



GEO DRILLING MACHINERY

*From application
To production*



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About Us

GEO Sondaj Makine İmalat Ltd. Şti. was established in 2010 to meet the current demands and requirements of the drilling industry more economically through innovative products and by assisting customers in drilling more meters in a more productive manner. GEO Sondaj Makine İmalat Ltd. Şti. aims to enhance its manufacturing capacity by leveraging the collective experience of our partner drilling company, ORTADOĞU Sondaj A.Ş. which utilizes our safety-regulated drilling equipment and rigs in its deep core drilling projects.

After our company was founded, we conducted studies and began manufacturing drilling machines such as the GEO 500, GEO 900, GEO 900-E, GEO 1500 and GEO 2000, drilling equipment as well as water pumps. As GEO Sondaj Makine, we design these drilling rigs according to customer demands and with innovative features. In order to support our design and innovation efforts, we participated in the support programs sponsored by The Technology and Innovative Support Programs Department of The National Research Council of Turkey (TUBITAK).

At GEO Sondaj Makine İmalat Ltd. Şti. we are committed to ongoing product development. We value feedback from our clients, the expertise of our Research & Development team, and suggestions and feedback from our team members as integral to this process. We don't limit these suggestions to just our products, but also incorporate them into our services and business processes. We continuously strive to improve our quality promise at GEO Sondaj Makine İmalat Ltd. Şti.

Drilling Rigs



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DÖNER
EKİPMAN



DÖNER
EKİPMAN



DÖNER
EKİPMAN

UTALIMAT
İŞİTME VE İKAZLARINA UY.
BİLGİSİZ İŞ YAPMA.
SAYIYI DERHAL YETKİLİSİNE
İDİYYETİ İLE ÇALIŞ.
MA SAHAŞINDAN İZİNGİZ



GEO 500 Drill Rig





Depth Capacities (Vertical Borehole)

	Dry Hole (m)*	Wet Hole (m)*
PWL	300	350
HWL	520	600
NWL	1.100	1.150

(*) Depth capacity is given according to standard QWL rods. Depth capacity might be increased while using the rods which have light weight V-wall or different thread design.

Power Unit

	1. Option	2. Option
MFG	Deutz	Iveco
Model	TCD 4.1	N67MNTX20.00 A800
Power (2300 RPM)	115 kW (154 HP)	129 kW (175 HP)
Engine Type	Turbo and intercooler	Turbo and intercooler
Cooling	Water	Water

Iveco and Deutz engines are our standard production, at request of the different MFG (Volvo, Cummins, Perkins) than delivery date changing according to engine delivery date.

Torque & RPM Rating

Extreme duty gear driven head power by 4 speed transmission with hydraulic sliding.

Power : 80 cc, 2 Speed Bent Axis Piston Type Hydraulic Motor)

Gear Ratio	Speed (rpm)	Torque (Nm)
1. 6.27:1	122 - 199	3.950 - 2.250
2. 3.12:1	246 - 400	1.650 - 1.420
3. 1.75:1	439 - 714	1.620 - 705
4. 1.00:1	714 - 1.250	705 - 341

Lubrication Unit

Hydraulically driven cooled oil circulation with 25 micron suction filter.

Chuck Assembly

Type	7 Jaws - Hydraulic open / Spring closed
Maximum Inside Diameter	120 mm (PWL)
Holding Capacity	19.000 kg

Hydraulic System (@1600 RPM)

	Max. Flow Rate	Max. Pressure
Primary Pump (80 cc LS Axial Piston Pump)	128 L/min	300 Bar
Second Pump (45 cc LS Axial Piston Pump)	72 L/min	230 Bar
Auxiliary Pump (45 cc PS Axial Piston Pump)	72 L/min	180 Bar
Mixer Gear Pump (20 cc Gear Pump)	32 L/min	60 Bar

Hydraulic Oil Cooling

Hydraulic and rotation oil are cooling by air.

Telescopic Drill Mast and Feed System

Drilling Angle	Vertical to 45 degree
Dump Stroke	2,20 m (According to mast axis)
Feed Travel	3,40 m
Telescopic Mast	3,30 m (Open and close by hydraulic feed cylinder)
Feed Speeds	Fast and slow with variable controls
Maximum Pull	16.000 kg
Maximum Push	12.750 kg

Standard 6 m pull, angel hole, telescopic mast for ease of set up, ST 52-3 profile.

Main Line Hoist

Capacity	9.000 kg (Single line)
Cable Size	21.5 m x 16 mm rope
Line Speed	Bare drum 35 m/min

Hydraulic driven planetary hoist.

Wireline Hoist

Capacity	1.100 m of 4.8 mm rope	
Line Pull	Bare drum: 1.870 kg	Full drum: 545 kg
Line Speed	Bare drum: 138 m/min	Full drum: 474 m/min

Hydraulically driven with integral counter balance valves.

Rod Clamp

Capacity	25.000 kg
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Hydraulically operated and self energizing, range from NWL to SWL rod.

Water Pump

Hydraulically driven 835 water / mud pump Maximum Flow Rate : 35 gpm @ 800 psi

Mud Mixer (With Mud Mixing Tank)

Hydraulically driven mud mixer Maximum Speed : 2.800 rpm

Weight

Skid mounted weight 6.450 kg

Crawler mounted weight 8.650 kg

Drill Base Supports

Skid mounted or crawler, supports 4 hydraulic leveling jacks.

Lighting System

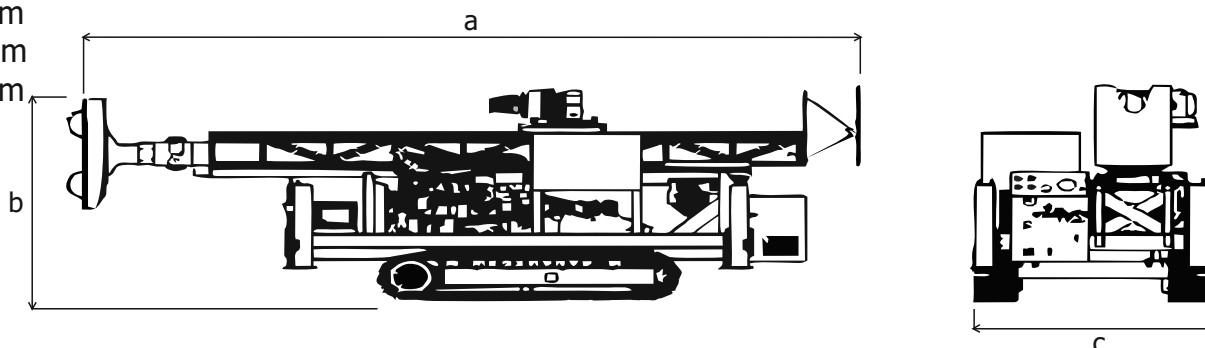
There are 6 LED lighting lamp on the mast.

Dimensions

a : 7.200 mm

b : 2.500 mm

c : 2.400 mm



Warranty

2 year against faulty workmanship. Individual manufactures warranty on all components as per our terms and conditions of sale.

Options

Hydraulic welder and generator package, Hydro pump and cyclone, Mast lighting and installation, Water pump release valve, manometer, accumulator and diaphragm, Rod spinner, Rod holder, Rod loader, Remote control panel, Mast ladder, Enclose operator cabin, Warning horn to alert drill crew, Fire suppression unit

These technical specification are based on theoretical engineering calculations. Actual capacity will depend on specific drilling conditions and materials. Geo Sondaj Makine İmalat Ltd. Şti. reserves the right to change or make modifications to designs and specifications without prior notice or obligation.

GEO 900 Drill Rig





Depth Capacities (Vertical Borehole)

	Dry Hole (m)*	Wet Hole (m)*
PWL	650	800
HWL	1.000	1.150
NWL	1.500	1.700
BWL	1.900	2.200

(*) Depth capacity is given according to standard QWL rods. Depth capacity might be increased while using the rods which have light weight V-wall or different thread design.

Power Unit

MFG	Ford
Model	Ecotorq
Power (2300 RPM)	275 kW (374 HP)
Engine Type	Diesel Turbo charged and intercooler
Cooling	Water

Ford engine is at our standard production, at request of the different MFG (Volvo, Cummins, Deutz, Iveco) than delivery date changing according to engine delivery date.

Torque & RPM Rating

Extreme duty gear driven head power by 4 speed transmission with hydraulic sliding.

Power : 107 cc, 2 Speed Bent Axis Piston Type Hydraulic Motor

Gear Ratio	Speed (rpm)	Torque (Nm)
1. 6.27:1	122 - 199	5.322 - 3.254
2. 3.12:1	246 - 400	2.648 - 1.620
3. 1.75:1	439 - 714	1.620 - 908
4. 1.00:1	714 - 1.250	849 - 519

Lubrication Unit

Hydraulically driven cooled oil circulation with 25 micron suction filter.

Chuck Assembly

Type	7 Jaws - Hydraulic open / Spring closed
Maximum Inside Diameter	120 mm (PWL)
Holding Capacity	19.000 kg

Hydraulic System (@1600 RPM)

	Max. Flow Rate	Max. Pressure
Primary Pump (112 cc LS Axial Piston Pump)	179 L/min	300 Bar
Second Pump (45 cc LS Axial Piston Pump)	72 L/min	230 Bar
Auxiliary Pump (45 cc PS Axial Piston Pump)	72 L/min	180 Bar
Mixer Gear Pump (20 cc Gear Pump)	32 L/min	60 Bar

Hydraulic Oil Cooling

Hydraulic and rotation oil are cooling by air.

Telescopic Drill Mast and Feed System

Drilling Angle	Vertical to 45 degree
Dump Stroke	2,20 m (According to mast axis)
Feed Travel	3,40 m
Telescopic Mast	3,30 m (Open and close by hydraulic feed cylinder)
Feed Speeds	Fast and slow with variable controls
Maximum Pull	16.000 kg
Maximum Push	12.750 kg

Standard 6 m pull, angel hole, telescopic mast for ease of set up, ST 52-3 profile.

Main Line Hoist

Capacity	13.000 kg (Single line)
Cable Size	21.5 m x 18 mm rope
Line Speed	Bare drum 35 m/min

Hydraulic driven planetary hoist.

Wireline Hoist

Capacity	2.000 m of 4.8 mm rope	
Line Pull	Bare drum: 1.870 kg	Full drum: 545 kg
Line Speed	Bare drum: 138 m/min	Full drum: 474 m/min

Hydraulically driven with integral counter balance valves.

Rod Clamp

Capacity	25.000 kg
Hydraulically operated and self energizing, range from NWL to SWL rod.	

Water Pump

Hydraulically driven 835 water / mud pump Maximum Flow Rate : 35 gpm @ 800 psi

Mud Mixer (With Mud Mixing Tank)

Hydraulically driven mud mixer Maximum Speed : 2.800 rpm

Weight

Skid mounted weight 9.200 kg

Crawler mounted weight 11.500 kg

Drill Base Supports

Skid mounted or crawler, supports 4 hydraulic leveling jacks.

Lighting System

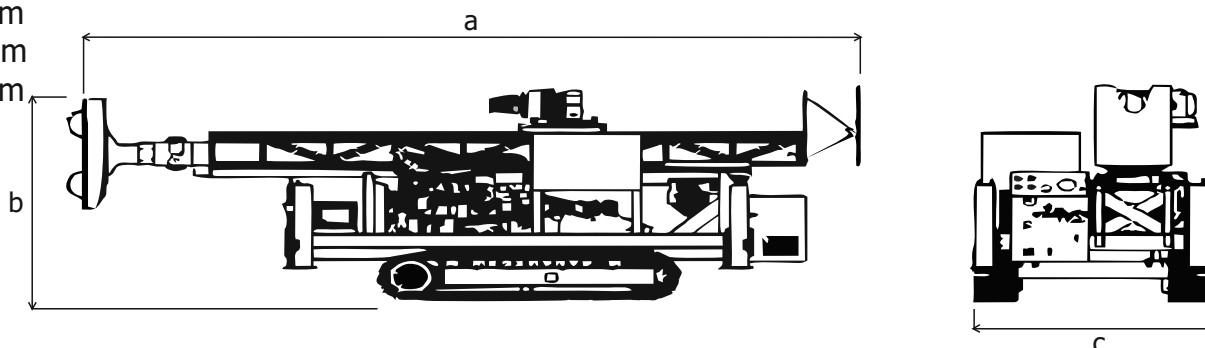
There are 6 LED lighting lamp on the mast.

