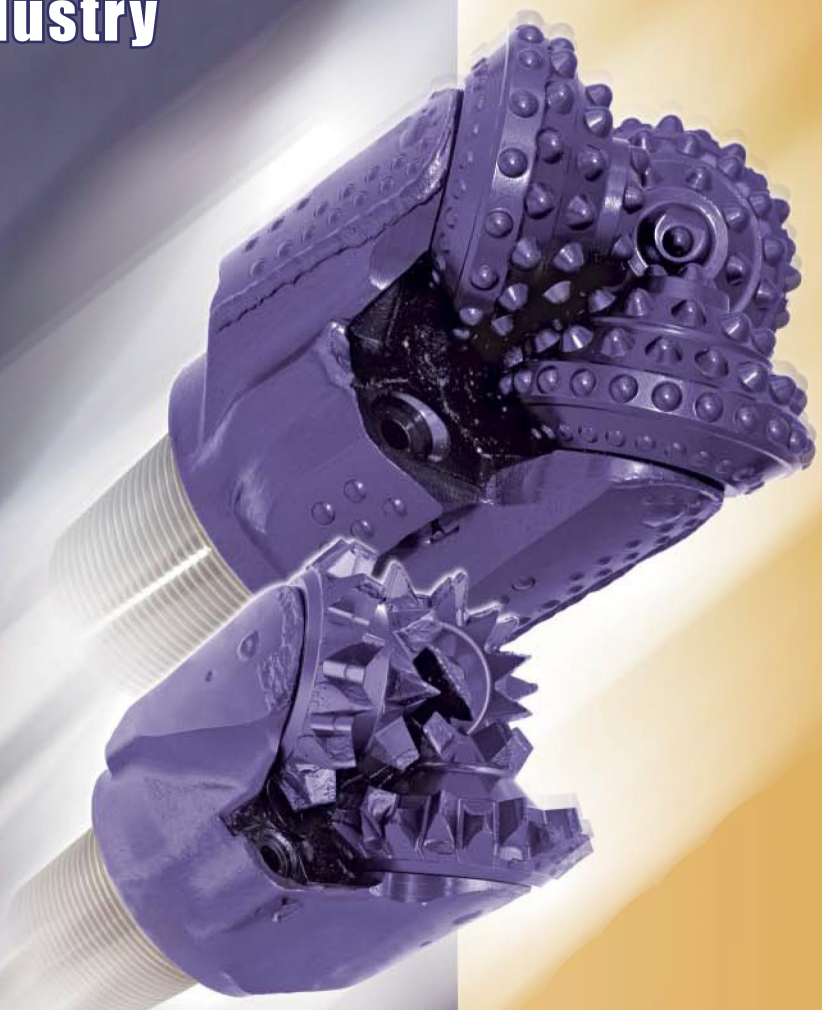
UniDrillTech

DRILL BITS

For oil and gas industry



catalogue

LIMITED LIABILITY COMPANY

UNIVERSAL DRILLING TECHNIQUE, LLC

ABOUT THE COMPANY

«Universal Drilling Technique, LLC» is the company which runs its business under the UniDrillTech trademark and is the manufacturer of roller drill bits from 74,6 mm to 508,0 mm in diameter for oil and gas industry. UniDrillTech is located in Drohobych, L`viv region, Ukraine.

Our company is:

High level qualification and long-term experience of the personnel

- The team of highly qualified managers and developers of drilling tools have long experience in satisfying the needs of the customers on the global market.
- The professional team of experienced specialists involved in production can realize any design ideas and solutions.

Latest technologies

- The innovative software enables to develop and optimize the design of the drill bit for specific drilling conditions within the shortest possible time.

High level technical support

- Timely assistance in solving actual problems.
- Efficient selection of necessary parameters for effective operation of the drill bits.
- Optimization of the design of the drill bit for specific operation conditions irrespective of their complicacy.

Guaranteed quality and reliability

- In order to assure high quality of manufactured products at LLC «UNIDRILLTECH» the quality management system has been implemented to comply with API Spec.Q1 standards.
- The technical specifications of the drill bits comply with the requirements of State Standard of Ukraine GOST 20692:2004,
  State Standard of Ukraine ISO10424-1:2013 and the specification of API Spec.7-1.
- The products are manufactured according to the up-to-date technology on the equipment of the leading world machine building manufacturers.

