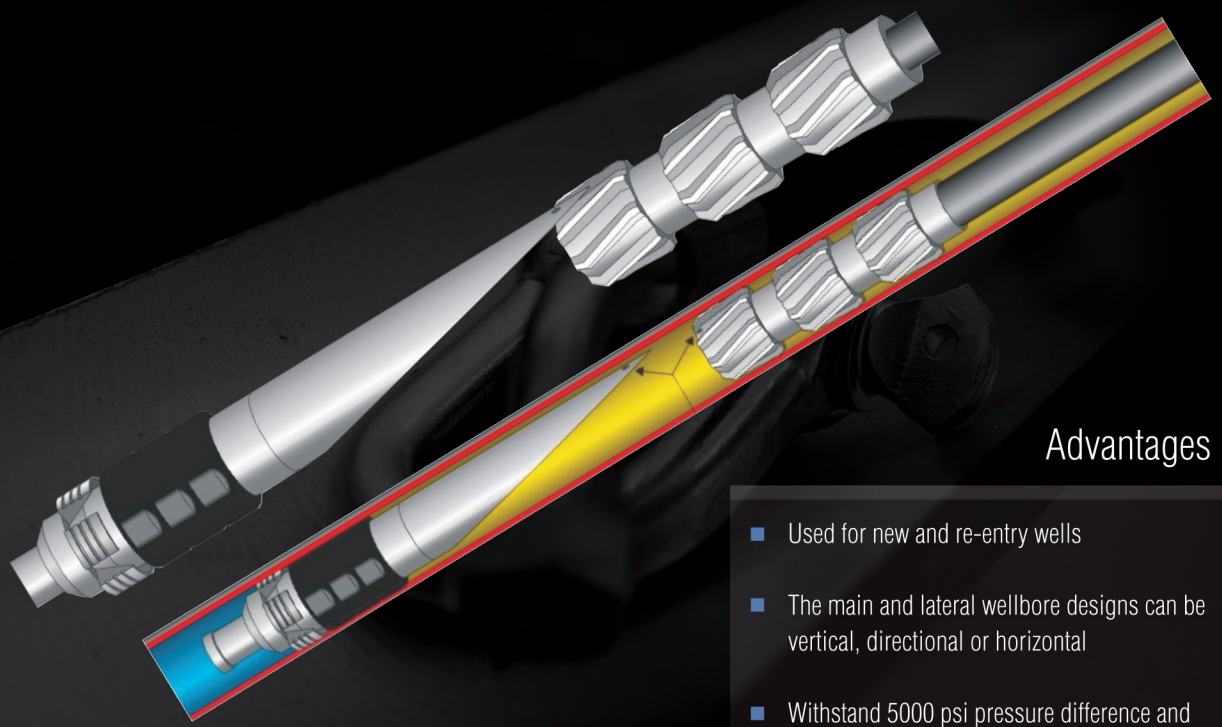
Whipstock KLEN with Open Nozzle System™

Drilling Innovation has designed Open Nozzle System™, which allows circulation through the milling assembly.

Advantages

- Open Nozzle System allows to make the circulation (direct flushing) with minimum flow rate compatible with kickoff operation and SPR (slow pump rate) 30 - 45 SPM Equal to 120 GPM
- Whipstock equipment can be oriented with MWD or Gyro

Whipstock KLEN with retrievable and permanent packer



Advantages

- Used for new and re-entry wells
- The main and lateral wellbore designs can be vertical, directional or horizontal
- Withstand 5000 psi pressure difference and 300 F (150C^{0})temperature

Hydraulic packer

Packer specifications & advantages

- Releasing by moving upwards the drill string
- Working principle is based on built hydraulic cylinder activating anchor and packer device
- Triple packer seals of advanced reliability
- Pressure rating - 5 000 psi
- Recommended for use in inclined wells and in conditions where mechanical packers are not applicable
- Unique design of packer device provides secure sealing of annulus under high pressure
- Possible to set in shallow areas without limitation of drill string weight
- Temperature rating - 300 F

Hydraulic packer

Setting the Packer as follow:

- Connect Kelly/Top drive with drill string.
- Start pumping with rig pump. Increase the pressure slowly up to 1000 psi and hold it while 2 min.
- Increase the pressure slowly up to 2500 psi and hold it while 2 min.
- Increase the pressure slowly up to 3500 psi and hold it while 3 min.