Dimensions

a : 7.200 mm

b : 2.260 mm

c : 2.420 mm



Warranty

2 year against faulty workmanship. Individual manufactures warranty on all components as per our terms and conditions of sale.

Options

Hydraulic welder and generator package, Hydro pump and cyclone, Mast lighting and installation, Water pump release valve, manometer, accumulator and diaphragm, Rod spinner, Rod holder, Rod loader, Remote control panel, Mast ladder, Enclose operator cabin, Warning horn to alert drill crew, Fire suppression unit

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GEO 900 - E Drill Rig





Depth Capacities (Vertical Borehole)

	Dry Hole (m)*	Wet Hole (m)*
PWL	1.040	1.190
HWL	1.420	1.590
NWL	2.230	2.660
BWL	3.020	3.460

(*) Depth capacity is given according to standard QWL rods. Depth capacity might be increased while using the rods which have light weight V-wall or different thread design.

Power Unit

Power	110 kW (148 HP)
Engine Type	Electric Engine

EMTAS, Siemens or ABB electric engines are using our production.

Torque & RPM Rating

Extreme duty gear driven head power by 4 speed transmission with hydraulic sliding.

Power : 107 cc, 2 Speed Bent Axis Piston Type Hydraulic Motor

Gear Ratio	Speed (rpm)	Torque (Nm)
1. 6.27:1	122 - 199	5.322 - 3.254
2. 3.12:1	246 - 400	2.648 - 1.620
3. 1.75:1	439 - 714	1.620 - 908
4. 1.00:1	714 - 1.250	849 - 519

Lubrication Unit

Hydraulically driven cooled oil circulation with 25 micron suction filter.

Chuck Assembly

Type	7 Jaws - Hydraulic open / Spring closed
Maximum Inside Diameter	120 mm (PWL)
Holding Capacity	19.000 kg

Crawler Undercarriage

Driven by Diesel Power Pack can be driven independently.
(Supplied with Perkins, Deutz, Cummins diesel engines)

Hydraulic System (@1450 RPM)

	Max. Flow Rate	Max. Pressure
Primary Pump (140 cc LS Axial Piston Pump)	203 L/min	300 Bar
Second Pump (45 cc LS Axial Piston Pump)	62 L/min	220 Bar
Mixer Gear Pump (20 cc Gear Pump)	29 L/min	60 Bar

Hydraulic Oil Cooling

Hydraulic and rotation oil are cooling by air.

Telescopic Drill Mast and Feed System

Drilling Angle	Vertical to horizontal
Dump Stroke	1,00 m (According to mast axis)
Feed Travel	1,80 m
Telescopic Mast	1,50 m (Open and close by hydraulic feed cylinder)
Feed Speeds	Fast and slow with variable controls
Maximum Pull	16.000 kg
Maximum Push	12.750 kg

Standard 3 m pull, angel hole, telescopic mast for ease of set up, ST 52-3 profile.

Main Line Hoist

Capacity	9.000 kg (Single line)
Cable Size	16 m x 16 mm rope
Line Speed	Bare drum 35 m/min

Wireline Hoist

Capacity	1.500 m of 4.8 mm rope	
Line Pull	Bare drum: 1.870 kg	Full drum: 545 kg
Line Speed	Bare drum: 138 m/min	Full drum: 474 m/min

Hydraulically driven with integral counter balance valves.

Rod Clamp

Capacity :25.000 kg

Hydraulically operated and self energizing, range from NWL to SWL rod.

Water Pump

Hydraulically driven 835 water / mud pump

Maximum Flow Rate : 35 gpm @ 800 psi

Weight

Skid mounted weight 8.200 kg

Crawler mounted weight 10.000 kg

Drill Base Supports

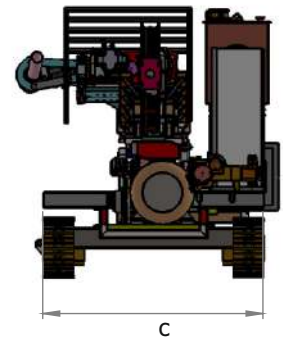
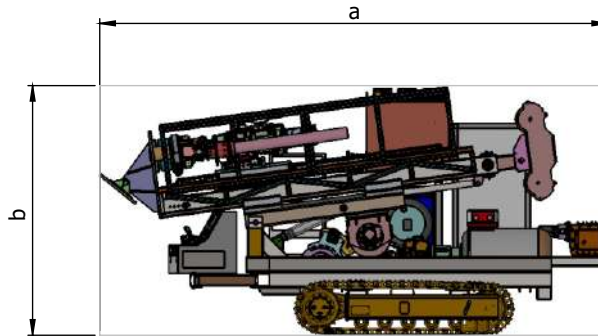
Skid mounted or crawler, supports 4 hydraulic leveling jacks.
Drilling functions stowed on swivelling panel.

Dimensions

a : 5.400 mm

b : 2.665 mm

c : 2.150 mm



Warranty

2 year against faulty workmanship. Individual manufactures warranty on all components as per our terms and conditions of sale.

Options

Water pump release valve, manometer, accumulator and diaphragm, Rod loader, Remote control panel, Warning horn to alert drill crew

Radio remote control for crawler with the option machine can be driven without anybody on the machine. The driver can stand in a safe place or walk aside from the machine.

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GEO 1500 Drill Rig





Depth Capacities (Vertical Borehole)

	Dry Hole (m)*	Wet Hole (m)*
PWL	1.040	1.190
HWL	1.420	1.590
NWL	1.230	2.660
BWL	3.020	2.200

(*) Depth capacity is given according to standard QWL rods. Depth capacity might be increased while using the rods which have light weight V-wall or different thread design.

Power Unit

MFG	Ford
Model	Ecotorq
Power (2300 RPM)	275 kW (374 HP)
Engine Type	Diesel Turbo charged and intercooler
Cooling	Water

Ford engine is at our standard production, at request of the different MFG (Volvo, Cummins, Deutz, Iveco) than delivery date changing according to engine delivery date.

Torque & RPM Rating

Extreme duty gear driven head power by 4 speed transmission with hydraulic sliding.

Power : 160 cc, 2 Speed Bent Axis Piston Type Hydraulic Motor

4 Speed Transmission

Gear Ratio	Speed (rpm)	Torque (Nm)
1. 6.27:1	122 - 199	5.800 - 3.700
2. 3.12:1	246 - 400	3.150 - 2.120
3. 1.75:1	439 - 714	2.120 - 1.400
4. 1.00:1	714 - 1.250	1.400 - 850

Lubrication Unit

Hydraulically driven cooled oil circulation with 25 micron suction filter.

Chuck Assembly

Type 7 Jaws - Hydraulic open / Spring closed

Maximum Inside Diameter 120 mm (PWL)

Holding Capacity 19.000 kg

Hydraulic System (@1600 RPM)

	Max. Flow Rate	Max. Pressure
Primary Pump (140 cc LS Axial Piston Pump)	224 L/min	300 Bar
Second Pump (45 cc LS Axial Piston Pump)	72 L/min	230 Bar
Auxiliary Pump (45 cc PS Axial Piston Pump)	72 L/min	180 Bar
Mixer Gear Pump (20 cc Gear Pump)	32 L/min	60 Bar

Hydraulic Oil Cooling

Hydraulic and rotation oil are cooling by air.

Telescopic Drill Mast and Feed System

Drilling Angle Vertical to 45 degree

Dump Stroke 2,20 m (According to mast axis)

Feed Travel 3,40 m

Telescopic Mast 3,30 m (Open and close by hydraulic feed cylinder)

Feed Speeds Fast and slow with variable controls

Maximum Pull 19.000 kg

Maximum Push 13.000 kg

Standard 6 m pull, angel hole, telescopic mast for ease of set up, ST 52-3 profile.

Main Line Hoist

Capacity 18.000 kg (Single line)

Cable Size 21.5 m x 18 mm rope

Line Speed Bare drum 35 m/min

Hydraulic driven planetary hoist.

Wireline Hoist

Capacity 3.000 m of 4.8 mm rope

Line Pull Bare drum: 1.870 kg Full drum: 545 kg

Line Speed Bare drum: 159 m/min Full drum: 475 m/min

Rod Clamp

Capacity: 25.000 kg

Hydraulically operated and self energizing, range from NWL to SWL rod.

Water Pump

Hydraulically driven 835 water / mud pump

Maximum Flow Rate : 35 gpm @ 800 psi

Mud Mixer (With Mud Mixing Tank)

Hydraulically driven mud mixer

Maximum Speed : 2.800 rpm

Weight

Skid mounted weight 9.200 kg

Crawler mounted weight 11.500 kg

Drill Base Supports

Skid mounted or crawler, supports 4 hydraulic leveling jacks.

Lighting System

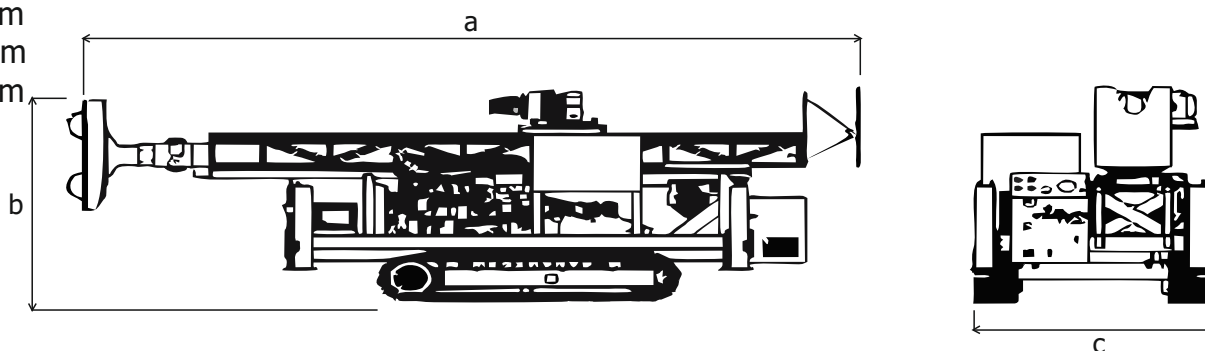
There are 6 LED lighting lamp on the mast.

Dimensions

a : 7.200 mm

b : 2.770 mm

c : 2.260 mm



Warranty

2 year against faulty workmanship. Individual manufactures warranty on all components as per our terms and conditions of sale.

Options

Hydraulic welder and generator package, Hydro pump and cyclone, Mast lighting and installation, Water pump release valve, manometer, accumulator and diaphragm, Rod spinner, Rod holder, Rod loader, Remote control panel, Mast ladder, Enclose operator cabin, Warning horn to alert drill crew, Fire suppression unit

GEO 2000 Drill Rig





Depth Capacities (Vertical Borehole)

	Dry Hole (m)*	Wet Hole (m)*
PWL	1.040	1.190
HWL	1.420	1.590
NWL	1.230	2.660
BWL	3.020	2.200

(*) Depth capacity is given according to standard QWL rods. Depth capacity might be increased while using the rods which have light weight V-wall or different thread design.

Power Unit

MFG	Ford
Model	Ecotorq
Power (2300 RPM)	275 kW (374 HP)
Engine Type	Diesel Turbo charged and intercooler
Cooling	Water

Ford engine is at our standard production, at request of the different MFG (Volvo, Cummins, Deutz, Iveco) than delivery date changing according to engine delivery date.

Torque & RPM Rating

Extreme duty gear driven head power by 2 speed transmission with hydraulic sliding.

Power : 160 cc, 2 Speed Bent Axis Piston Type Hydraulic Motor

2 Speed Transmission

Gear Ratio	Speed (rpm)	Torque (Nm)
1	122 - 220	5.900 - 4.660
2	750 - 1.300	1.499 - 850

Lubrication Unit

Hydraulically driven cooled oil circulation with 25 micron suction filter.