Customer orientation

- The company immediately responds to the enquiries of the customer for maximum satisfaction of his needs.
- The policy of the company in the work with the customers is based on establishing long time and mutually beneficial partnership.
- The company always attempts to create maximum comfortable conditions for its customers.

OUR GOAL

To be a leader in manufacturing drilling tools.

OUR OBJECTIVE

To ensure efficient and economical solution for drilling a specific borehole.

OUR SOLUTIONS

Using a wide range of management and technical methods.

OUR APPROACH

The innovations in all the spheres of the company activity which enable to satisfy the most complex query of the customer in the shortest possible time.

PRODUCT LINES

Product line	Short description
Gulliver	Premium class drill bits of large diameters with sealed bearing.
FM	The premium class drill bits with sealed journal bearing which are used for drilling vertical, directional and horizontal boreholes.
FS	Standard drill bits with sealed journal bearing which are used for drilling vertical and directional boreholes.
RS	Standard drill bits with sealed roller bearing which are used for drilling vertical and directional boreholes.
R	Drill bits with unsealed bearing with jet or combined circulation for universal purposes.
T	Drill bits with unsealed bearing with central circulation for universal purposes.

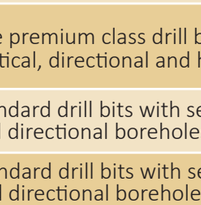
DRILL BIT DESIGNATION

215,9 FM 45 UT279

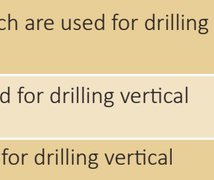
- 215,9 — Drill bit diameter, mm
- FM — Product line
- 45 — Cutting structure number
- UT279 — Design number

SHIRTTAIL AND LEG PROTECTION

TYPE 1
The leg shirttail is hardfaced with hard grain alloy.



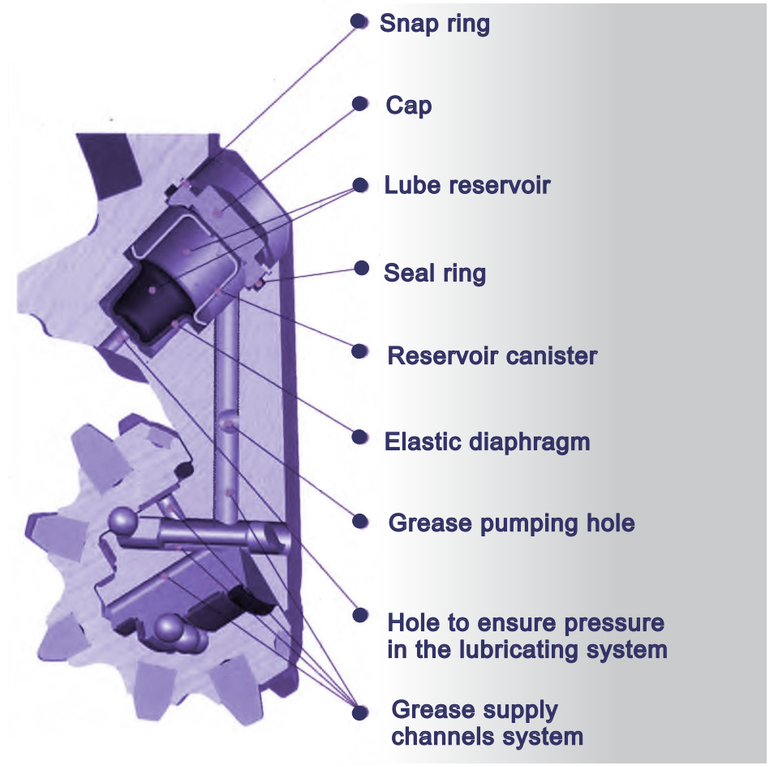
TYPE 2
The leg shirttail and entering edge are hardfaced with hard grain alloy.



TYPE 3
The leg shirttail and entering edge are hardfaced with hard grain alloy. The leg in the ball plug area is also protected with tungsten carbide inserts.

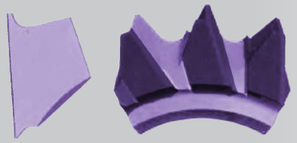
TYPE 4
The leg shirttail and entering edge are hardfaced with hard grain alloy. The leg in the ball plug area and the whole length of the leg entering edge are also protected with tungsten carbide inserts.

