



DLESP PACKER

9-5/8" X 3-1/2" X 2-3/8" X (1) 1" NPT
X (2) 3/8" NPT

Manual No:
DL-948-9625-1153

Revision: **B**

Revision Date:
08/18/2020

Authored by: J.Anderson

Approved by: K.Riggs

A) DESCRIPTION

The DLESP is a hydraulic set, mechanically held, Electric Submersible Pump (ESP) production packer, with secondary bores for ESP feed through cable and optional chemical feed through lines. Because no tubing manipulation is required to set this packer, the wellhead can be installed and flanged up before setting.

This packer is available with a variety of tubing connections. The packer features a sequential upper slip release system designed to release each slip individually to reduce the pull required to release it. The angles on the upper slips and upper slip body result in the slips releasing smoothly from the casing.

B) SPECIFICATION GUIDE

CASING		
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)
9-5/8	47.0 – 53.5	8.535 – 8.681

TOOL				
OD (INCHES)	LONG STRING ID, NOMINAL (INCHES)	SHORT STRING ID, NOMINAL (INCHES)	FEED-THROUGH TUBE ID, NOMINAL (INCHES)	PART NUMBER
8.312	2.94	1.94	0.50 (3/8" NPT) 1.05 (1" NPT)	94896-BAE-BAB-1

THREAD CONNECTION		
LONG STRING BOX UP / PIN DOWN	SHORT STRING BOX UP / BOX DOWN	FEED THRU TUBE BOX UP / BOX DOWN
3-1/2" EUE	2-3/8" EUE	1" NPT, 3/8" NPT

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
5,000 PSI	84,000 LBS*

*With all eight (8 qty) shear releasing screws.

SETTING				
SETTING AREA (IN ²)	SHEAR VALUE (PSI/SCREW)	INITIATION PRESSURE (PSI)	MINIMUM SETTING PRESSURE (PSI)	RECOMMENDED SETTING PRESSURE (PSI)
28.46	84	1,001	1,350	2,025

RELEASING
Shear release is adjustable from 15,000 to 40,000 lbs (5,000 lbs increments). Minimum of 3 shear screws required.

D & L OIL TOOLS
P.O. BOX 52220 TULSA, OK 74152
PHONE: (800) 441-3504 www.dloiltools.com



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C) PRE-INSTALLATION INSPECTION PROCEDURES

CAUTION₁: D&L ships tool connections made-up **HAND TIGHT**—labeled with hand-tight tape on the tool (Fig. 1)—unless stated otherwise. Tighten/torque all connections properly before operating tool.



Fig. 1

GENERAL THREAD CONNECTION TORQUE RECOMMENDATIONS			
STUB ACME / ACME THREADS	INTERNAL TAPERED TUBING THREADS		PREMIUM THREADS
	UP TO 2-3/8"	GREATER THAN 2-3/8"	
600 – 800 FT-LBS	600 – 800 FT-LBS	800 – 1,200 FT-LBS	Consult thread manufacturer's recommendations.

NOTE₁₀: Do not tighten long string mandrel (2) into flat top (1) with more than 200 ft-lbs of torque.

GENERAL SCREW TORQUE RECOMMENDATIONS									
SCREW SIZE (INCHES)	#6	#8	#10	1/4	5/16	3/8	7/16	1/2	5/8 and larger
TORQUE RANGE (INCH-POUNDS)	5 – 8	10 – 15	18 – 25	25 – 40	50 – 80	90 – 135	160 – 210	250 – 330	450 – 650

Before first use, D&L recommends disassembly and inspection of the tool unless stated otherwise. Ensure parts have not been damaged during shipping. Replace damaged parts with D&L replacement parts. Contact D&L sales for replacement part information.

Re-assemble the tool after inspection. Install parts in the correct order and orientation. Properly tighten connections.

Before re-using the tool, D&L recommends disassembly and inspection of the tool. Clean parts and ensure parts are in good working condition. Replace worn or damaged parts with D&L replacement parts.