Chuck Assembly

Type	7 Jaws - Hydraulic open / Spring closed
Maximum Inside Diameter	120 mm (PWL)
Holding Capacity	19.000 kg

Hydraulic System (@1600 RPM)

	Max. Flow Rate	Max. Pressure
Primary Pump (140 cc LS Axial Piston Pump)	224 L/min	300 Bar
Second Pump (45 cc LS Axial Piston Pump)	72 L/min	230 Bar
Third Pump (45 cc LS Axial Piston Pump)	72 L/min	230 Bar
Auxiliary Pump (45 cc PS Axial Piston Pump)	72 L/min	180 Bar
Mixer Gear Pump (20 cc Gear Pump)	32 L/min	60 Bar

Hydraulic Oil Cooling

Hydraulic and rotation oil are cooling by air.

Telescopic Drill Mast and Feed System

Drilling Angle	Vertical to 45 degree
Dump Stroke	2,20 m (According to mast axis)
Feed Travel	3,40 m
Telescopic Mast	3,30 m (Open and close by hydraulic feed cylinder)
Feed Speeds	Fast and slow with variable controls
Maximum Pull	30.000 kg
Maximum Push	17.000 kg

Standard 6 m pull, angel hole, telescopic mast for ease of set up, ST 52-3 profile.

Main Line Hoist

Capacity	18.000 kg (Single line)
Cable Size	21.5 m x 18 mm rope
Line Speed	Bare drum 35 m/min

Hydraulic driven planetary hoist.

Wireline Hoist

Capacity	3.000 m of 4.8 mm rope	
Line Pull	Bare drum: 1.870 kg	Full drum: 545 kg
Line Speed	Bare drum: 159 m/min	Full drum: 475 m/min

Rod Clamp

Capacity :25.000 kg

Hydraulically operated and self energizing, range from NWL to SWL rod.

Water Pump

Hydraulically driven 835 water / mud pump

Maximum Flow Rate : 35 gpm @ 800 psi

Mud Mixer (With Mud Mixing Tank)

Hydraulically driven mud mixer Maximum Speed : 2.800 rpm

Weight

Skid mounted weight	9.200 kg
Crawler mounted weight	11.500 kg

Drill Base Supports

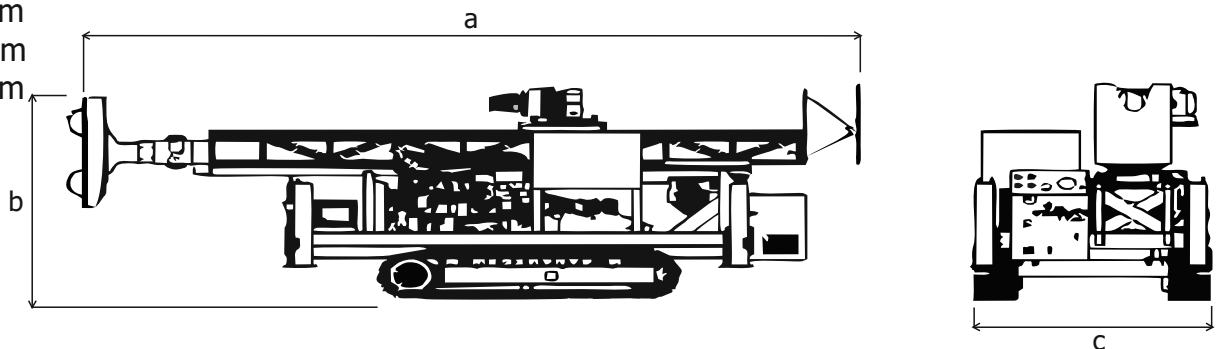
Skid mounted or crawler, supports 4 hydraulic leveling jacks.
Drilling functions stowed on swivelling panel.

Lighting System

There are 6 LED lighting lamp on the mast.

Dimensions

a : 7.200 mm
b : 2.770 mm
c : 2.260 mm



Warranty

2 year against faulty workmanship. Individual manufactures warranty on all components as per our terms and conditions of sale.

Options

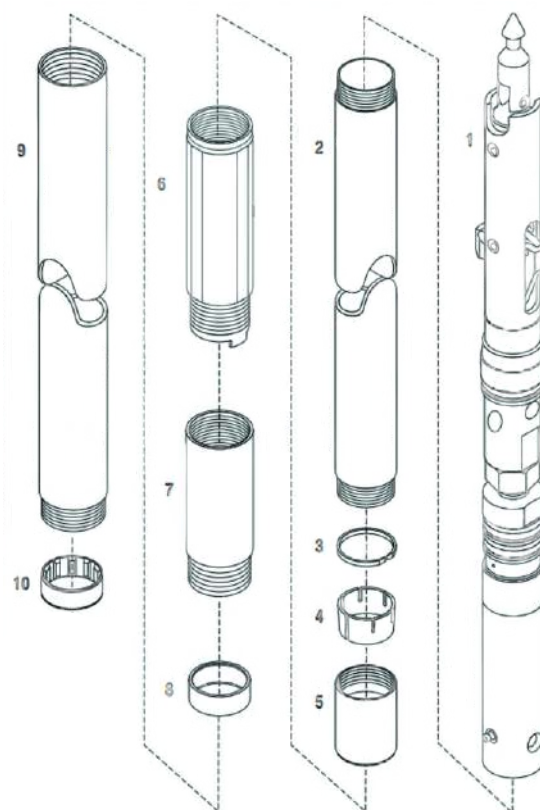
Hydraulic welder and generator package, Hydro pump and cyclone, Mast lighting and installation, Water pump release valve, manometer, accumulator and diaphragm, Rod spinner, Rod holder, Rod loader, Remote control panel, Mast ladder, Enclose operator cabin, Warning horn to alert drill crew, Fire suppression unit

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Wireline Coring System

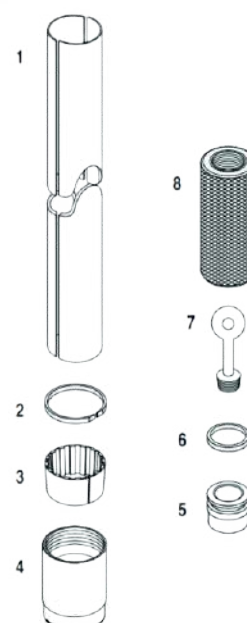


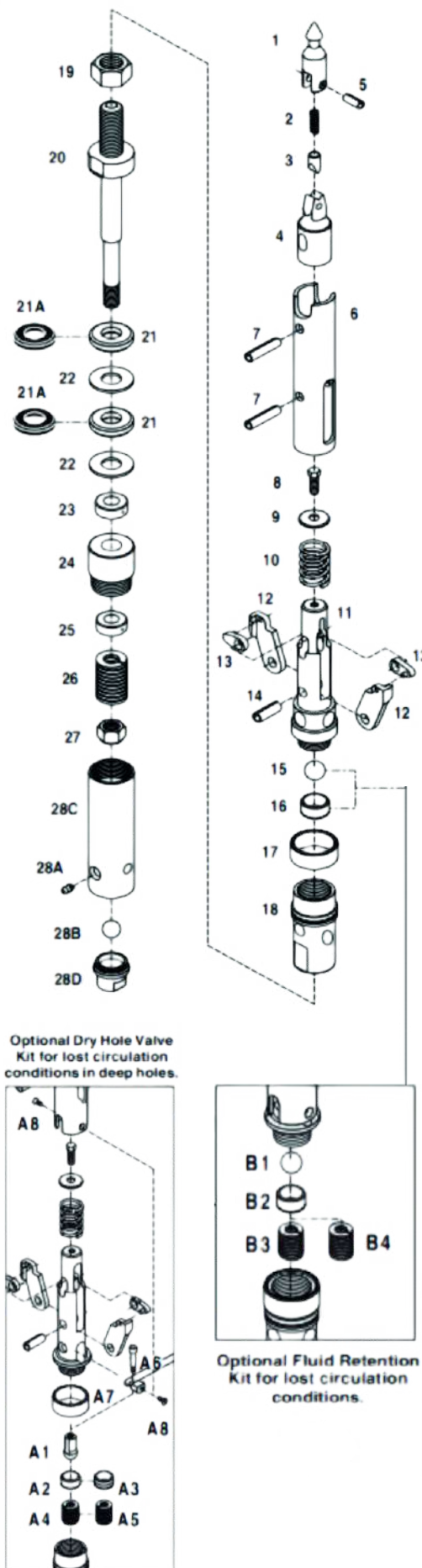
Item No	Part No	Description
	G306001	Core Barrel 1,5 m
	G306002	Core Barrel 3,0 m
1	G3542751	Head Assembly
2	G24909	Inner Tube 1,5 m
	G24891	Inner Tube 3,0 m
3	G24893	Stop Ring
4	G30488	Core Lifter (Thin Threaded)
	G30488-T	Core Lifter (Thick Threaded)
5	G24892	Core Lifter Case
6	G3545405-0	Locking Coupling
	G3545405-01	NHD Locking Coupling
	G3545405	Locking Coupling (Tanged)
	G3545405-1	NHD Locking Coupling (Tanged)
	G62764-T	Locking Coupling (TC)
	G62764-T1	NHD Locking Coupling (TC)
	G62764	Locking Coupling (Welded)
	G62764-1	NHD Locking Coupling (Welded)
7	G24896	Adapter Coupling
8	G24897	Landing Ring
9	G24910	Outer Tube 1,5 m
	G24898	Outer Tube 3,0 m
10	G44407	Inner Tube Stabilizer



Core Barrel Conversion Kits - NWL3

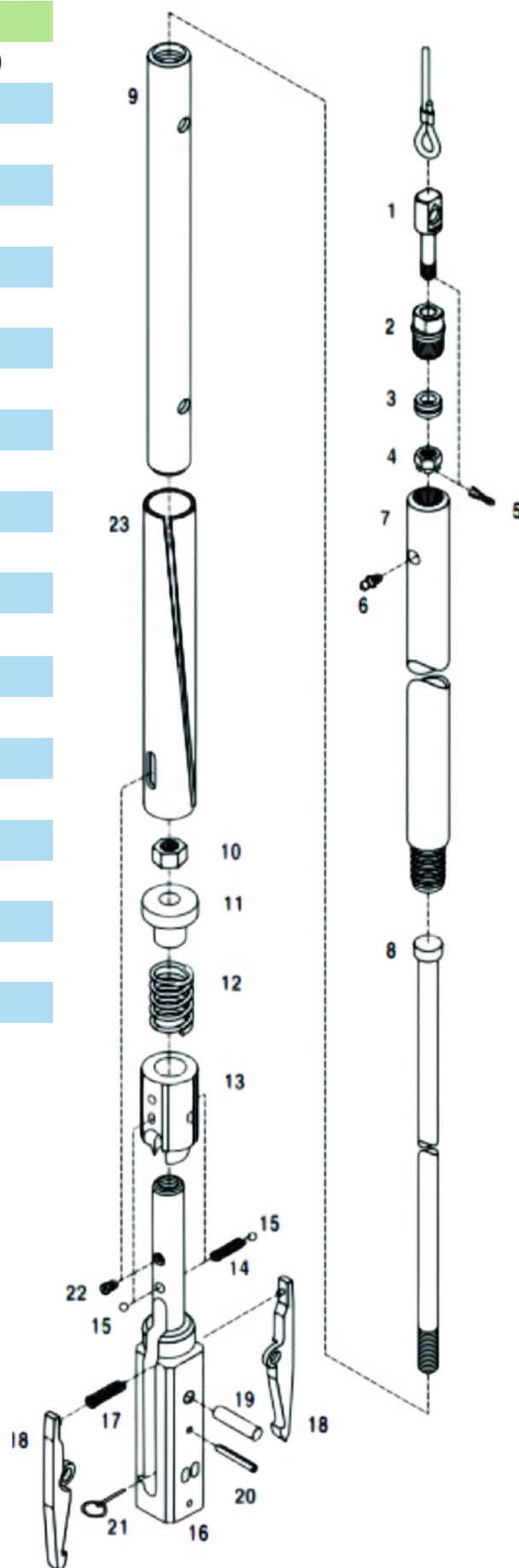
Item No	Part No	Description
1	G26527	Split Tube 1,5 m
	G26528	Split Tube 3,0 m
2	G26530	Stop Ring
3	G26531	Core Lifter (Thin Threaded)
	G26531-T	Core Lifter (Thick Threaded)
4	G26529	Core Lifter Case
5	G26526	Core Ejection Piston
6	G26134	O-Ring
7	G26662	Piston Plug
8	G26532	Pump-Out Adapter