LUBRICATING SYSTEM WITH ELASTIC DIAPHRAGM ON THE SIDE OF THE CONE AREA



STEEL TOOTH CONE GAGE PROTECTION

TYPE 1
Surface hardfacing.



TYPE 2
Thick hardfacing.

TYPE 3
Thick hardfacing protected with tungsten carbide inserts.

TYPE 4
Thick hardfacing protected with two rows of tungsten carbide inserts.

CONE GAGE PROTECTION WITH TUNGSTEN CARBIDE INSERTS

TYPE 1

Cone gage protection with inserts which have crest surface on the heel row and one row of flat inserts.

TYPE 2

Cone gage protection with two rows of flat inserts.

TYPE 3

Cone gage protection with rows of semi spherical and flat inserts.

DRILL BITS CLASSIFICATION ACCORDING TO IADC

SERIES		FORMATIONS	TYPE	1		3		4	5		6	7	
				Open bearing without tungsten carbide inserts on cone gage		Open bearing with tungsten carbide inserts on cone gage		Sealed roller bearing without tungsten carbide inserts on cone gage	Sealed roller bearing with tungsten carbide inserts on cone gage		Sealed journal bearing without tungsten carbide inserts on cone gage	Sealed journal bearing with tungsten carbide inserts on cone gage	
				PRODUCT LINE									
				R	T	R	T	RS	RS	G	FS	FS	FM
Steel tooth bits	1	Soft formations with low strength	1	R1	T1	R1	T1	RS1	RS1	G1	FS1	FS1	FM1
			2	R2	T2	R2	T2	RS2	RS2	G2	FS2	FS2	FM2
			3	R3	T3	R3	T3	RS3	RS3	G3	FS3	FS3	FM3
			4										
	2	Medium and medium hard formations with high strength	1	R4	T4	R4	T4	RS4	RS4	G4	FS4	FS4	FM4
			2	R5	T5	R5	T5	RS5	RS5	G5	FS5	FS5	FM5
			3	R6	T6	R6	T6	RS6	RS6	G6	FS6	FS6	FM6
			4										
	3	Hard semi-abrasive formations	1	R7	T7	R7	T7	RS7	RS7	G7	FS7	FS7	FM7
			2	R8	T8	R8	T8	RS8	RS8	G8	FS8	FS8	FM8
			3	R9	T9	R9	T9	RS9	RS9	G9	FS9	FS9	FM9
			4										

SERIES		FORMATIONS	TYPE	1	3	4	5	6	7
				Open bearing without tungsten carbide inserts on cone gage	Open bearing with tungsten carbide inserts on cone gage	Sealed roller bearing without tungsten carbide inserts on cone gage	Sealed roller bearing with tungsten carbide inserts on cone gage	Sealed journal bearing without tungsten carbide inserts on cone gage	Sealed journal bearing with tungsten carbide inserts on cone gage
				PRODUCT LINE					
				R	T	R	T	RS	RS	G	FS	FS	FM
Tungsten carbide inserts bits	4	Especially soft abrasive formations of low strength	1	R00 R03	T00 T03	R00 R03	T00 T03	RS00 RS03	RS00 RS03	G00 G03	FS00 FS03	FS00 FS03	FM00 FM03
			2	R05 R08	T05 T08	R05 R08	T05 T08	RS05 RS08	RS05 RS08	G05 G08	FS05 FS08	FS05 FS08	FM05 FM08
			3	R10 R13	T10 T13	R10 R13	T10 T13	RS10 RS13	RS10 RS13	G10 G13	FS10 FS13	FS10 FS13	FM10 FM13
			4	R15	T15	R15	T15	RS15	RS15	G15	FS15	FS15	FM15
	5	Soft and medium abrasive formations with low strength	1	R20	T20	R20	T20	RS20	RS20	G20	FS20	FS20	FM50
			2	R25	T25	R25	T25	RS25	RS25	G25	FS25	FS25	FM25
			3	R30	T30	R30	T30	RS30	RS30	G30	FS30	FS30	FM30
			4	R35 R38	T35 T38	R35 R38	T35 T38	RS35 RS38	RS35 RS38	G35 G38	FS35 FS38	FS35 FS38	FM35 FM38
	6	Hard abrasive formations of high strength	1	R40 R43	T40 T43	R40 R43	T40 T43	RS40 RS43	RS40 RS43	G40 G43	FS40 FS43	FS40 FS43	FM40 FM43
			2	R45 R48	T45 T48	R45 R48	T45 T48	RS45 RS48	RS45 RS48	G45 G48	FS45 FS48	FS45 FS48	FM45 FM48
			3	R50	T50	R50	T50	RS50	RS50	G50	FS50	FS50	FM50
			4	R60	T60	R60	T60	RS60	RS60	G60	FS60	FS60	FM60
	7	Hard abrasive formations	1	R70	T70	R70	T70	RS70	RS70	G70	FS70	FS70	FM70
			2	R73	T73	R73	T73	RS73	RS73	G73	FS73	FS73	FM73
			3	R75	T75	R75	T75	RS75	RS75	G75	FS75	FS75	FM75
			4	R77	T77	R77	T77	RS77	RS77	G77	FS77	FS77	FM77
	8	Extra hard abrasive formations	1	R80	T80	R80	T80	RS80	RS80	G80	FS80	FS80	FM80
			2	R83	T83	R83	T83	RS83	RS83	G83	FS83	FS83	FM83
			3	R85	T85	R85	T85	RS85	RS85	G85	FS85	FS85	FM85
			4	R90	T90	R90	T90	RS90	RS90	G90	FS90	FS90	FM90