- The pressure should be gradually reduced to 0 psi smoothly.
- The mill detachment from wedge-deflector. To slacken 6'600 lbf (3'000 kg). To make tighten up to 35,000 lbf(~16'000 kg), slowly. When breaking of shear bolt occurs, the hook load must be reflected on the weight indicator.
- Hydraulic Packer setted completely.

Available sizes of packer system

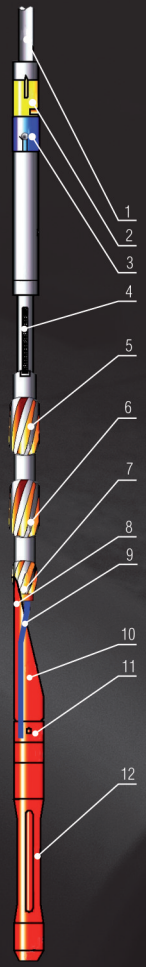
Packer	Casing		Setting pressure, (psi)	Releasing load, Klb	Connecting thread
	Size	Casing weight, lb/ft			
PGK-136-350	6-⅝"	28-32	No more than 3600	51-56	3-½" IF
PGK-140-350	6-⅝"	20-28			3-½" IF
	7"	35-41			
PGK-145-350	6-⅝"	16-19			3-½" IF
	7"	28-33			
PGK-150-350	7	20-26			3-½" IF
	7-⅝"	45,3			
PGK-155-350	7"	17			3-½" IF
	7-⅝"	33,7-42,8			
PGK-204-350	9-⅝"	43,5-58,4		103-112	4-½" IF
PGK-210-350	9-⅝"	32,3-40		134-157	4-½" IF
PGK-340-350	13-⅜"	40-83			6-⅝" Reg

Product line of Whipstock KLEN

Casing/whipstock type	Mechanical anchor type	Hydraulic anchor type	Hydraulic retrievable packer type
	KLEN MA	KLEN HA	KLEN RP
140 (139,7) mm 5-½"	KLEN MA 5-½"	KLEN HA 5-½"	KLEN RP 5-½"
146 mm 5-¾"	KLEN MA 5-¾"	KLEN HA 5-¾"	KLEN RP 5-¾"
168 (168,28) mm 6-⅝"	KLEN MA 6-⅝"	KLEN HA 6-⅝"	KLEN RP 6-⅝"
178 (177,8) mm 7"	KLEN MA - 7"	KLEN HA – 7"	KLEN RP - 7"
194 (193,7) mm 7-⅝"	KLEN MA 7-⅝"	KLEN HA 7-⅝"	KLEN RP 7-⅝"
219 (219,08) mm 8-⅝"	KLEN MA 8-⅝"	KLEN HA 8-⅝"	KLEN RP 8-⅝"
245 (244,48) mm 9-⅝"	KLEN MA9-⅝"	KLEN HA 9-⅝"	KLEN RP 9-⅝"
273 (273,05) mm 10-¾"	KLEN MA 10-¾"	KLEN HA 10-¾"	KLEN RP 10-¾"
324 mm 12-¾"	KLEN MA 12-¾"	KLEN HA 12-¾"	KLEN RP 12-¾"
340 (339,72) mm 13-⅜	KLEN MA 13-⅜"	KLEN HA 13-⅜"	KLEN RP 13-⅜"

Setting procedure
for Whipstock KLEN

- Run gauge mill & casing scrapper
- Pressure test of Whipstock valve DIV on the Rig floor.
- M/U whipstock, DIV valve & other elements of BHA.
  Start Mill connecting to the Mill on the Rig Floor.
- Run BHA with Whipstock
- Conduct flushing
- Orient the Whipstock by MWD
- Increase the flow rate to set the anchor/packer
- Shear the milling assembly
- Mill the window and drill the rat hole
- Pull out BHA
- Gauge the reaming mills
- M/U and Run drilling assembly