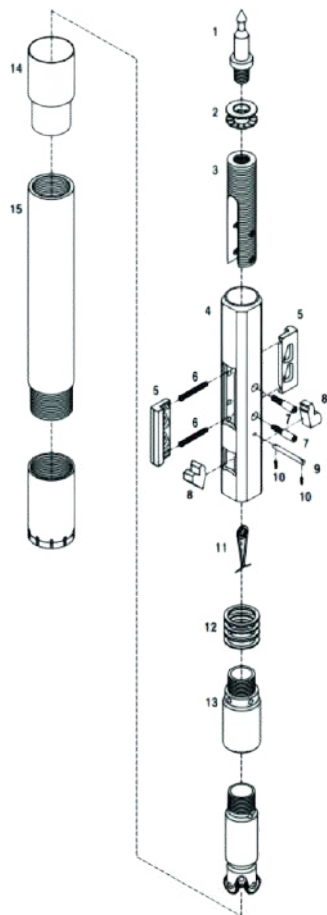




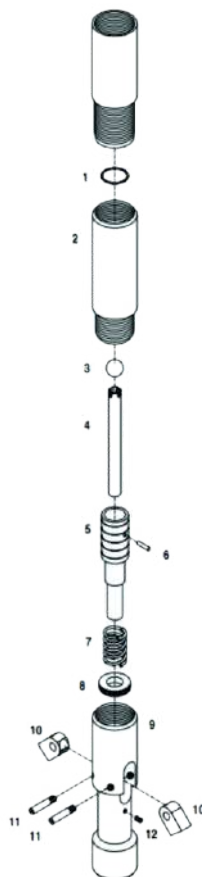
Item No	Part No	Description
1-5	G429131	Compact Spearhead and Base
1	G42913	Spearhead Point
2	G15141	Compression Spring
3	G42914	Detent Plunger
4	G3540329	Spearhead Base, NWL
5	G42905	Spirol Pin
6	G306455	Latch Retracting Case, NWL
7	G24305	Spring Pin, NWL
A	G3541210	Dry Hole Valve Kit
A1	G3543947	Steel Threaded Ball
A2	G306131	Landing Indicator Bushing (Steel)
A3	G3543378	Fluid Retention Spring, Heavy
A4	G104971	Fluid Retention Spring, Medium
A5	G104966	Fluid Retention Spring, Light
A6	G3533388	Shoulder Bolt
A7	G3540153	Dry Hole Valve Holder
A8	G3541117	Nylon Insert Machine Screw
8	G3541932	Nyloc Bolt
9	G306022	Washer
10	G3543812	Latch Compression Spring, NWL
11	G3541778	Upper Latch Body, NWL
12	G104816	Latch, NWL
13	G306454	Link, NWL
14	G24548	Spring Pin
15	G62374	Stainless Steel Ball
16	G62380	Landing Indicator Bushing
17	G306009	Landing Shoulder Ring, NWL
18	G306008	Lower Latch Body, NWL
19	G24885	Hexagonal Nut
20	G24886	Spindle, NWL
21	G44209	Shut-Off Valve, NWL
22	G24888	Valve Adjusting Washer, NWL
23	G24312	Thrust Bearing, NWL
24	G24889	Spindle Bushing, NWL
25	G18298	Hanger Bearing, NWL
26	G24313	Compression Spring
27	G22918	Stover Lock Nut
28	G40664	Inner Tube Cap Assembly, NWL
28A	G17447	Grease Fitting
28B	G62374	Stainless Steel Ball
28C	G40677	Inner Tube Cap, NWL
28D	G37382	Check Valve Body, NWL
B	G3542610	Fluid Retention Kit
B1	G62374	Stainless Steel Ball
B2	G306131	Fluid Retention Bushing
B3	G104966	Fluid Retention Spring, Light
B4	G104971	Fluid Retention Spring, Medium

Item No	Part No	Description
	G3546744	Overshot Assembly (Ezy-Lock)
1	G25991	Eye Bolt
2	G25990	Cable Swivel Collar
3	G25986	Thrust Bearing
4	G25985	Castle Nut
5	G44615	Cotter Pin
6	G17447	Grease Fitting
7	G44444	Cable Swivel Body
8	G3540516	Jar Staff
9	G44445	Jar Tube
10	G44524	Hexagonal Nut
11	G3544103	Cap, Ezy Lock O/Shot
12	G3544105	Spring, Ezy Lock O/Shot
13	G3546745	Sleeve, Ezy Lock O/Shot
14	G6951	Compression Spring
15	G3543772	Ball
16	G3546746	Ezy Lock Overshot Head
17	G3542027	Compression Spring
18	G3540529	Lifting Dog
19	G42906	Plain Pin
20	G37394	Spring Pin
21	G3546747	Locking Pin </td
22	G3545073	Set Screw
23	G15965	Locking Sleeve



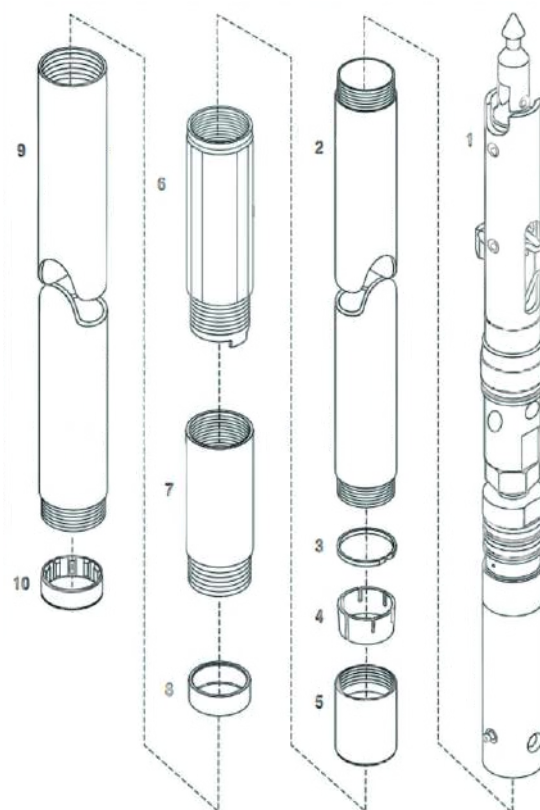


Item No	Description	
1-15	G59000	NW (HWL) Casing Advancer
1-14	G82421	Inner Assembly
1	G93415	Spearhead
2	G58040	Disc Lock Washer
3	G58038	Release Shaft
4	G58999	Latch Body
5	G93417	Latch Shoe
6	G93420	Spring
7	G58035	Location Pin
8	G59001	Stop Latch Set
9	G59087	Stop Latch Pin
10	G44861	Split Cotter Pin
11	G59082	Stop Latch Spring
12	G93418	Spacer Set
13	G93416	Bit Sub
14	G59063	Loading Sleeve
15	G80963	Driver



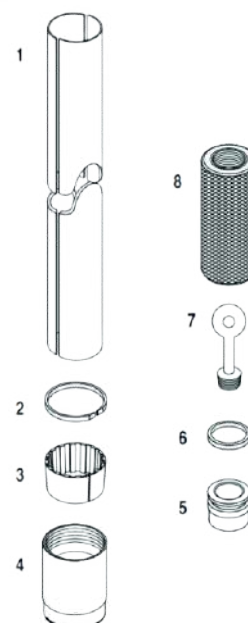
Item No	Part No	Description
	G52777	NW Casing / HWL Rod Cutter
1	G61460	Retaining Ring
2	G52778	Plunger Case
3	G26157	Stainless Steel Ball
4	G14529	Water Tube
5	G14528	Plunger
6	G22834	Pin
7	G14531	Spring
8	G14530	Spring Rest
9	G14526	Body
10	G14532	Casing Cutter Lug
11	G14588	Casing Cutter Pin
12	G44663	Set Screw

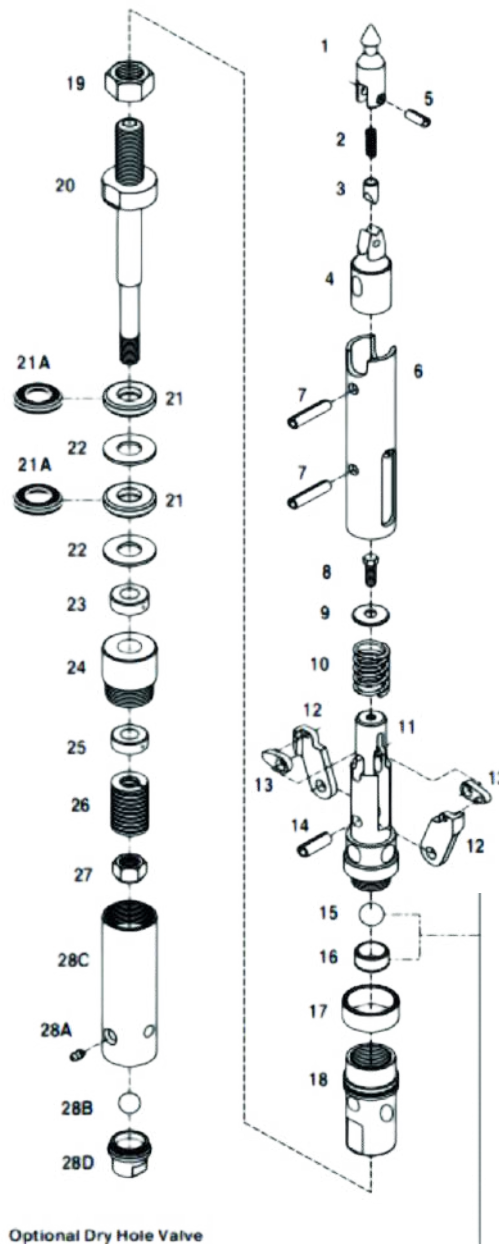
Item No	Part No	Description
	G3542946	Core Barrel 1,5 m
	G3542949	Core Barrel 3,0 m
1	G3542941	Head Assembly
2	G25258	Inner Tube 1,5 m
	G25236	Inner Tube 3,0 m
3	G25238	Stop Ring
4	G30489	Core Lifter (Thin Threaded)
	G30489-T	Core Lifter (Thick Threaded)
5	G25237	Core Lifter Case
6	G3545409-0	Locking Coupling
	G3545409	Locking Coupling (Tanged)
	G62765-T	Locking Coupling (TC)
	G62765-W	Locking Coupling (Welded)
7	G25241	Adapter Coupling
8	G25242	Landing Ring
9	G44408	Outer Tube 1,5 m
	G25243	Outer Tube 3,0 m
10	G25244	Inner Tube Stabilizer



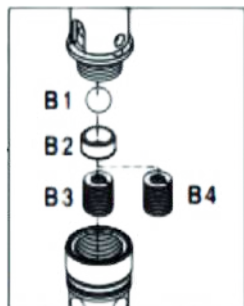
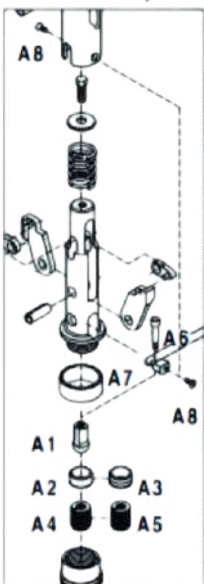
Core Barrel Conversion Kits - HWL3

Item No	Part No	Description
1	G26512	Split Tube 1,5 m
	G26513	Split Tube 3,0 m
2	G26515	Stop Ring
3	G26516	Core Lifter (Thin Threaded)
	G26516-T	Core Lifter (Thick Threaded)
4	G26514	Core Lifter Case
5	G26510	Core Ejection Piston
6	G20651	O-Ring
7	G26662	Piston Plug
8	G26517	Pump-Out Adapter





