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)
7	17.0 – 26.0	6.276 – 6.538

TOOL			**PART NUMBER**
OD (INCHES)	**LONG STRING ID** (INCHES)	**FEED THRU HOLES ID** (INCHES)	
6.062	2.39	0.42	94872-BAC-1 94872H-BAC-1[1] 94872V-BAC-1[2] 94872C-BAC-1[3] 94872HC-BAC-1[4] 94872VC-BAC-1[5]

Tool Options: [1]HSN, [2]Viton, [3]Nitrile, Carbide, [4]HSN, Carbide, [5]Viton, Carbide

THREAD CONNECTION	
LONG STRING BOX UP / PIN DOWN	**FEED THRU HOLES** BOX UP / BOX DOWN
2-7/8 EUE	1/4 NPT

DIFFERENTIAL PRESSURE (MAX)	**TENSILE LOAD THRU TOOL** (MAX)
5,000 PSI	61,000 LBS*

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

SETTING				
SETTING AREA (SQ INCHES)	**SHEAR VALUE** (PSI/SCREW)	**INITIATION PRESSURE** (PSI)	**MINIMUM SETTING PRESSURE** (PSI)	**RECOMMENDED SETTING PRESSURE** (PSI)
16.10	148	1,180	1,739	2,609

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

C) PRE-INSTALLATION INSPECTION PROCEDURES

CAUTION$_1$: 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.

NOTE$_2$: Do not tighten long string mandrel (10) 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

CAUTION$_2$: 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.

CAUTION$_3$: 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.

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 1,739 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 61,000 lbs below the packer. If the combined force required to release the shear segment plus the weight below the tool exceeds 61,000 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

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

G-1.1) From upper end of tool, unscrew and remove top sub (23) from pup joint (21).

G-1.1.1) Remove o-rings (30) from top sub (23).

G-1.2) Unscrew and remove pup joint (21) from flat top (1).

G-1.3) Moving to lower end of tool, unscrew and remove bottom sub (24) from long string mandrel (2).

G-1.3.1) Remove o-rings (32) from bottom sub (24).

G-1.4) Unscrew and remove shear screws (22) from shear sleeve (16).

G-1.5) Unscrew and remove shear sleeve (16) from lower slip body cap (15).

G) DISASSEMBLY (cont’d)

G-1.6) Unscrew and remove low head cap screws (18) from lower cone (13).

G-1.7) Unscrew and remove shear screws (17) from lower slip body (14).

G-1.8) Wedge lower slips (20) outwards. Remove lower slip body assembly and disassemble:

G-1.8.1) Remove wedges (if needed). Remove lower slips (20) from lower slip body (14).

G-1.8.1.1) Unscrew and remove button head cap screws (5) from lower slips (20) and remove slip springs (4).

G-1.8.2) Unscrew and remove lower slip body (14) from lower slip body cap (15).

G-1.8.3) Remove o-ring (28) from lower slip body cap (15).

G-1.9) Remove pick-up ring (26) from long string mandrel (2).

G-1.10) Remove setting mandrel assembly and disassemble:

G-1.10.1) Unscrew and remove lower cone (13) from setting chamber (12).

G-1.10.1.1) Remove o-rings (28, 30, 33) from lower cone (13).

G-1.10.2) Unscrew and remove lock ring (25) from lower end of setting mandrel (11).

G-1.10.3) Unscrew and remove shear screws (17) from setting chamber (12).

G-1.10.4) Remove setting mandrel (11) from setting chamber (12).

G-1.10.4.1) Remove o-rings (28, 30) from setting mandrel (11).

G-1.10.4.2) Remove o-rings (31) from setting chamber (12).

G-1.11) Remove elements (8, 10) and rubber spacers (9) from long string mandrel (2) and feed through tube (3).

G-1.12) Unscrew and remove low head cap screws (18) from upper cone (7).

G-1.13) Unscrew and remove shear screws (17) from upper slip body (6).

G-1.14) Wedge upper slips (19) outwards (if needed). Remove upper cone (7) from upper slip body (6).

G-1.14.1) Remove o-rings (28, 30) from upper cone (7).

G-1.15) Unscrew and remove upper slip body (6) from flat top (1)

G-1.16) Remove wedges (if needed). Remove upper slips assemblies from upper slip body (6) and disassemble:

G-1.16.1) Unscrew and remove button head cap screws (5) from upper slips (19) and remove slip springs (4).