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List of the Customers

Qalf Drilling Saplay FZE
Azerbaijan

ERIELL Group
Uzbekistan

ADCO
UAE

PDO
Oman

Smart Oil
Kazakhstan

Wellspring energy
Ukraine

Stockholm Precision Tools AB
Cuba

Karasu Operating Company
Azerbaijan

LUKOIL Operating Co.
Uzbekistan

Kaspian Tehlukesizlik Baltaları
Azerbaijan

IPS
Mexico

Petroleos Mexicanos
Mexico

WildCat Oilfield Services
UAE

PT. Newtech Energy
Indonesia

Rosneft
Russia

Gasprom Burenie
Russia

Tatneft
Russia

Irkutsk Oil Company
Russia

Siberian Service Company
Russia

Otradnoe Company
Russia

Certificates

ПромСтройСтандарт

ISO

Система добровольной сертификации
«ПромСтройСтандарт»
Регистрационный номер РОСС RU.31306.04ЖТЭ0

Орган по сертификации
Общество с ограниченной ответственностью «Валби Групп»
109428, Москва, Рязанский проспект, д.24, корп.1

РАЗРЕШЕНИЕ
На применение знака соответствия
СДС «ПромСтройСтандарт»

Разрешение выдано
Обществу с ограниченной ответственностью
«Инновации в бурении» (ООО «ИНБУР»)
452614, Республика Башкортостан, г. Октябрьский,
ул. Куйбышева, д. 40/1, офис 43
ИНН 0265031519

ПС

Интегрированная система менеджмента
ISO 9001, ISO 14001, OHSAS 18001

на основании сертификата
№ СДС.ПСС.ИСМ.976

Применение знака соответствия: интернет-сайты, фирменные бланки предприятия, рекламные материалы и договоры.

Начало действия: 11.02.2018 Срок действия до: 11.02.2021

Руководитель органа по сертификации Бирюков В.В.

М.П.

Valbi Group

ПромСтройСтандарт

ISO

The voluntary certification system
«PromStroyStandart»
Registration № РОСС RU.31306.04ЖТЭ0

Certification Center
Limited Liability Company «Valbi Group»
building 1, Ryazanskiy prospect, 24, Moscow, 109428, Russian Federation

CERTIFICATE OF CONFORMITY
№ СДС.ПСС.ИСМ.0976

Has been issued to
"DRILLING INNOVATION" Co ltd
office 43, Kuibyshev str., 40/1, Oktyabrskiy, Republic of Bashkortostan,
452614, Russian Federation
ITN 0265031519

THIS IS CERTIFY THAT
INTEGRATED MANAGEMENT SYSTEM

Is applicable to provision of services on profile liner installation while drilling and casing's repair; rendering whipstock services while drilling of lateral bores; provision of orientation services for specialized equipment and tools while drilling; rendering services for curing mud losses by application of polymeric material while drilling; equipment supply and provision of services for drilling rate increase; provision of services on installation, repair and maintenance of drilling, oilfield and pumping equipment

COMPLIES WHIS THE REQUIREMENTS OF
GOST R ISO 9001-2015 (ISO 9001:2015), GOST R ISO 14001-2016
(ISO 14001:2015), GOST R 54934-2012 (OHSAS 18001:2007)

Issued: February 11th, 2018 Expires: February 11th, 2021

CEO of Certification Body Biryukov V.V.

The Present Certificate obligates the Company to sustain the quality of executed works in compliance with the Standard mentioned above. That will be under control of the Certification Body of «Valbi Group» System and to be examined by annual inspections.

Valbi Group

You can learn more about our company
and Whipstock KLEN System
by visiting our website

www.diddt.com

Contact us:

Office 43, building #40/1,
Kuibysheva Str.,
Oktyabrsky town,
Republic of Bashkortostan,
Russian Federation

Tel/fax: +7 34767 31700
Mob.: +7 909 310 11 13
e-mail: inburdi@mail.ru