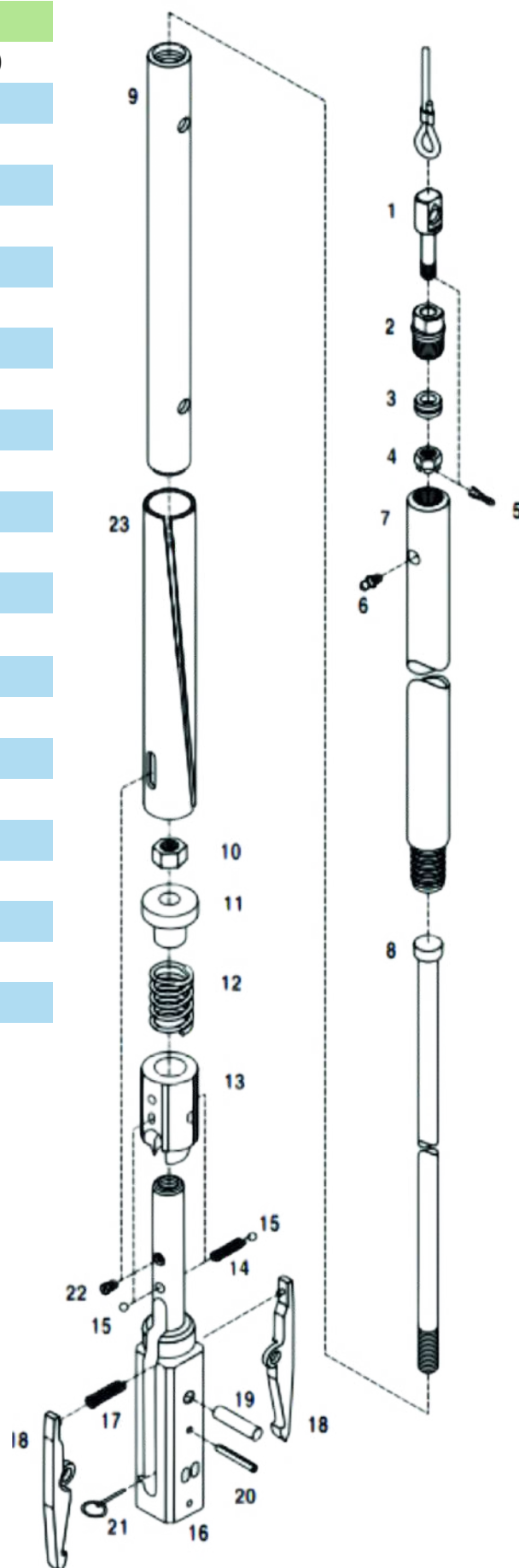
Optional Dry Hole Valve Kit for lost circulation conditions in deep holes.

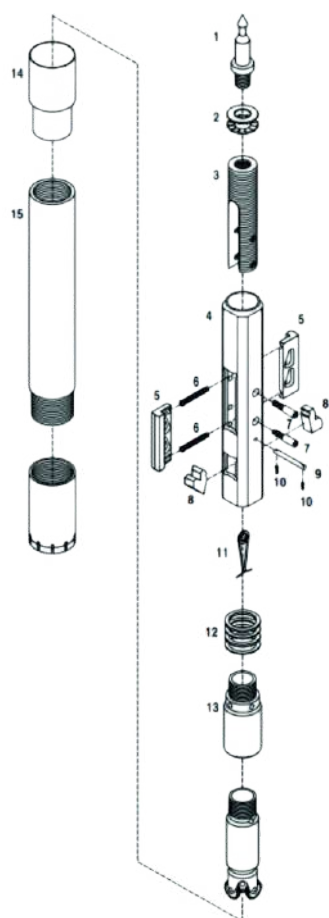


Optional Fluid Retention Kit for lost circulation conditions.

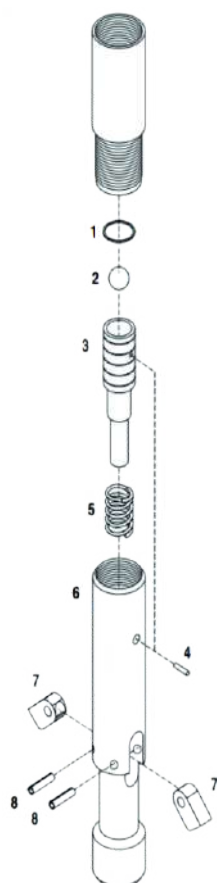
Item No	Part No	Description
1-5	G429131	Compact Spearhead and Base
1	G42913	Spearhead Point
2	G15141	Compression Spring
3	G42914	Detent Plunger
4	G3540330	Spearhead Base, HWL
5	G42905	Spirol Pin
6	G3540151	Latch Retracting Case, HWL
7	G24524	Spring Pin, HWL
A	G3541210	Dry Hole Valve Kit
A1	G3540152	Steel Threaded Ball
A2	G306131	Landing Indicator Bushing (Steel)
A3	G3543378	Fluid Retention Spring, Heavy
A4	G104971	Fluid Retention Spring, Medium
A5	G104966	Fluid Retention Spring, Light
A6	G3533388	Shoulder Bolt
A7	G3540153	Dry Hole Valve Holder
A8	G3541117	Nylon Insert Machine Screw
8	G3541932	Nyloc Bolt
9	G104953	Washer
10	G3543619	Latch Compression Spring, HWL
11	G3540156	Upper Latch Body, HWL
12	G104818	Latch, HWL
13	G306216	Link, HWL
14	G24305	Spring Pin
15	G62374	Stainless Steel Ball
16	G62380	Landing Indicator Bushing
17	G104958	Landing Shoulder Ring, HWL
18	G104957	Lower Latch Body, HWL
19	G44574	Hexagonal Nut
20	G25231	Spindle, HWL
21	G43513	Shut-Off Valve, HWL
22	G25233	Valve Adjusting Washer HWL
23	G24528	Thrust Bearing, HWL
24	G25234	Spindle Bushing, HWL
25	G24312	Hanger Bearing, HWL
26	G24529	Compression Spring
27	G103465	Stover Lock Nut
28	G40678	Inner Tube Cap Assembly, HWL
28A	G17447	Grease Fitting
28B	G62374	Stainless Steel Ball
28C	G40401	Inner Tube Cap, HWL
28D	G37382	Check Valve Body, HWL
B	G3542610	Fluid Retention Kit
B1	G62374	Stainless Steel Ball
B2	G306131	Fluid Retention Bushing
B3	G306443	Fluid Retention Spring, Light
B4	G306444	Fluid Retention Spring, Medium

Item No	Part No	Description
	G3546744	Overshot Assembly (Ezy-Lock)
1	G25991	Eye Bolt
2	G25990	Cable Swivel Collar
3	G25986	Thrust Bearing
4	G25985	Castle Nut
5	G44615	Cotter Pin
6	G17447	Grease Fitting
7	G44444	Cable Swivel Body
8	G3540516	Jar Staff
9	G44445	Jar Tube
10	G44524	Hexagonal Nut
11	G3544103	Cap, Ezy Lock O/Shot
12	G3544105	Spring, Ezy Lock O/Shot
13	G3546745	Sleeve, Ezy Lock O/Shot
14	G6951	Compression Spring
15	G3543772	Ball
16	G3546746	Ezy Lock Overshot Head
17	G3542027	Compression Spring
18	G3540529	Lifting Dog
19	G42906	Plain Pin
20	G37394	Spring Pin
21	G3546747	Locking Pin
22	G3545073	Set Screw
23	G15965	Locking Sleeve



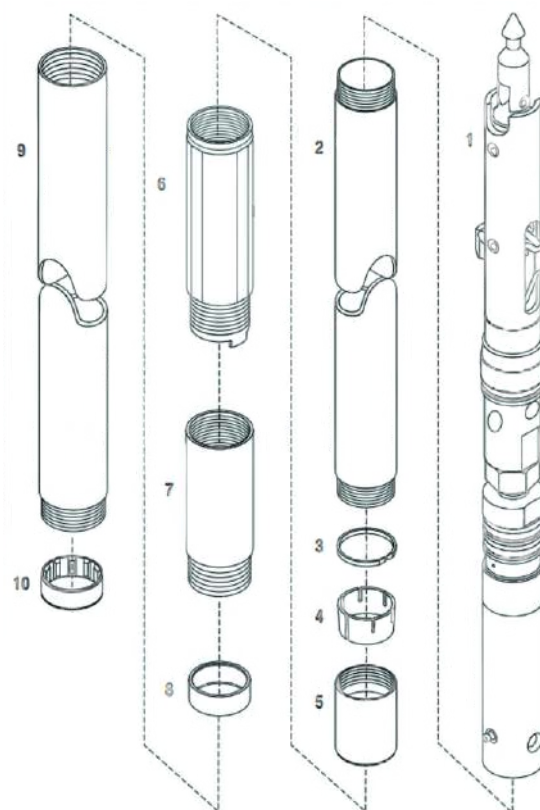


Item No	Part No	Description
1-15	G3000863	HWT (PWL) Casing Advancer
1-14	G3000868	Inner Assembly
1	G93415	Spearhead
2	G58040	Disc Lock Washer
3	G58038	Release Shaft
4	G59078	Latch Body
5	G93865	Latch Shoe
6	G93420	Spring
7	G58035	Location Pin
8	G59076	Stop Latch Set
9	G59077	Stop Latch Pin
10	G44861	Split Cotter Pin
11	G59082	Stop Latch Spring
12	G93863	Spacer Set
13	G93864	Bit Sub
14	G3000869	Loading Sleeve
15	G3000864	Driver



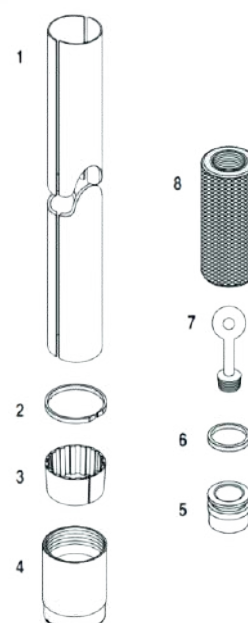
Item No	Part No	Description
	G60879	HW Casing / PWL Rod Cutter
1	G61460	Retaining Ring
2	G26157	Stainless Steel Ball
3	G14528	Plunger
4	G22834	Pin
5	G14531	Spring
6	G60880	Body
7	G62830	Casing Cutter Lug
8	G36216	Spring Pin

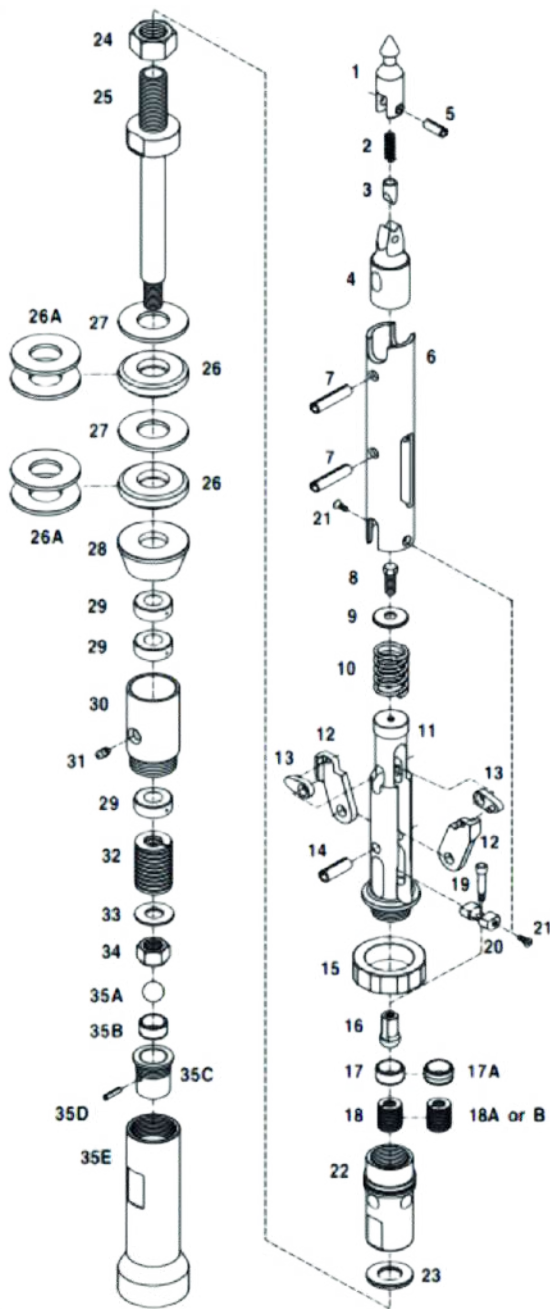
Item No	Part No	Description
	G3543865	Core Barrel 1,5 m
	G3543866	Core Barrel 3,0 m
1	G3543806	Head Assembly
2	G26159	Inner Tube 1,5 m
	G26534	Inner Tube 3,0 m
3	G26161	Stop Ring
4	G26162	Core Lifter (Thin Threaded)
	G26162-T	Core Lifter (Thick Threaded)
5	G52172	Core Lifter Case
6	G101343-0	Locking Coupling
	G101343	Locking Coupling (Tanged)
	G101343-T	Locking Coupling (TC)
	G101343-W	Locking Coupling (Welded)
7	G3543808	Adapter Coupling
8	G3543814	Landing Ring
9	G44923	Outer Tube 1,5 m
	G3543802	Outer Tube 3,0 m
10	G3543801	Inner Tube Stabilizer