When redressing the tool, D&L recommends replacement of all seals, elements, o-rings, shear screws, etc. Contact D&L sales for redress kit and/or other replacement part information.

D) OPERATION

CAUTION₂: If not running chemical feed through lines, make sure that the unused feed through bores in the top of the packer have plugs properly installed.

CAUTION₃: Do not run the tool without properly tightening connections. Running the tool with loose connections may damage the tool and cause malfunction.

When tubing pressure is applied to the packer, the inlet port allows pressure differential to be present in the setting chamber. This differential forces the setting mandrel to separate from the setting cylinder, shearing the setting shear screws. The setting cylinder is forced down, which shears the lower slip body shear screws and sets the lower slips. The setting mandrel is forced up, which shears the upper slip body shear screws, and sets the upper slips and packs off the elements. Any relative motion between the setting cylinder and the setting mandrel is held in place by the locking nut, which will ratchet in only one direction. With a pressure differential from above, the force is transferred through the outer components of the packer and is supported by the lower slips. With the pressure differential from below, the force transfers through the outer components of the packer and is supported by the upper slips.

D-1) SETTING PROCEDURES

Running speed is critical, especially in heavy or viscous fluid where excess speed can result in swabbing off the packing element or in creating pressure waves which could lead to creating a preset condition. As a guide it is recommended that running speed should not be more than 30 seconds per joint (range II or 30 feet). **Do not exceed this speed**, particularly when running the packer in the heaviest weight casing for the range for which the packer is dressed.



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D) OPERATION (cont'd)

A run in the well with a junk basket and suitable sized gauge ring or a bit and scraper is strongly recommended prior to running. The location of any tight spots should be noted and the running speed for the packer through these spots should be reduced.

Being a hydraulically set packer, it can be subject to preset conditions by pressure waves through the fluid. A slow steady running speed should be used and sudden stops and starts, such as when setting or pulling slips, should be avoided. Make up the packer to the tubing string in the desired position and to the required torque.

Allow at least 30 minutes for the packer to equalize thermally before setting. Temporarily plug the long string below the packer and apply a minimum of 1,350 psi differential in the tubing at the packer and hold it for 30 minutes. The packer should now be fully set and can be pressure tested if desired.

D-2) RELEASING PROCEDURES

The packer is released by a straight pick up on the long string.

The standard mandrel can carry a maximum of 124,000 lbs below the packer. If the combined force from the releasing shear segment plus the weight below the tool exceeds 124,000 lbs, a telescoping union should be run directly below the packer.

E) ELASTOMER TRIM TEMPERATURE GUIDE

TEMPERATURE RANGE (F°)			
TEMPERATURE RANGE (F°)	DUROMETER		
	END	MIDDLE	END
40° - 125°	60	60	60
125° - 300°	80	70	80
300° +	Contact D&L Sales		

RUBBER TYPE	TEMPERATURE RANGE
NITRILE	40° - 250°F
HSN (HNBR)	70° - 300°F
VITON	100° - 350°F

F) RECOMMENDED HAND TOOLS

- VISE
- GLOVES
- ALLEN WRENCHES
- TAPE MEASURE
- O-RING PICK
- BAR
 - 1/2-INCH
 - 3/4-INCH
- PAINT BRUSH, 2-INCH
- PIPE WRENCH, 3-FT (2 EA)
- "CHEATER" PIPE, 4-FT LONG
- ADJUSTABLE WRENCH, 12-INCH
- CORDLESS DRILL, 18V
- SNAP RING SPREADER PLIERS
- ALIGNING PUNCH
- BOLTS, 1/4-20 X 1-1/4" LONG (4EA)
- SCREWDRIVER SET, FLAT-TIPPED
- SOCKET SETS
 - 3/8-INCH DRIVE
 - 1/2-INCH DRIVE
- HAMMERS
 - SLEDGE
 - BALL PEEN
 - DEAD BLOW

G) DISASSEMBLY

NOTE6: Ensure vise is capable of handling weight of tool.