Gulliver product line

Gulliver line drill bits of premium class are used for drilling boreholes of large diameter 490 mm and over.

Size range:

490 mm and over

Bearing

The drill bits of this line have extended operation life owing to the special design of the roller bearing with a single or double elastomer seal.

508,0 G20

Cutting structure

Steel teeth or tungsten carbide inserts are used as the cutting structure of the cones. The cone gage is hardfaced with special wear resistant material or is protected with tungsten carbide inserts.

Steel teeth are hardfaced with special wear resistant tungsten carbide material on all working surfaces.

Tungsten carbide teeth and inserts are made of tungsten carbide alloy with specified properties according to real drilling conditions. In case of drilling hard abrasive formations tungsten carbide inserts with diamond coating can be used.

Shirttail and leg protection

The leg is hardfaced with wear resistant material and is protected with tungsten carbide inserts.

Tungsten carbide inserts can have diamond coating for drilling extra abrasive formations.

Circulation system

Effective cleaning of the borehole bottom and prevention of balling between the body of the drill bit and the cones are ensured by three side and one central jetting nozzle. To prevent erosive wear of the cones, the central jetting nozzle can be of special shape of the jetting channel.

FM product line

FM line drill bits of premium class are used for drilling any complicated boreholes. The design of FM drill bits is adapted to the real drilling project taking into account the borehole path, bottom hole assembly and the drilling technology.

Size range:

190,5 mm – 311,1 mm

215,9 FM10

Bearing

The drill bits of this line have sealed journal bearings and special bearing elements which enable top drive drilling and using high speed downhole motors (up to 350 rpm).

Cutting structure

Steel teeth with enhanced thick hardfacing with special wear resistant material or tungsten carbide inserts of specified properties are used as the cutting structure of the cones. In case of drilling hard abrasive formations different cutting structures of the cones with tungsten carbide inserts and inserts with diamond coating are used. In case of severe abrasive wear of the cones solid wear resistant coating of the cones is used.

Shirttail and leg protection

Stabilizing system of the body of the drill bits is developed taking into account the path of the borehole with the additional stabilizing pad in the area of side jetting nozzles. The leg is hardfaced with wear resistant alloy and is protected with tungsten carbide inserts. For drilling hard abrasive formations tungsten carbide inserts can have diamond coating.

Circulation system

In order to make the borehole bottom cleaning more effective, the circulation system is used which enables to improve operating conditions of the drill bit in the bottom hole area owing to the optimization of the hydraulic system of the drilling mud flows. Beginning with 279,4 mm in diameter the additional central nozzle in the drill bits can be used. If necessary, the central nozzle can be installed in the drill bits of other diameters.

Drill bits with the stabilizing pad

Drill bits without the stabilizing pad

FS Product line

FS line drill bits of high quality are used for drilling boreholes of any structure using top drive or downhole motors.

Size range:
190,5 mm – 311,1 mm

215,9 FS10

Bearing

All the drill bits have sealed journal bearing. The design for different sizes and types of the drill bits slightly differs but high quality of all manufactured elements of the bearing remains unchanged what guarantees reliable operation at the drilling speed of up to 200 rpm.

Cutting structure

Steel teeth with thick hardfacing with special wear resistant material or tungsten carbide inserts of specified properties are used as the cutting structure of the cones.