Core Barrel Conversion Kits - HWL3

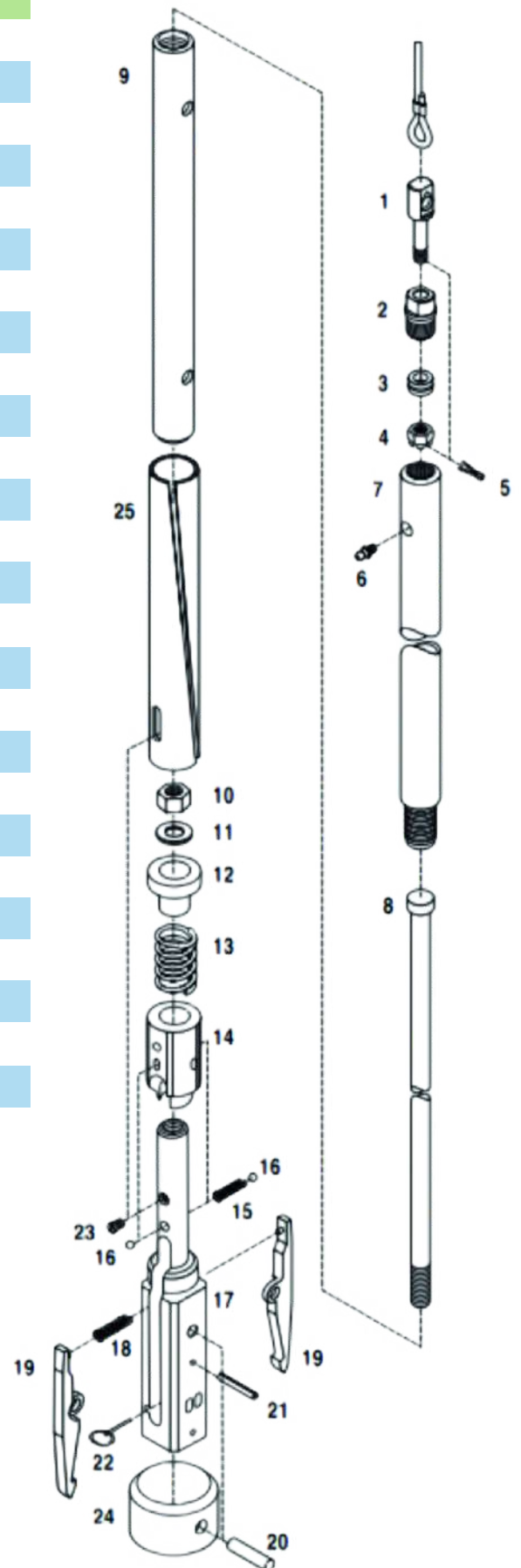
Item No	Part No	Description
1	G26180	Split Tube 1,5 m
	G26710	Split Tube 3,0 m
2	G26176	Stop Ring
3	G26177	Core Lifter (Thin Threaded)
	G26177-T	Core Lifter (Thick Threaded)
4	G26160	Core Lifter Case
5	G26662	Core Ejection Piston
6	G26179	O-Ring
7	G26178	Piston Plug
8	G26182	Pump-Out Adapter

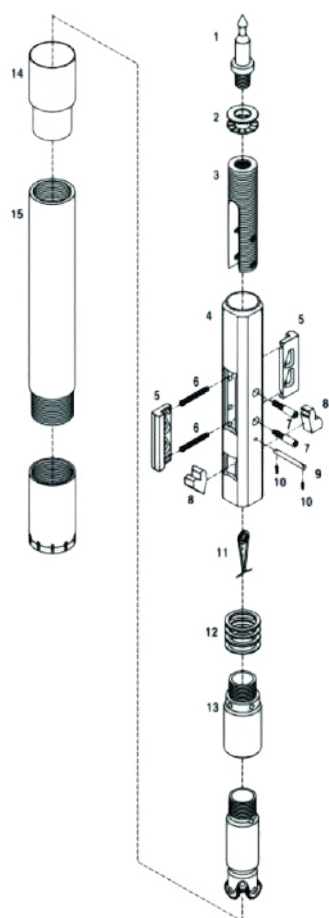




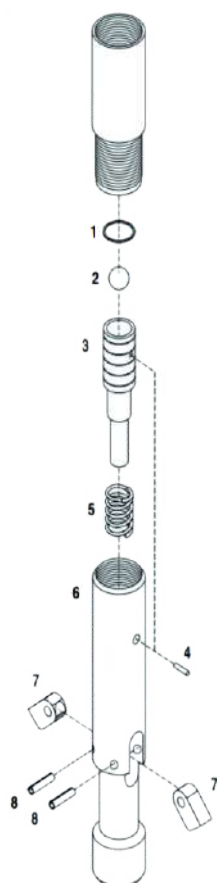
Item No	Part No	Description
1-5	G42913-1	Compact Spearhead and Base
1	G42913	Spearhead Point
2	G15141	Compression Spring
3	G42914	Detent Plunger
4	G3540330	Spearhead Base, PWL
5	G42905	Spirol Pin
6	G3540151	Latch Retracting Case, PWL
7	G24524	Spring Pin, PWL
8	G3541932	Nyloc Bolt
9	G104953	Washer
10	G3543619	Latch Compression Spring
11	G3540156	Upper Latch Body
12	G3543796	Latch, PWL
13	G306216	Link, HWL
14	G24305	Spring Pin
15	G3543797	Landing Shoulder
16	G3543947	Threaded Ball
17	G306131	Fluid Retention Bushing
17A	G3543378	Fluid Retention Bushing, Heavy
18	G104966	Fluid Retention Spring, Light
18A	G104971	Fluid Retention Spring, Medium
19	G3543388	Shoulder Bolt
20	G3540153	Dry Hole Valve Holder
21	G3541117	Nylon Insert Machine Screw
22	G104957	Lower Latch Body
23	G3545206	Washer, Nord-lock
24	G44574	Hexagonal Nut
25	G3541058	Spindle, PWL
26	G3540308	Shut-Off Valve
27	G3540300	Valve Adjusting Washer
28	G3540299	Washer, Tapered
29	G24528	Thrust Bearing, PWL
30	G3540794	Spindle Bearing, PWL
31	G17447	Grease Fitting
32	G3540755	Compression Spring
33	G3544324	Washer
34	G103062	Stover Lock Nut
35A	G62374	Stainless Steel Ball
35B	G3540745	Bushing
35C	G3540745	Check Valve Body
35D	G100865	Spring Pin
35E	G3543804	Inner Tube Cap

Item No	Part No	Description
	G3546895	Overshot Assembly (Ezy-Lock)
1	G25991	Eye Bolt
2	G25990	Cable Swivel Collar
3	G25986	Thrust Bearing
4	G25985	Castle Nut
5	G44615	Cotter Pin
6	G17447	Grease Fitting
7	G44444	Cable Swivel Body
8	G3540516	Jar Staff
9	G3540515	Jar Tube
10	G44524	Hexagonal Nut
11	G 3548178	Washer, Nord-lock
12	G3544103	Cap, Ezy Lock O/Shot
13	G3544105	Spring, Ezy Lock O/Shot
14	G3546745	Sleeve, Ezy Lock O/Shot
15	G6951	Compression Spring
16	G3543772	Ball
17	G3546748	Ezy Lock Overshot Head
18	G3542027	Compression Spring
19	G3540529	Lifting Dog
20	G3540213	Plain Pin
21	G24307	Spring Pin
22	G3546747	Locking Pin
23	G3545073	Set Screw
24	G3541072	Sleeve
25	G15965	Locking Sleeve





Item No	Part No	Description
1-15	G3543991	PW (SWL) Casing Advancer
1-14	G3543771	Inner Assembly
1	G93415	Spearhead
2	G58040	Disc Lock Washer
3	G58038	Release Shaft
4	G59435	Latch Body
5	G59438	Latch Shoe
6	G93420	Spring
7	G58035	Location Pin
8	G59436	Stop Latch Set
9	G59437	Stop Latch Pin
10	G44861	Split Cotter Pin
11	G59082	Stop Latch Spring
12	G59440	Spacer Set
13	G59441	Bit Sub
14	G59454	Loading Sleeve
15	G3543990	Driver



Item No	Part No	Description
	G60879	PW Casing / SWL Rod Cutter
1	G61460	Retaining Ring
2	G26157	Stainless Steel Ball
3	G14528	Plunger
4	G22834	Pin
5	G14531	Spring
6	G60880	Body
7	G62830	Casing Cutter Lug
8	G36216	Spring Pin