NOTE7: Support tool during disassembly and assembly with jack stands as necessary.

G-1) Clamp flat top (1) in vise.

G-1.1) Unscrew and remove top sub (26) from handling pup (30).

G-1.1.1) Remove o-rings (36) from top sub (26).

G-1.2) Unscrew and remove handling pup (30) from flat top (1).

G-1.3) Unscrew and remove short string top sub (27) from short string handling pup (8).

G-1.3.1) Remove o-rings (35) from top sub (27).



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G) DISASSEMBLY (cont'd)

- G-1.4) Unscrew and remove handling pup (8) from flat top (1).
- G-1.5) Moving to lower end of tool, unscrew and remove bottom sub (25) from long string mandrel (2).
 - G-1.5.1) Remove o-rings (36) from bottom sub (25).
- G-1.6) Unscrew and remove short string bottom sub (24) from from short string handling pup (8).
 - G-1.6.1) Remove o-rings (35) from bottom sub (24).
- G-1.7) Unscrew and remove handling pup (8) from lower slip body cap (16).
- G-1.8) Unscrew and remove shear screws (20) from shear sleeve (19).
- G-1.9) Unscrew and remove shear sleeve (19) from lower slip body cap (16).
- G-1.10) Unscrew and remove cap screws (22) from lower cone (29).
- G-1.11) Unscrew and remove shear screws (18) from lower slip body (10).
- G-1.12) Wedge lower slips (15) outwards (if needed). Remove lower slip body assembly and disassemble:
 - G-1.12.1) Remove wedges (if needed). Remove slip springs (21) and lower slips (15) from lower slip body (10).
 - G-1.12.2) Unscrew and separate lower slip body (10) from lower slip body cap (16).
 - G-1.12.3) Remove o-rings (31, 33, 35) from lower slip body cap (16).
- G-1.13) Remove pick-up ring (23) from long string mandrel (2)
- G-1.14) Remove setting mandrel assembly and disassemble:
 - G-1.14.1) Unscrew and remove lower cone (29) from setting chamber (28).
 - G-1.14.1.1) Remove o-rings (31, 33, 35, 36, 37) from lower cone (29).
 - G-1.14.2) Unscrew and remove lock ring (17) from lower end of setting chamber (28) and setting mandrel (11).

NOTE₁: Using snap ring spreader pliers, lock ring (17) may be spread slightly to be removed.
 - G-1.14.3) Unscrew and remove shear screws (18) from setting chamber (28).
 - G-1.14.4) Remove setting mandrel (11) from setting chamber (28).
 - G-1.14.4.1) Remove o-rings (31, 33, 35, 36) from setting mandrel (11).
 - G-1.14.4.2) Remove o-rings (38) from setting chamber (28).
- G-1.15) Remove elements (13, 14) and rubber spacers (12) from short string mandrel (3), long string mandrel (2), and feed-through tubes (4, 9).
- G-1.16) Unscrew and remove cap screws (22) from upper cone (5).
- G-1.17) Unscrew and remove shear screws (18) from upper slip body (6).
- G-1.18) Wedge upper slips (7) outwards (if needed). Remove upper cone (5) from upper slip body (6).
 - G-1.18.1) Remove o-rings (31, 33, 35, 31) from upper cone (5).
- G-1.19) Unscrew and remove upper slip body (6) from flat top (1).
 - G-1.19.1) Remove wedges (if needed). Remove slip springs (21) and upper slips (7) from upper slip body (6).
- G-1.20) Unscrew and remove long string mandrel (2), short string mandrel (3) and feed-through tubes (4, 9) from flat top (1).

NOTE₃: Flats are provided on mandrels and tubes for wrenching.

CAUTION₄: Do NOT wrench or clamp on seal surfaces.
- G-2) Unclamp and remove flat top (1) from vise.
 - G-2.1) Remove o-rings (32, 34, 35, 36) from flat top (1).