G-1.17) Unscrew and remove long string mandrel (2) from flat top (1).

CAUTION$_4$: Do NOT wrench or clamp on seal surfaces.

NOTE$_3$: Flats are provided for wrenching.

G-1.18) Unscrew and remove feed-through tube (3) from flat top (1).

NOTE$_3$: Flats are provided for wrenching.

CAUTION$_4$: Do NOT wrench or clamp on seal surfaces.

G-2) Unclamp and remove flat top (1) from vise.

G-2.1) Remove o-rings (29, 30) from flat top (1).

H) ASSEMBLY

NOTE$_1$: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.

CAUTION$_5$: To ensure tool operates properly, install o-rings in o-ring grooves **NOT** thread reliefs (Fig. 2).

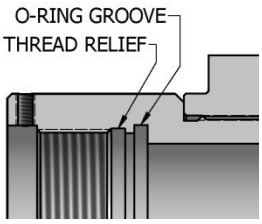


Fig. 2

H-1) Install o-rings (29, 30) in o-ring grooves in flat top (1).

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

H) ASSEMBLY (cont’d)

H-2.1) Screw pup joint (21) into flat top (1).

CAUTION$_6$: Do NOT rip or tear o-rings while installing.

H-2.2) Insert o-rings (30) in o-ring grooves in top sub (23).

H-2.3) Screw top sub (23) onto pup joint (21).

CAUTION$_6$: Do NOT rip or tear o-rings while installing.

H-2.4) Screw feed-through tube (3) into flat top (1).

NOTE$_3$: Flats are provided for wrenching.

CAUTION$_4$: Do NOT wrench or clamp on seal surfaces.

H-2.5) Screw long string mandrel (2) into flat top (1).

NOTE$_3$: Flats are provided for wrenching.

CAUTION$_4$: Do NOT wrench or clamp on seal surfaces.

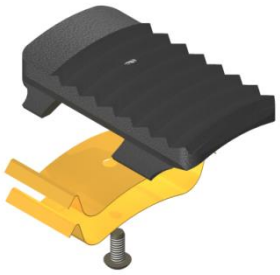


Fig. 3

H-2.6) Assemble upper slip assemblies and install:

H-2.6.1) Place slip springs (4) onto upper slips (19) and screw button head cap screws (5) into upper slips (19) to secure slip springs (4).

NOTE$_4$: Install two (2ea) springs per slip (Fig. 3).

H-2.6.2) Install upper slip assemblies into upper slip body (6). Wedge slips outwards.

H-2.7) Screw upper slip body (6) onto flat top (1).

H-2.8) Install o-rings (28, 30) in o-ring grooves in upper cone (7).

H-2.9) Install upper cone (7) into upper slip body (6). Align threaded holes in upper cone (7) with slots in upper slip body (6).

CAUTION$_6$: Do NOT rip or tear o-rings while installing.

H-2.10) Screw low head cap screws (18) into upper cone (7).

H-2.11) Screw shear screws (17) into upper slip body (6). Tighten until shear screws (17) contact upper cone (7). Back shear screws (17) out 1/4 turn. Remove wedges.

H-2.12) Install elements (8, 10) and rubber spacers (9) onto feed through tube (3) and long string mandrel (2).

H-2.13) Assemble setting mandrel assembly and install:

H-2.13.1) Install o-rings (28, 30) in o-ring grooves in setting mandrel (11).

H-2.13.2) Install o-rings (32) in o-ring grooves in setting chamber (12).

H-2.13.3) Gently tap setting mandrel (11) into setting chamber (12).

CAUTION$_6$: Do NOT rip or tear o-rings while installing.

H-2.13.4) Align threaded holes in setting chamber (12) with groove in setting mandrel (11). Screw one (1 qty) shear screw (17) into setting chamber (12) to hold parts together temporarily.

H-2.13.5) Install lock ring (25) into bottom end of setting chamber (12) and screw onto setting mandrel (11). Keep lock ring (25) in smooth part of setting chamber (12) to avoid premature setting.

NOTE$_5$: Spread lock ring (25) to hold a gap of 3/4” to 1”.

H-2.13.6) Install o-rings (28, 30, 33) in o-ring grooves in lower cone (13).