Shirttail and leg protection

The leg is hardfaced with wear resistant alloy and is protected with tungsten carbide inserts. For drilling hard abrasive formations tungsten carbide inserts can have diamond coating. The additional stabilizing pad is possible or inserts on the upper part of the leg.

Circulation system

In order to make the borehole bottom cleaning more effective the circulation system is used which enables to improve operating conditions of the drill bit in the bottom hole area owing to the optimization of the hydraulic system of the drilling mud flows. Beginning with 279,4 mm in diameter the additional central nozzle in the drill bits can be used. If necessary, the central nozzle can be installed in the drill bits of other diameters.

RS product line

RS line drill bits of high quality are used for drilling boreholes of any structure.

Size range:
104,8 mm – 444,5 mm

215,9 RS10

Bearing

The drill bits of this line have sealed roller bearing designed for drilling at the speed of up to 300 rpm.

Cutting structure

Steel teeth with thick enhanced hardfacing with special wear resistant material or tungsten carbide inserts of specified properties are used as the cutting structure of the cones.

Shirttail and leg protection

The leg is hardfaced with special wear resistant alloy and is protected with tungsten carbide inserts if necessary. Additional stabilizing inserts are possible on the upper part of the leg.

Circulation system

In order to make the borehole bottom cleaning more effective, the vector and orienting circulation system is used which enables to improve operating conditions of the drill bit in the bottom hole area owing to the optimization of the hydraulic scheme of the drilling mud flows. Beginning with 279,4 mm in diameter the additional central nozzle in the drill bits can be used. If necessary, the central nozzle can be installed in the drill bits of other diameters.

R, T product line

The drill bits of this line are used for rotor and turbine drilling of boreholes of any structure.

Size range:
74,6 mm – 508,0 mm

444,5 R1

Bearing

The drill bits of this line have unsealed roller bearings which enable drilling at the speed of up to 600 rpm.

Cutting structure

Steel teeth hardfaced with special wear resistant material on the entering and trailing edges or tungsten carbide inserts are used as the cutting structure of the cones.

Shirttail and leg protection

The leg is hardfaced with special wear resistant alloy and can be protected with tungsten carbide inserts.

Circulation system

The central circulation system is used in the drill bits of T line.

The jetting or combined circulation system is used in the drill bits of R line which enables to improve operating conditions of the drill bit in the bottom hole area owing to the optimization of the hydraulic scheme of the drilling mud flows.

TABLE OF STANDARD NOZZLES

Nozzle designation	Drill bit diameter mm	Outlet diameters, 1/32"/mm																			
		7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	28
		5,6	6,4	7,1	7,9	8,7	9,5	10,3	11,1	11,9	12,7	13,5	14,3	15,1	15,9	16,7	17,5	18,3	19,1	19,8	20,6	22,2
UD0122	92,1 – 108,0	*	*	*	*	*	*	*	*													
UD0115	120,6 – 130,2	*	*	*	*	*	*	*	*	*	*		*		*							
UD0123	139,7 – 152,4	*	*	*	*	*	*	*	*	*	*		*		*							
UD0124	155,6 – 171,4			*	*	*	*	*	*	*	*		*		*							
UD0125	190,5 – 244,5		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*			*
UD0126	250,8 - 508,0		*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

TABLE OF EXTENDED NOZZLES

Nozzle designation	Drill bit diameter mm	Outlet diameters, 1/32"/mm														
		8	9	10	11	12	13	14	15	16	17	18	20	22	24	26	28
		6,4	7,1	7,9	8,7	9,5	10,3	11,1	11,9	12,7	13,5	14,3	15,9	17,5	19,1	20,6	22,2
UD0281	190,5 – 244,5	*	*	*	*	*	*	*	*	*	*	*	*	*	*		
UD0282	250,8 - 508,0	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*

DIAMETER TOLERANCES OF ROLLER DRILL BITS

Drill bit nominal diameter	Tolerance, mm
from 44,4 to 349,2 inclusive	+0,8 0
over 355,6 to 444,5 inclusive	+1,6 0
over 444,5	+2,4 0