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H) ASSEMBLY

NOTE5: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.

CAUTION5: To ensure tool operates properly, install o-rings in o-ring grooves **NOT** thread reliefs unless stated otherwise (Fig. 2).

NOTE6: Ensure vise is capable of handling weight of tool.

NOTE7: Support tool during disassembly and assembly with jack stands as necessary.

H-1) Install o-rings (32, 34, 35, 36) in o-ring grooves in flat top (1).

H-2) Clamp flat top (1) in vise.

H-2.1) Screw long string mandrel (2), short string mandrel (3) and feed-through tubes (4, 9) into flat top (1).

NOTE3: Flats are provided on mandrels and tubes for wrenching.

CAUTION4: Do NOT wrench or clamp on seal surfaces.

H-2.2) Assemble upper slip body assembly and install:

H-2.2.1) Install slip springs (21) in place in upper slip body (6). Tips on springs must go in holes in upper slip body (6).

NOTE8: Install three (3 ea) springs per slip (Fig. 3).

H-2.2.2) Install upper slips (7) into windows in upper slip body (6). Wedge slips outwards.

H-2.2.3) Screw upper slip body (6) onto flat top (1).

H-2.3) Install o-rings (31, 33, 35, 36) in o-ring grooves in upper cone (5)

H-2.4) Install upper cone (5) into upper slip body (6). Align threaded holes in upper cone (5) with counterbore holes and slots in upper slip body (6)

CAUTION6: Do NOT rip or tear o-rings while installing.

H-2.5) Screw cap screws (22) into upper cone (5).

H-2.6) Screw shear screws (18) into upper slip body (6). Tighten until shear screws (18) contact upper cone (5). Back shear screws (18) out 1/4 turn. Remove wedges.

H-2.7) Install elements (13, 14) and rubber spacers (12) onto short string mandrel (3), long string mandrel (2), and feed-through tubes (4, 9).

H-2.8) Assemble setting mandrel assembly and install:

H-2.8.1) Install o-rings (31, 33, 35, 36) in o-ring grooves in setting mandrel (11).

H-2.8.2) Install o-rings (38) in o-ring grooves in setting chamber (28).

H-2.8.3) Gently tap setting mandrel (11) into setting chamber (28). Align shear screw groove in setting mandrel (11) with threaded holes in setting chamber (28).

CAUTION6: Do NOT rip or tear o-rings while installing.

H-2.8.4) Temporarily screw one shear screw (18) into setting chamber (28) to hold parts together.

H-2.8.5) Install lock ring (17) into bottom end of setting chamber (28) and screw onto setting mandrel (11). Keep lock ring (25) in smooth part of setting chamber (28) to avoid premature setting.

H-2.8.6) Install o-rings (31, 33, 35, 36, 37) in o-ring grooves in lower cone (29).

H-2.8.7) CAREFULLY screw lower cone (29) into setting chamber (28) until they shoulder.

CAUTION6: Do NOT rip or tear o-rings while installing.

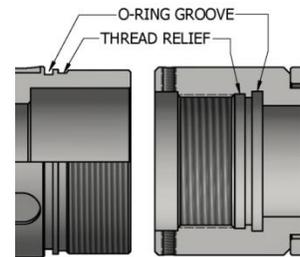


Fig. 2



Fig. 3



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H) ASSEMBLY (cont'd)

H-2.8.8) Unscrew and remove shear screw (18) from setting chamber (28). Rotate setting chamber (28) and lower cone (29) in right-hand motion to align holes for long string mandrel, short string mandrel, and feed-through tubes.

H-2.8.9) Screw shear screws (18) into setting chamber (28). Tighten until shear screws (18) contact setting mandrel (11). Back shear screws (18) out 1/4 turn.

H-2.8.10) Back up on setting chamber (28) with wrench and back off lower cone (29) to align holes for long string mandrel, short string mandrel, and feed-through tubes.