H-2.13.7) CAREFULLY screw lower cone (13) into setting chamber (12) until they shoulder.

CAUTION$_6$: Do NOT rip or tear o-rings while installing.

H-2.13.8) Remove shear screw (17) from setting chamber (12). Rotate setting chamber (12) and lower cone (13) in right-hand motion to align holes for long string mandrel (2) and feed through tube (3).

H) ASSEMBLY (cont’d)

H-2.13.9) Screw shear screws (17) into setting chamber (12). Tighten until shear screws (17) contact setting mandrel (11). Back shear screws (17) out 1/4 turn.

H-2.13.10) Back up on setting chamber (12) with a wrench while backing off lower cone (13) to re-align holes for long string mandrel (2) and feed through tube (3).

H-2.13.11) Install setting mandrel assembly onto long string mandrel (2) and feed through tube (3).

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

H-2.14) Install pick-up ring (19) in groove in long string mandrel (2).

H-2.15) Assemble lower slip body assembly and install:

H-2.15.1) Install o-ring (28) in o-ring grooves in lower slip body cap (15).

H-2.15.2) Screw lower slip body (14) onto lower slip body cap (15).

H-2.15.3) Assemble lower slip assemblies and install:

H-2.15.3.1) Place slip springs (4) onto lower slips (20) and screw button head cap screws (5) into lower slips (20) to secure slip springs (4).

NOTE4: Install two (2ea) springs per slip (Fig. 4).

Fig. 4

H-2.15.3.2) Install lower slip assemblies onto lower slip body (14). Wedge slips outwards.

H-2.15.4) Install lower slip body assembly onto feed through tube (3) and long string mandrel (2) and onto lower cone (13).

NOTE6: Back off lower slip body cap (15) as needed to align feed through tube (3) and long string mandrel (2).

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

H-2.16) Align threaded holes in lower cone (13) with slots in lower slip body (14). Screw low head cap screws (18) into lower cone (13).

H-2.17) Screw shear screws (17) into lower slip body (14). Tighten until shear screws (17) contact lower cone (13). Back shear screws (17) out 1/4 turn. Remove wedges.

H-2.18) Screw shear sleeve (16) into lower slip body cap (15) until shouldered.

H-2.19) Screw shear screws (22) into shear sleeve (16). Tighten until shear screws (22) contact long string mandrel (2). Back shear screws (22) out 1/4 turn.

NOTE7: Install a minimum of three (3 qty) shear screws (22). Install additional shear screws (22) as needed to achieve desired shear value.

H-2.20) Install o-rings (32) in o-ring grooves in bottom sub (24).

H-2.21) Screw bottom sub (24) onto long string mandrel (2).

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

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

NOTE9: If pressure testing of the packer is desired, refer to technical manual *DL-945-7000-1219*. Pressure testing of the packer is not mandatory.

I) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 94872-BAC-1
1	1	FLAT TOP	DLMS80	94870600C1
2	1	LONG STRING MANDREL	DLMS110	94527200-SA
3	1	FEED THROUGH TUBE	DLMS60	94537210
4	16	SLIP SPRING	-	72455950
5	8	BUTTON HEAD SOCKET CAP SCREW #10-24 UNC X 1/4	STEEL	BHSC1024C025
6	1	UPPER SLIP BODY	DLMS110	94572322
7	1	UPPER CONE	DLMS80	94872400C1
8	2	ELEMENT	80 DURO NITRILE	94872512C1
9	2	RUBBER SPACER	DLMS80	94872841C1
10	1	ELEMENT	70 DURO NITRILE	94872511C1
11	1	SETTING MANDREL	DLMS80	94872751C1
12	1	SETTING CHAMBER	DLMS110	94572780
13	1	LOWER CONE	DLMS80	94872420C1
14	1	LOWER SLIP BODY	DLMS80	94572372
15	1	LOWER SLIP BODY CAP	DLMS80	94870336C1
16	1	SHEAR SLEEVE	DLMS110	94570741
17	16	SHEAR SCREW (2375#)	DLM360BRS	60100990
18	4	LOW HEAD SOCKET CAP SCREW 3/8-16 UNC X 5/16	STEEL	LHSC037C031
19	4	UPPER SLIP	DLMS35	90572111
20	4	LOWER SLIP	DLMS35	90572131
21	1	HANDLING PUP	DLMS80	90470221
22	8	SHEAR SCREW (5000#)	DLM464BRS	65050902
23	1	COUPLING	DLMS80	CP-BAC-AB281B-1
24	1	LONG STRING BOTTOM SUB	DLMS80	90427631
25	1	LOCK RING	DLMS80	94570725
26	1	PICK-UP RING	DLMS110	94570761
27	1	REDUCER BUSHING	DLMS80	948075M025F
28	6	115 O-RING	90 DURO NITRILE	90115
29	1	117 O-RING	90 DURO NITRILE	90117
30	11	150 O-RING	90 DURO NITRILE	90150
31	2	161 O-RING	90 DURO NITRILE	90161
32	2	233 O-RING	90 DURO NITRILE	90233
33	2	160 O-RING	90 DURO NITRILE	90160