Part No	Description	Part No	Description
NWL Rod Adapter Subs		G306253-HD	HWL-HD Rod Box to HWL-Q Rod Pin
G104744-Q	NWL-Q Rod Box to NWL-HD Rod Pin	G306254-HD	HWL-HD Rod Box to HWL-R Rod Pin
G104745-Q	NWL-Q Rod Box to NWL-R Rod Pin	G306255-HD	HWL-HD Rod Box to HWL-X Rod Pin
G104746-Q	NWL-Q Rod Box to NWL-X Rod Pin	G306253-X	HWL-X Rod Box to HWL-Q Rod Pin
G104744-HD	NWL-HD Rod Box to NWL-Q Rod Pin	G306254-X	HWL-X Rod Box to HWL-HD Rod Pin
G104745-HD	NWL-HD Rod Box to NWL-R Rod Pin	G306255-X	HWL-X Rod Box to HWL-R Rod Pin
G104746-HD	NWL-HD Rod Box to NWL-X Rod Pin	G306253-R	HWL-R Rod Box to HWL-Q Rod Pin
G104744-X	NWL-X Rod Box to NWL-Q Rod Pin	G306254-R	HWL-R Rod Box to HWL-HD Rod Pin
G104745-X	NWL-X Rod Box to NWL-HD Rod Pin	G306255-R	HWL-R Rod Box to HWL-X Rod Pin
G104746-X	NWL-X Rod Box to NWL-R Rod Pin	Water Swivel/Hoisting Plug Adapter Subs	
G104744-R	NWL-R Rod Box to NWL-Q Rod Pin	G31093-Q	AW Rod Pin to HWL-Q Rod Pin
G104745-R	NWL-R Rod Box to NWL-HD Rod Pin	G31093-HD	AW Rod Pin to HWL-HD Rod Pin
G104746-R	NWL-R Rod Box to NWL-X Rod Pin	G31093-X	AW Rod Pin to HWL-X Rod Pin
Water Swivel/Hoisting Plug Adapter Subs		G31093-R	AW Rod Pin to HWL-R Rod Pin
G25617-Q	AW Rod Pin to NWL-Q Rod Pin	G44464-Q	BW Rod Pin to HWL-Q Rod Pin
G25617-HD	AW Rod Pin to NWL-HD Rod Pin	G44464-HD	BW Rod Pin to HWL-HD Rod Pin
G25617-X	AW Rod Pin to NWL-X Rod Pin	G44464-X	BW Rod Pin to HWL-X Rod Pin
G25617-R	AW Rod Pin to NWL-R Rod Pin	G44464-R	BW Rod Pin to HWL-R Rod Pin
G27559-Q	BW Rod Pin to NWL-Q Rod Pin	G27558-Q	HWL-Q Rod Box to HW Casing Pin
G27559-HD	BW Rod Pin to NWL-HD Rod Pin	G27558-HD	HWL-HD Rod Box to HW Casing Pin
G27559-X	BW Rod Pin to NWL-X Rod Pin	G27558-X	HWL-X Rod Box to HW Casing Pin
G27559-R	BW Rod Pin to NWL-R Rod Pin	G27558-R	HWL-R Rod Box to HW Casing Pin
G30040-Q	NWL-Q Rod Box to NW Casing Pin	G3542933-Q	NW Rod Pin to HWL-Q Rod Pin
G30040-HD	NWL-HD Rod Box to NW Casing Pin	G3542933-HD	NW Rod Pin to HWL-HD Rod Pin
G30040-X	NWL-X Rod Box to NW Casing Pin	G3542933-X	NW Rod Pin to HWL-X Rod Pin
G30040-R	NWL-R Rod Box to NW Casing Pin	G3542933-R	NW Rod Pin to HWL-R Rod Pin
Casing Adapter Subs		Casing Adapter Subs	
G30558-Q	NWL-Q Rod Box to BW Casing Pin	G30555-Q	HWL-Q Rod Box to NW Casing Pin
G30558-HD	NWL-HD Rod Box to BW Casing Pin	G30555-HD	HWL-HD Rod Box to NW Casing Pin
G30558-R	NWL-R Rod Box to BW Casing Pin	G30555-R	HWL-R Rod Box to NW Casing Pin
G30558-X	NWL-X Rod Box to BW Casing Pin	G30555-X	HWL-X Rod Box to NW Casing Pin
G30040-Q	NWL-Q Rod Box to NW Casing Pin	G27558-Q	HWL-Q Rod Box to HW Casing Pin
G30040-HD	NWL-HD Rod Box to NW Casing Pin	G27558-HD	HWL-HD Rod Box to HW Casing Pin
G30040-R	NWL-R Rod Box to NW Casing Pin	G27558-R	HWL-R Rod Box to HW Casing Pin
G30040-X	NWL-X Rod Box to NW Casing Pin	G27558-X	HWL-X Rod Box to HW Casing Pin
G30101-Q	NWL-Q Rod Box to HW Casing Pin	Recovery Tool & Adapter Subs	
G30101-HD	NWL-HD Rod Box to HW Casing Pin	G306079	HWL Rod Recovery Tap
G30101-R	NWL-R Rod Box to HW Casing Pin	G4011574	HWL Pilot Bit
G30101-X	NWL-X Rod Box to HW Casing Pin	G3542968	HW Casing Recovery Tap
Recovery Tool & Adapter Subs		G61734	HWL Cable Fisher
G306034	NWL Rod Recovery Tap	G25262-Q	HWL-Q Rod Box to NW Rod Pin
G4011685	NWL Pilot Bit	G25262-HD	HWL-HD Rod Box to NW Rod Pin
G306066	NW Casing Recovery Tap	G25262-X	HWL-X Rod Box to NW Rod Pin
G61733	NWL Cable Fisher	G25262-R	HWL-R Rod Box to NW Rod Pin
G24928-Q	NWL-Q Rod Box to BW Rod Pin	PWL Casing Adapter Subs	
G24928-HD	NWL-HD Rod Box to BW Rod Pin	G35433992	PWL-Q Rod Box to PW Casing Pin
G24928-X	NWL-X Rod Box to BW Tj Rod Pin	Water Swivel/Hoisting Plug Adapter Subs	
G24928-R	NWL-R Rod Box to BW Rod Pin	G103008	BW Rod Pin to PWL-Q Rod Pin
G24931-Q	NWL-Q Rod Box to NW Rod Pin	G3543992	NW Rod Pin to PW-Q Rod Pin
G24931-HD	NWL-HD Rod Box to NW Rod Pin	Recovery Tool & Adapter Subs	
G24931-X	NWL-X Rod Box to NW Rod Pin	G3542968	PWL Rod Recovery Tap
G24931-R	NWL-R Rod Box to NW Rod Pin	G3543013	PW Casing Recovery Tap
HWL Drill Rod Adapter Subs		G3543319	PWL-Q Rod Box to NW Rod Pin
G306253-Q	HWL-Q Rod Box to HWL-HD Rod Pin		
G306254-Q	HWL-Q Rod Box to HWL-R Rod Pin		
G306255-Q	HWL-Q Rod Box to HWL-X Rod Pin		

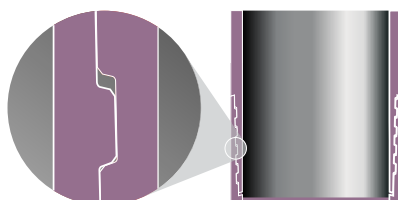
Drill Rod & Casing



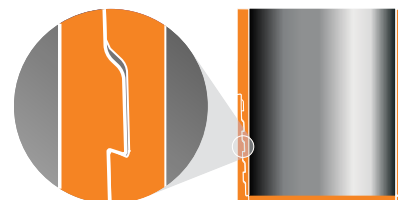
GEO SONDAJ MAKİNE İMALAT LTD. ŞTİ. rods are produced using cold drawn steel tubes, grades of them is ASTM A510 4130 standart. Drill rods are 20 cm quench and temper heat treatment of box and pin ends for increased tensile and yield strength.

GEO SONDAJ MAKİNE İMALAT LTD. ŞTİ. produce 4 types of thread profiled as WL-Q, WL-HD, WL-R and WL-X. For easily identification grooves are open on the pin end of drill rods according to profile types.

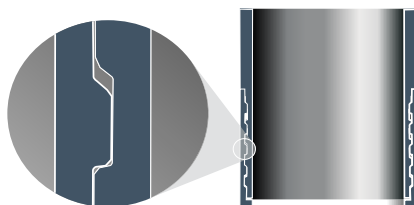
WL-Q THREAD PROFILE



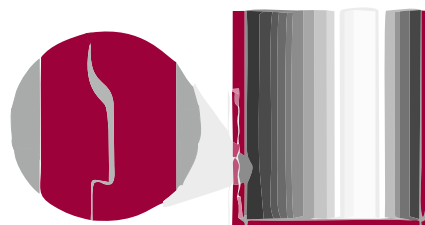
WL-R THREAD PROFILE



WL-HD THREAD PROFILE



WL-X THREAD PROFILE



Wireline Drill Rod Threads

Item No	Description	Outer Diameter	Inner Diameter	Weight	Depth	Yield Strength	Tensile Strength
G51587-Q	NWL-Q	69.90 mm	60.30 mm	7.8 kg/m	1500 m	650 MPa	790 MPa
G51587-HD	NWL-HD	69.90 mm	60.30 mm	7.8 kg/m	3000 m	650 MPa	790 MPa
G51587-R	NWL-R	69.90 mm	60.30 mm	7.8 kg/m	3000 m	650 MPa	790 MPa
G51587-X	NWL-X	69.90 mm	60.30 mm	7.8 kg/m	3350 m	650 Mpa	790 Mpa

Item No	Description	Outer Diameter	Inner Diameter	Weight	Depth	Yield Strength	Tensile Strength
G51593-Q	HWL-Q	88.90 mm	77.80 mm	11.4 kg/m	1500 m	650 MPa	790 MPa
G51593-HD	HWL-HD	88.90 mm	77.80 mm	11.4 kg/m	2500 m	650 MPa	790 MPa
G51593-R	HWL-R	88.90 mm	77.80 mm	11.4 kg/m	2500 m	650 MPa	790 MPa
G51593-X	HWL-X	88.90 mm	77.80 mm	11.4 kg/m	3050 m	650 Mpa	790 Mpa

Item No	Description	Outer Diameter	Inner Diameter	Weight	Depth	Yield Strength	Tensile Strength
G3541744-HD	PWL-HD	114.40 mm	101.40 mm	16.9 kg/m	1500 m	650 Mpa	790 Mpa

Casing Threads

Item No	Description	Outer Diameter	Inner Diameter	Weight	Thread Pitch	Pin Length	Content
G66544	NW	88.90 mm	76.20 mm	12.8 kg/m	10.2	62.7 mm	455.7 l/100m
G101337	HW	114.30 mm	101.60 mm	17.4 kg/m	10.2	44.4 mm	810.8 l/100m
G3543977	PW	139.70 mm	127.00 mm	21.4 kg/m	10.2	44.4 mm	1266.6 l/100m

Part No	Description
N Size Rod	
G51586-Q	NWL-Q Rod 1,50 m
G51587-Q	NWL-Q Rod 3,00 m
G51586-QT	NWL-QT Rod 1,50 m, Heat Threated
G51587-QT	NWL-QT Rod 3,00 m, Heat Threated
G51586-HD	NWL-HD Rod 1,50 m
G51587-HD	NWL-HD Rod 3,00 m
G51586-HDT	NWL-HDT Rod 1,50 m, Heat Threated
G51587-HDT	NWL-HDT Rod 3,00 m, Heat Threated
G51586-R	NWL-R Rod 1,50 m
G51587-R	NWL-R Rod 3,00 m
G51586-RT	NWL-RT Rod 1,50 m, Heat Threated
G51587-RT	NWL-RT Rod 3,00 m, Heat Threated
G51586-X	NWL-X Rod 1,50 m
G51587-X	NWL-X Rod 3,00 m
G51586-XT	NWL-XT Rod 1,50 m, Heat Threated
G51587-XT	NWL-XT Rod 3,00 m, Heat Threated
N Size Casing	
G66543	NW Casing, 1,50 m
G66544	NW Casing, 3,00 m
G66543-HWL	NW Casing (HWL Rod) 1,50 m
G66544-HWL	NW Casing (HWL Rod), 3,00 m
G66543-HND	NW Casing (HND Rod) 1,50 m
G66544-HND	NW Casing (HND Rod), 3,00 m
H Size Rod	
G51592-Q	HWL-Q Rod 1,50 m
G51593-Q	HWL-Q Rod 3,00 m
G51592-QT	HWL-QT Rod 1,50 m, Heat Threated
G51593-QT	HWL-QT Rod 3,00 m, Heat Threated
G51592-HD	HWL-HD Rod 1,50 m
G51593-HD	HWL-HD Rod 3,00 m
G51592-HDT	HWL-HDT Rod 1,50 m, Heat Threated
G51593-HDT	HWL-HDT Rod 3,00 m, Heat Threated

Part No	Description
G51592-R	HWL-R Rod 1,50 m
G51593-R	HWL-R Rod 3,00 m
G51592-RT	HWL-RT Rod 1,50 m, Heat Threated
G51593-RT	HWL-RT Rod 3,00 m, Heat Threated
G51592-X	HWL-X Rod 1,50 m
G51593-X	HWL-X Rod 3,00 m
G51592-XT	HWL-XT Rod 1,50 m, Heat Threated
G51593-XT	HWL-XT Rod 3,00 m, Heat Threated
H Size Casing	
G101336	HW Casing 1,50 m
G101337	HW Casing 3,00 m
G101336-PWL	HW Casing (PWL Rod) 1,50 m
G101337-PWL	HW Casing (PWL Rod) 3,00 m
P Size Rod	
G3541743-HD	PWL-HD Rod 1,50 m
G3541744 -HD	PWL-HD Rod 3,00 m
G3541743-HDT	PWL-HDT Rod 1,50 m, Heat Threated
G3541744-HDT	PWL-HDT Rod 3,00 m, Heat Threated
P Size Casing	
G3543976	PW Casing 1,50 m
G3543977	PW Casing 3,00 m
G3543976-HD	PHD Casing 1,50 m
G3543977-HD	PHD Casing 3,00 m
G3543978	SW Casing 1,50 m
G3543979	SW Casing 3,00 m
G3543978-HD	SHD Casing 1,50 m
G3543979-HD	SHD Casing 3,00 m



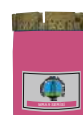
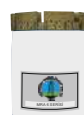
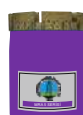
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Drill Bits & Reaming Shell