H-2.8.11) Install setting mandrel assembly onto long string mandrel (2), short string mandrel (3), and feed-through tubes (4, 9).

CAUTION₆: Do NOT rip or tear o-rings while installing.

H-2.9) Install pick-up ring (23) in pick-up ring groove in long string mandrel (2).

H-2.10) Assemble lower slip body assembly and install:

H-2.10.1) Install o-rings (31, 33, 35) in o-ring grooves in lower slip body cap (16).

H-2.10.2) Screw lower slip body (10) onto lower slip body cap (16).

H-2.10.3) Install slip springs (21) in place in lower slip body (10). Tips on springs must go in holes in lower slip body (10).

NOTE₈: Install three (3 ea) springs per slip (Fig. 4).



Fig. 4

H-2.10.4) Install lower slips (15) into windows in lower slip body (10). Wedge slips outwards.

H-2.10.5) Install lower slip body assembly onto short string mandrel, long string mandrel, and feed-through tube and onto lower cone (29).

H-2.11) Align threaded holes in lower cone (29) with holes and slots in lower slip body (10). Screw cap screws (22) into lower cone (29). Remove wedges.

NOTE₂: Back off lower slip body (10) as needed to align slots with threaded holes.

CAUTION₆: Do NOT rip or tear o-rings while installing.

H-2.12) Screw shear screws (18) into lower slip body (10). Tighten until shear screws (18) contact lower cone (29). Back shear screws (18) out 1/4 turn.

H-2.13) Screw shear sleeve (19) into lower slip body cap (16) until shouldered. Back off shear sleeve (19) as needed to align threaded holes in shear sleeve (19) with shear groove in long string mandrel (2).

H-2.14) Screw shear screws (20) into shear sleeve (19). Tighten until shear screws (20) contact long string mandrel (2). Back shear screws (20) out 1/4 turn.

NOTE₄: Install a minimum of three (3 qty) shear screws (20). Install additional shear screws (20) as needed to achieve desired shear value.

H-2.15) Install o-rings (36) in o-ring grooves in bottom sub (25).

H-2.16) Screw bottom sub (25) onto long string mandrel (2).

CAUTION₆: Do NOT rip or tear o-rings while installing.

H-2.17) Screw short string handling pup (8) into lower slip body cap (16).

CAUTION₆: Do NOT rip or tear o-rings while installing.

H-2.18) Install o-rings (35) in o-ring grooves in short string bottom sub (24).

H-2.19) Screw bottom sub (24) onto handling pup (8).

CAUTION₆: Do NOT rip or tear o-rings while installing.

H-2.20) Moving to upper end of tool, screw handling pup (30) into flat top (1).

CAUTION₆: Do NOT rip or tear o-rings while installing.



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H) ASSEMBLY (cont'd)

H-2.21) Install o-rings (36) in o-ring grooves in top sub (26).

H-2.22) Screw top sub (26) onto handling pup (30).

CAUTION: Do NOT rip or tear o-rings while installing.

H-2.23) Screw short string handling pup (8) into flat top (1).

CAUTION: Do NOT rip or tear o-rings while installing.

H-2.24) Install o-rings (35) in o-ring grooves in short string top sub (27).

H-2.25) Screw top sub (27) onto handling pup (8).

CAUTION: Do NOT rip or tear o-rings while installing.

H-3) Unclamp flat top (1) from vise and remove assembled tool.

NOTE: If pressure testing of the packer is desired, refer to technical manual *DL-945-9625-1206*. Pressure testing of the packer is not mandatory.

I) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	PART NUMBER
1	1	FLAT TOP	DLMS80	94896608EB3
2	1	LONG STRING MANDREL	DLMS110	94535202
3	1	SHORT STRING MANDREL	DLMS80	94520210
4	1	FEED THROUGH TUBE 1" NPT	DLMS80	94510210
5	1	UPPER CONE	DLMS80	94896400EB3
6	1	UPPER SLIP BODY	DLMS80	94596320
7	4	UPPER SLIP	DLMS35	94596115
8	2	HANDLING PUP 2-3/8	DLMS80	90420223-B
9	2	FEED THROUGH TUBE 3/8 NPT	DLMS60	94537210
10	1	LOWER SLIP BODY	DLMS80	94596315
11	1	SETTING MANDREL	DLMS80	94896751EB3
12	2	RUBBER SPACER	DLMS80	94896840EB3
13	1	ELEMENT	70 DURO NITRILE	94896511EB3
14	2	ELEMENT	80 DURO NITRILE	94896512EB3
15	4	LOWER SLIP	DLMS35	94596130
16	1	LOWER SLIP BODY CAP	DLMS80	94896338EB3
17	1	LOCK RING	DLMS80	94596725
18	20	SHEAR SCREW (2375#)	DLM360BRS	60100990
19	1	SHEAR SLEEVE	DLMS80	94596741-1
20	8	SHEAR SCREW (5000#) 1/2-13 W/ .418 DOG POINT	DLM360BRS	65050902



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I) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	PART NUMBER
21	24	TAPERED SLIP SPRING	DLMINC750	DL94829
22	4	CAP SCREW 3/8-16 UNC X 3/8	STEEL	SCS037C037
23	1	PICK-UP RING	DLMS110	94535915
24	1	SHORT STRING BOTTOM SUB	DLMS80	90420630
25	1	LONG STRING BOTTOM SUB	DLMS80	90435631
26	1	LONG STRING TOP SUB	DLMS80	90435610
27	1	TOP SUB 2-3/8	DLMS80	90420610
28	1	SETTING CHAMBER	DLMS110	94596755
29	1	LOWER CONE	DLMS80	94896420EB3
30	1	HANDLING PUP 3-1/2	DLMS110	90495221-C
31	12	115 O-RING	90 DURO NITRILE	90115
32	2	117 O-RING	90 DURO NITRILE	90117
33	6	126 O-RING	90 DURO NITRILE	90126
34	1	128 O-RING	90 DURO NITRILE	90128
35	16	142 O-RING	90 DURO NITRILE	90142
36	13	153 O-RING	90 DURO NITRILE	90153
37	2	169 O-RING	90 DURO NITRILE	90169
38	2	170 O-RING	90 DURO NITRILE	90170

REDRESS KIT (RDK)	94896-E-B-3-050
ASSEMBLED WEIGHT	658 LBS



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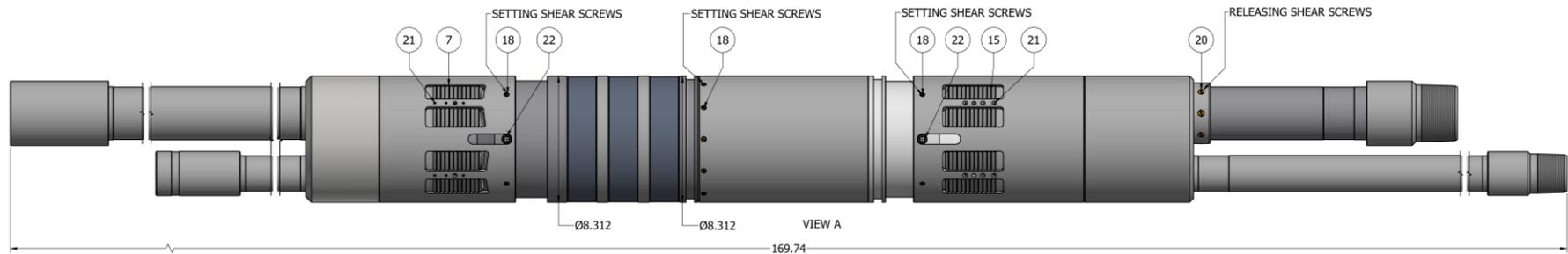
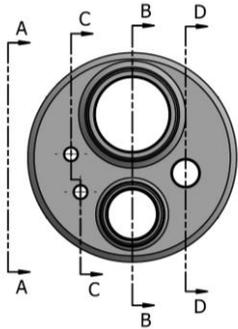
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J) TECHNICAL ILLUSTRATION