REDRESS KIT (RDK)		94872-B-1-050
ASSEMBLED WEIGHT		353 LBS

I) PARTS LIST (cont’d)

I-1) ELASTOMER TRIM OPTIONS

NOTE$_8$: For temperature range, refer to Elastomer Trim Temperature Guide.

I-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 94872H-BAC-1
8	2	ELEMENT	80 DURO HSN	94872512C1H
10	1	ELEMENT	70 DURO HSN	94872511C1H
28	6	115 O-RING	90 DURO HSN	90115H
29	1	117 O-RING	90 DURO HSN	90117H
30	11	150 O-RING	90 DURO HSN	90150H
31	2	161 O-RING	90 DURO HSN	90161H
32	2	233 O-RING	90 DURO HSN	90233H
33	2	160 O-RING	90 DURO HSN	90160H

REDRESS KIT (RDK)		94872-B-1-050H

I-1.2) VITON

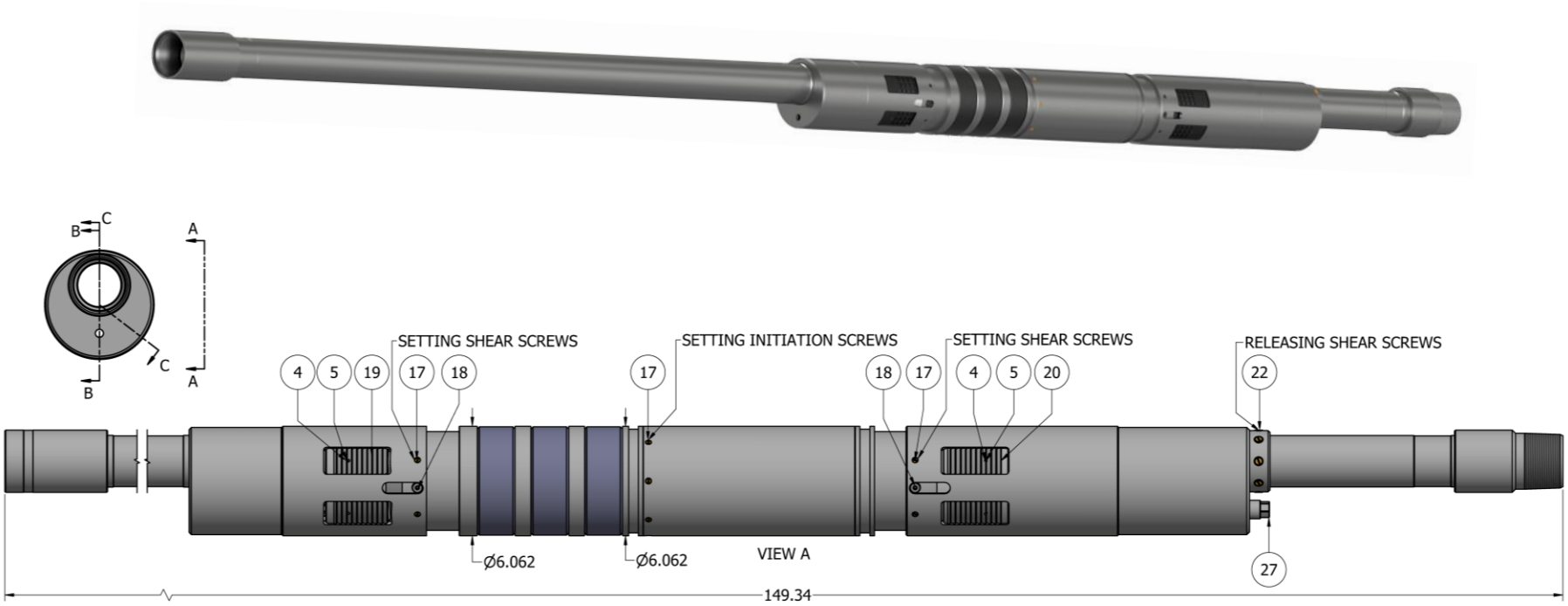
ITEM	QTY	DESCRIPTION	MATERIAL	P/N 94872V-BAC-1
8	2	ELEMENT	80 DURO VITON	94872512C1V
10	1	ELEMENT	70 DURO VITON	94872511C1V
28	6	115 O-RING	90 DURO VITON	90115V
29	1	117 O-RING	90 DURO VITON	90117V
30	11	151 O-RING	90 DURO VITON	90151V
31	2	161 O-RING	90 DURO VITON	90161V
32	2	233 O-RING	90 DURO VITON	90233V
33	2	160 O-RING	90 DURO VITON	90160V