RECOMMENDED TORQUE FOR CONNECTING THREAD OF ROLLER DRILL BITS

Drill bit diameter		Connecting thread		Recommended torque	
inch	mm	API	GOST	ft-lbs	kN•m
3 5/8 – 4 1/2	92,1 – 114,3	2 3/8 Reg	3-66	3000 - 3500	4,1 – 4,8
4 5/8 – 5 3/8	117,5 – 127,0	2 7/8 Reg	3-76	4500 - 5500	6,1 – 7,5
5 1/2 – 6 3/4	139,7 – 171,4	3 1/2 Reg	3-88	7000 - 9000	9,5 – 12,2
7 1/2 – 9 3/8	190,5 – 238,1	4 1/2 Reg	3-117	12000 - 16000	16 – 22
9 1/2 – 14 1/2	241,3 – 368,3	6 5/8 Reg	3-152	28000 - 32000	38 – 43
14 3/4 – 20	374,6 – 508,0	7 5/8 Reg	3-177	34000 - 40000	46 –54

TABLE OF TOTAL CROSS-SECTIONAL AREA OF JETTING NOZZLES (TFA), mm2

Number of nozzles	outlet diameter, mm																			
	5,6	6,4	7,1	7,9	8,7	9,5	10,3	11,1	11,9	12,7	13,5	14,3	15,1	15,9	16,7	17,5	18,3	19,1	19,8	20,6	22,2
1	24,27	31,65	40,02	49,49	59,83	71,29	83,60	96,89	111,35	126,61	142,85	160,30	178,51	197,96	218,14	239,31	262,89	286,38	307,75	333,12	386,88
2	48,53	63,31	80,04	98,98	119,65	142,59	167,21	193,79	222,70	253,23	285,71	320,60	357,03	395,91	436,29	478,62	525,78	572,75	615,50	666,25	773,76
3	72,80	94,96	120,06	148,47	179,48	213,88	250,81	290,68	334,05	379,84	428,56	480,90	535,54	593,87	654,43	717,93	788,67	859,13	923,25	999,37	1160,64
4	97,07	126,61	160,08	197,96	239,31	285,18	334,42	387,58	445,40	506,45	571,42	641,20	714,06	791,83	872,57	957,23	1051,55	1145,50	1231,01	1332,49	1547,52

TABLE OF TOTAL CROSS-SECTIONAL AREA OF JETTING NOZZLES (TFA), inch2

Number of nozzles	outlet diameter, mm																			
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	28
1	0,038	0,049	0,062	0,077	0,093	0,110	0,130	0,150	0,172	0,196	0,222	0,248	0,277	0,307	0,338	0,371	0,406	0,442	0,479	0,518	0,601
2	0,075	0,098	0,124	0,153	0,186	0,221	0,259	0,301	0,345	0,393	0,443	0,497	0,553	0,613	0,676	0,742	0,811	0,883	0,958	1,036	1,202
3	0,113	0,147	0,186	0,230	0,278	0,331	0,389	0,451	0,517	0,589	0,665	0,745	0,830	0,920	1,014	1,113	1,217	1,325	1,437	1,555	1,803
4	0,150	0,196	0,248	0,307	0,371	0,442	0,518	0,601	0,690	0,785	0,886	0,994	1,107	1,227	1,352	1,484	1,622	1,766	1,917	2,073	2,404

STANDARD MEASURE UNITS

Name	output units	multiplication factor	Designation
Depth	ft.	0,3048	m
Drill bit load	lbs.	0,445 4,535x10^{-4}	daN tonne
Nozzles diameter	32nds in.	0,794	mm
Drilling speed	ft./ht.	0,3048	m/hr.
Capacity	barrels U.S.gal./stroke	0,1590 3,785x10^{-3}	m^3 m^{3}stroke
Pump capacity	U.S.gal./min. bbls./stroke bbls./min	3,875x10^{-3} Oil barrels 0,159873xм3 Precisely 0,1590	m^3/min. m^3/stroke m^3/min.
Flow rate in annulus and cuttings velocity	ft./min	0,3048	m/min
Linear size and diameter	in.	25,4	mm
Pressure	psi	6,895 0,006895 0,06895	kPa MPa bar
Mud density	lbs./gal.(U.S.)	119,83	kg/m^3
Pressure gradient	psi/ft	22,621	kPa/m
Relative viscosity	secs./qt.(U.S.)	1,057	s/l
Plastic viscosity	centipoise	1	mPas
Static share stress	lb.f/100ft.^{2}	0,4788 (Rounded up to 0.5 for calculations)	Pa
Soil cap thickness	32nds in.	0,794	mm
Water drain	mm or cc	1	cm^3
Moment	ft./lbs.	1,3358	Nm

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