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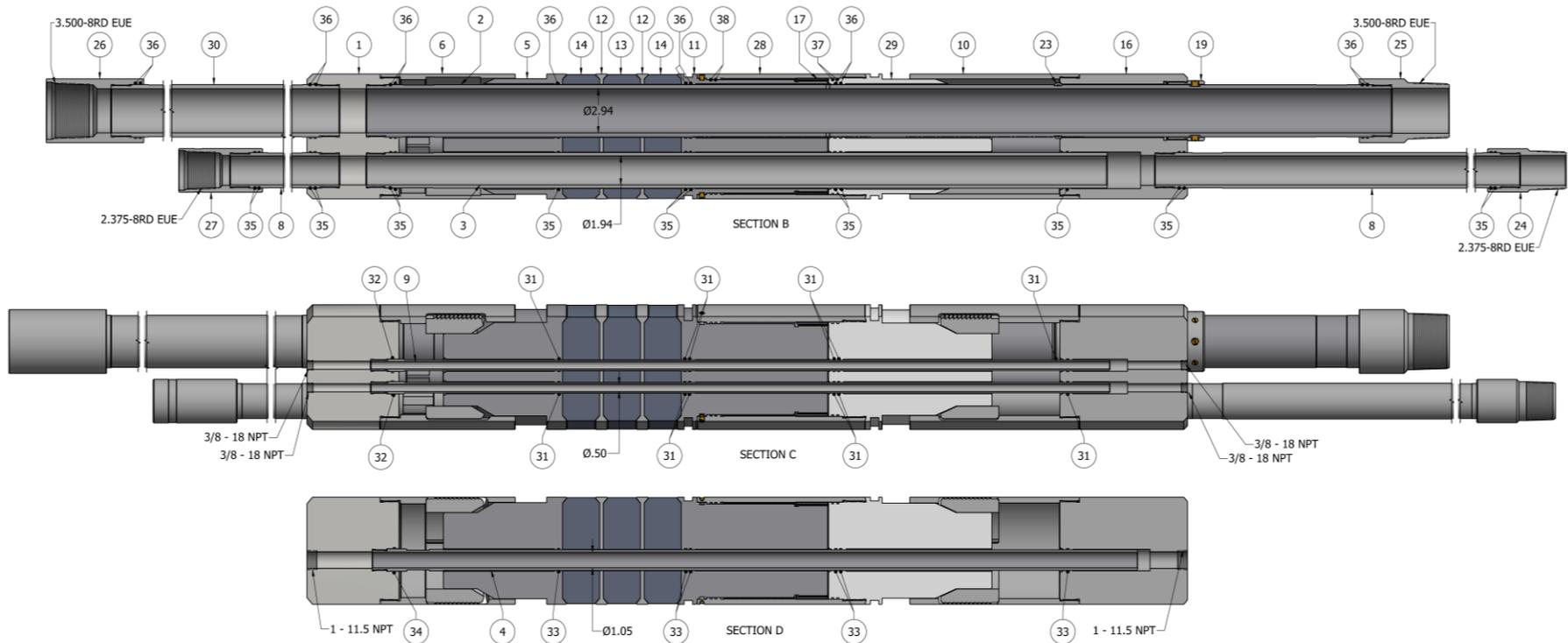
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J) TECHNICAL ILLUSTRATION (cont'd)



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K) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
08/18/2020	B	Corrected short string thread connection in Spec. Guide; Replaced Pressure Test section with Note9	J.Anderson	D.Hushbeck
08/06/2018	A	Created new manual	-	-