REDRESS KIT (RDK)		94872-B-1-050V

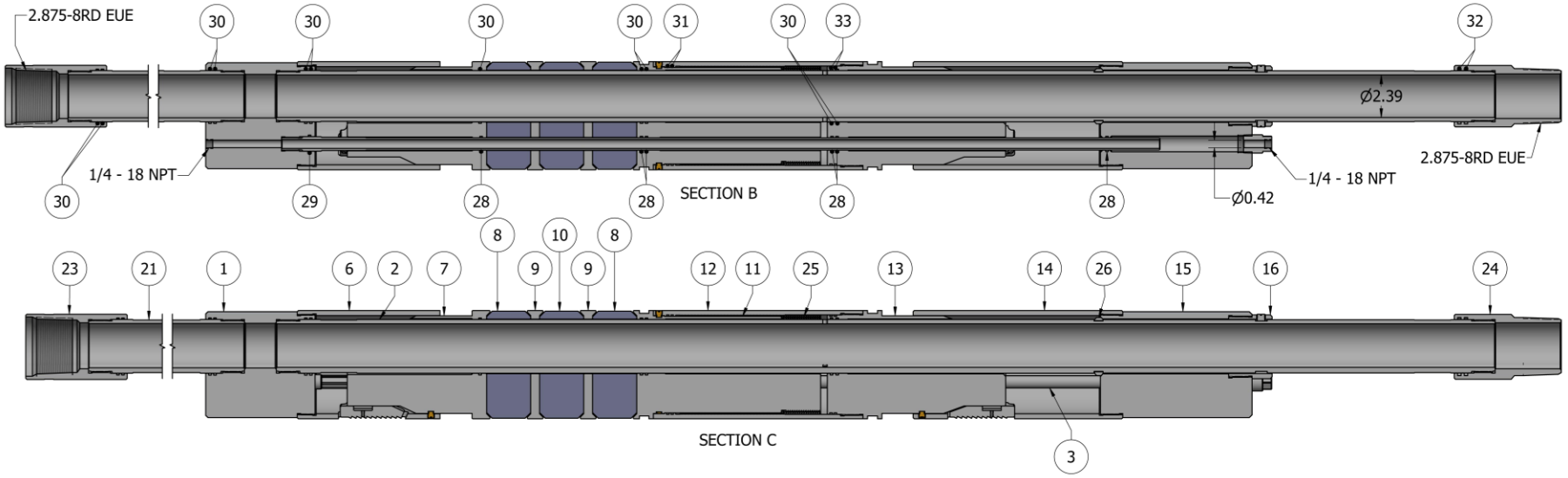
I-2) CARBIDE OPTIONS

19	4	CARBIDE UPPER SLIP	DLMS110	90572111C
20	4	CARBIDE LOWER SLIP	DLMS110	90572131C

J) TECHNICAL ILLUSTRATION



J) TECHNICAL ILLUSTRATION (cont’d)



K) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
06/28/2022	B	Added elastomer and carbide options, P/N 90160; revised P/N 90161 qty was 4	J.Anderson	
02/24/2020	A	Created new manual	-	-