GEO MRA Bit Series Selection Guide

ROCK Moh's Hardness	ROCK CONDITION	ROCK TYPE	MRA SERIES MATRIX (High) ----- Rock Abrasiveness Condition ----- (Low) (Fractured) ----- Rock Structure ----- (Compact) (High) ----- Power of Rig ----- (Low)
1 - 4	Soft, Medium hard, High abrasive to low abrasive, High fractured to low fractured	Shale Sandstone Limestone	
5	Medium hard, Abrasive, Medium fractured	Limestone Dolomite Weathered Granite Weathered Gneiss Serpentinite	
6	Medium hard, Partially abrasive, Partially fractured	Diorite Gabbro Peridotite Gneiss Basalt Andesite	
7	Medium hard - hard, Partially abrasive, Partially fractured - competent	Metabasalt Amfibolit Metamorphosed Diorite Metamorphosed Gabbro Diabase	
8	Hard, Low abrasive, Competent	Quartz rich skarn Granite Pegmatite	
9	Very hard, Very high abrasive, Very competent	Metamorphosed Granite Quartz Rich Gneiss	
10	Very hard, Non abrasive, Fine grained - massive, Very competent	Chert Jasperoid Quartzite Very highly metamorphosed volcanic rock	



GEO AZT Reaming Shell Selection Guide

ROCK Moh's Hardness	ROCK CONDITION	ROCK TYPE	AZT SERIES MATRIX (Low) Abrasiveness Condition (High)
1 - 4	Soft, Medium hard, High abrasive to low abrasive, High fractured to low fractured	Shale Sandstone Limestone	
5	Medium hard, Abrasive, Medium fractured	Limestone Dolomite Weathered Granite Weathered Gneiss Serpentine Metaperidotite	
6	Medium hard, Partially abrasive, Partially fractured	Diorite Gabbro Peridotite Gneiss Basalt Andesite	
7	Medium hard - hard, Partially abrasive, Partially fractured - competent	Metabasalt Amfibolit Metamorphosed Diorite Metamorphosed Gabbro Diabase	
8	Hard, Low abrasive, Competent	Quartz rich skarn Granite Pegmatite	
9	Very hard, Very high abrasive, Very competent	Metamorphosed Granite Quartz Rich Gneiss	
10	Very hard, Non abrasive, Fine grained - massive, Very competent	Chert Jasperoid Quartzite Very highly metamorphosed volcanic rock	



Part No	Description	Part No	Description
N Size Diamond Products		G4101563-7	HWL Impregnated Bit, MRA-7 RED
G3522860	NWL Reaming Shell without Reinforcement	G4101563-7.T	HWL Impregnated Bit, MRA-7.T, RED TURBO
G3522861	NWL Reaming Shell, Hard Welding	G4101563-8	HWL Impregnated Bit, MRA-8, YELLOW
G3522862	NWL Reaming Shell, Using Synthetic Diamond and Tungsten Carbide	G4101563-9	HWL Impregnated Bit, MRA-9, PINK
G3522863	NWL Reaming Shell, Tungsten Carbide Gauges	G4101563-T.C	HWL Tungsten Carbide Bit
G49448-1	NWL Impregnated Bit, MRA-1, BLACK	G4101796	HW Impregnated Casing Shoe
G49448-2	NWL Impregnated Bit, MRA-2, GREEN	G4101795	HWL Impregnated Casing Shoe
G49448-3	NWL Impregnated Bit, MRA-3, BLUE	G4101797	HW Tungsten Carbide Casing Shoe
G49448-4	NWL Impregnated Bit, MRA-4, BROWN	G4101798	HWL Tungsten Carbide Casing Shoe
G49448-5	NWL Impregnated Bit, MRA-5, PURPLE	G41015633-1	HWL3 Impregnated Bit, MRA-1, BLACK
G49448-6	NWL Impregnated Bit, MRA-6, WHITE	G41015633-2	HWL3 Impregnated Bit, MRA-2, GREEN
G49448-7	NWL Impregnated Bit, MRA-7, RED	G41015633-3	HWL3 Impregnated Bit, MRA-3, BLUE
G49448-7.T	NWL Impregnated Bit, MRA-7.T, RED TURBO	G41015633-4	HWL3 Impregnated Bit, MRA-4, BROWN
G49448-8	NWL Impregnated Bit, MRA-8, YELLOW	G41015633-5	HWL3 Impregnated Bit, MRA-5, PURPLE
G49448-9	NWL Impregnated Bit, MRA-9, PINK	G41015633-6	HWL3 Impregnated Bit, MRA-6, WHITE
G49448-1.OS	NWL Impregnated Bit, MRA-1, BLACK, O/SIZE	G41015633-7	HWL3 Impregnated Bit, MRA-7, RED
G49448-T.C	NWL Tungsten Carbide Bit	G41015633-7.T	HWL3 Impregnated Bit, MRA-7.T, RED TURBO
G4101793	NW Impregnated Casing Shoe	G41015633-8	HWL3 Impregnated Bit, MRA-8, YELLOW
G4101794	NWL Impregnated Casing Shoe	G41015633-9	HWL3 Impregnated Bit, MRA-9, PINK
G4101795	NW Tungsten Carbide Casing Shoe	G41015633-1.OS	HWL3 Imp. Bit, MRA-1, BLACK, O/SIZE
G4101796	NWL Tungsten Carbide Casing Shoe	G41015633-T.C	HWL3 Tungsten Carbide Bit
G494483-1	NWL3 Impregnated Bit, MRA-1, BLACK	P Size Diamond Products	
G494483-2	NWL3 Impregnated Bit, MRA-2, GREEN	G3522870	PWL Remaining Shell without Reinforcement
G494483-3	NWL3 Impregnated Bit, MRA-3, BLUE	G3522871	PWL Reaming Shell, Hard Welding
G494483-4	NWL3 Impregnated Bit, MRA-4, BROWN	G3522872	PWL Reaming Shell, Using Synthetic Diamond and Tungsten Carbide
G494483-5	NWL3 Impregnated Bit, MRA-5, PURPLE	G3522873	PWL Reaming Shell, Tungsten Carbide Gauges
G494483-6	NWL3 Impregnated Bit, MRA-6, WHITE	G4101564-1	PWL Impregnated Bit, MRA-1, BLACK
G494483-7	NWL3 Impregnated Bit, MRA-7, RED	G4101564-2	PWL Impregnated Bit, MRA-2, GREEN
G494483-7.T	NWL3 Impregnated Bit, MRA-7.T, RED TURBO	G4101564-3	PWL Impregnated Bit, MRA-3, BLUE
G494483-8	NWL3 Impregnated Bit, MRA-8, YELLOW	G4101564-4	PWL Impregnated Bit, MRA-4, BROWN
G494483-9	NWL3 Impregnated Bit, MRA-9, PINK	G4101564-5	PWL Impregnated Bit, MRA-5, PURPLE
G494483-1.OS	NWL3 Impregnated Bit, MRA-1, BLACK, O/SIZE	G4101564-6	PWL Impregnated Bit, MRA-6, WHITE
G3522866	NWL3 Tungsten Carbide Bit	G4101564-7	PWL Impregnated Bit, MRA-7, RED
H Size Diamond Products		G4101564-7.T	PWL Impregnated Bit, MRA-7.T, RED TURBO
G3522865	HWL Remaining Shell without Reinforcement	G4101564-8	PWL Impregnated Bit, MRA-8, YELLOW
G3522866	HWL Reaming Shell, Hard Welding	G4101564-9	PWL Impregnated Bit, MRA-9, PINK
G3522867	HWL Reaming Shell, Using Synthetic Diamond and Tungsten Carbide	G4101564-T.C	PWL Tungsten Carbide Bit
G3522868	HWL Reaming Shell, Tungsten Carbide Gauges	G4101798	PW Impregnated Casing Shoe
G4101563-1	HWL Impregnated Bit, MRA-1, BLACK	G4101799	PWL Impregnated Casing Shoe
G4101563-2	HWL Impregnated Bit, MRA-2, GREEN	G4101800	PW Tungsten Carbide Casing Shoe
G4101563-3	HWL Impregnated Bit, MRA-3, BLUE	G4101801	PWL Tungsten Carbide Casing Shoe
G4101563-4	HWL Impregnated Bit, MRA-4, BROWN	G3543989	PW Impregnated Casing Drive Shoe
G4101563-5	HWL Impregnated Bit, MRA-5, PURPLE		
G4101563-6	HWL Impregnated Bit, MRA-6, WHITE		

Part No	Description	Part No	Description
G41015643-1	PWL3 Impregnated Bit, MRA-1, BLACK	G41015643-7	PWL3 Impregnated Bit, MRA-7, RED
G41015643-2	PWL3 Impregnated Bit, MRA-2, GREEN	G41015643-7.T	PWL3 Impregnated Bit, MRA-7.T, RED TURBO
G41015643-3	PWL3 Impregnated Bit, MRA-3, BLUE	G41015643-8	PWL3 Impregnated Bit, MRA-8, YELLOW
G41015643-4	PWL3 Impregnated Bit, MRA-4, BROWN	G41015643-9	PWL3 Impregnated Bit, MRA-9, PINK
G41015643-5	PWL3 Impregnated Bit, MRA-5, PURPLE	G4101563-1.OS	PWL3 Impregnated Bit, MRA-1, BLACK, O/SIZE
G41015643-6	PWL3 Impregnated Bit, MRA-6, WHITE	G41015643-T.C	PWL3 Tungsten Carbide Bit

Normal Wear Patterns



New Condition



Ideal New Pattern

The face wear pattern of an impregnated bit should be relatively flat with slightly chamfered sides. Bit feels sharp, comet tails have formed to support diamonds. Diamonds release from matrix as they are worn. Gauge stays within tolerance.



Normal Retirement

Full depth of impregnation evenly consumed. Gauge stays within tolerance.

Irregular Wear Patterns



Concave Face Wear

(Rounded to Inner Diameter)
Cause: Often caused by excessive penetration rate for the RPM used. This can also be caused by core grinding, overdrilling.
Solution: Reduce penetration rate or increase RPM.



Concave Face Wear

(Rounded to Outer Diameter)
Cause: Insufficient water flow.
Solution: Check pump and rod string for leaks; increase pump output.



Gauge Loss ID

Cause:
(A) Overfeeding
(B) Broken formations
(C) Drilling over lost core
(D) Insufficient drilling fluid
Solution:
(A) Reduce penetration rate
(B) Cement or change to a lower series bit
(C) Check core barrel/core lifter/core lifter case
(D) Check inner tube length adjustment; check pump and rod string for leaks



Gauge Loss Outer Diameter

Cause:

- (A) Lack of circulation
- (B) Bit being reamed down under-size hole
- (C) Vibration

Solution:

- (A) Increase coolant flow rate
- (B) Check reamer shell gauge and replace if under-sized
- (C) After RPM



Excessive Diamond Exposure

Matrix abraded away before diamonds have worn sufficiently, resulting in high diamond exposure and low bit life.

Cause: Caused by overfeeding/overdrilling

Solution: Increase RPM, change to a lower series bit, or reduce bit weight.



Face Glazed

Bit does not feel sharp; diamonds flush w matrix; no significant "comet tails" behind each diamond. Snad blast face or use other recommended methods to re-expose diamond. If the face glazes repetedly, change to a higher bit.



Cracked Waterways

Cause:

- (A) Excessive bit load; dropped rods; free fall of (wireline) inner tube in dry hole
- (B) Bit crushed by rod holder, foot clamp or pipe wrench
- (C) Pushed down an undersized hole (i.e., reaming shell worn out).

Solution: Review proper operating procedures.



Burnt

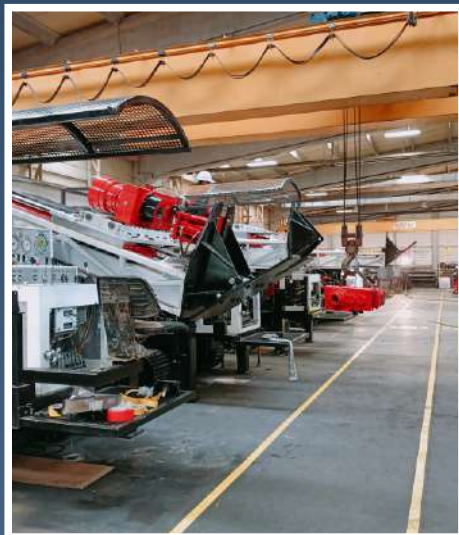
Cause:

- (A) Lack of fluid.
- (B) Too high of weight on bit being used

Solution: Check pump and rod string for leaks, check inner tube adjustment, maintain coolant flow rates.



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PROFESSIONAL'S CHOICE



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