A) DESCRIPTION

The Permanent Hydraulic Isolation Packer is a robust production packer capable of handling large amounts of weight hung below the packer. This packer features a large ID for increased flow potential. This packer also has upper and lower centralizing slips which increases its ability to set in deviated sections of wells. This packer uses our proven Permapak components.

The setting equipment for the Permanent Hydraulic Isolation Packer is built into the packer. It requires pressurizing the tubing/casing it is run on once the packer reaches setting depth.

B) SPECIFICATION GUIDE

CASING			TOOL		THREAD CONNECTION BOX UP / PIN DOWN	PART NUMBER
SIZE (INCHES)	**WEIGHT** (LBS/FT)	**RECOMMENDED HOLE SIZE** (INCHES)	**GAGE OD** (INCHES)	**NOMINAL ID** (INCHES)		
9-5/8	36.0 – 53.5	8.535 – 8.921	8.125	6.00	7 LTC	68595-XBCE 68595H-XBCE[1] 68595V-XBCE[2]

Elastomer Trim Options: [1]HSN, [2]Viton

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU UNSET TOOL (MAX)	HANGING WEIGHT ON SET TOOL (MAX)
6,500 PSI	325,000 LBS	325,000 LBS*

*Casing must be cemented for this load rating.

C) PRE-INSTALLATION INSPECTION PROCEDURES

CAUTION1: D&L ships tool connections made-up hand-tight—labeled with hand-tight tape on the tool—unless stated otherwise. Properly tighten connections before operating tool (Fig. 1).

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.

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.

C) PRE-INSTALLATION INSPECTION PROCEDURES (cont'd)

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

D) SETTING PROCEDURES

CAUTION2: Do not run the tool without properly tightening connections. Running the tool with loose connections may damage the tool and cause malfunction.

D-1) RUNNING SEQUENCE

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. 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.

A run in the well with a junk basket and suitable sized gage 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 pre-set conditions by pressure waves through the fluid. A slow steady running speed should be used. 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. Transmission of make-up torque through the packer should be avoided.

Run the packer to the desired setting depth at the recommended speed and taking precautions listed above.

- Typically the tubing/casing will be landed prior to setting.
- Establish a plug in the tubing below the packer using a drop ball, wireline plug or other device.
- Apply pressure to the tubing/casing to the recommended pressure for the given size of packer hold for 5 minutes. Pick up tubing to check that upper slips set then set down weight to check that lower slips set. Re-apply pressure to the tubing/casing to lock locknut in place.

NOTE1: The Permanent Hydraulic Isolation Packer is not designed to be released.

E) STORAGE RECOMMENDATIONS

When preparing the tool for storage, follow the Pre-Installation Inspection Procedures. Re-assemble the tool with connections hand-tight only and in running position if applicable. Elastomers should be in a relaxed state—free from tension, compression, and other stresses that could cause deformation.

Store the tool, if possible, in an enclosed, temperature and humidity controlled environment. Avoid excessively high temperatures over long periods of time. Shield elastomeric parts from ultraviolet light sources. Keep tool dry and protected from condensation. Do not store in contact with or near volatile or corrosive chemicals. Do not store near ozone generating equipment or operations such as welding.

F) SETTING AREA GUIDE

SIZE (INCHES)	**SETTING AREA** (SQ INCHES)	**SETTING INITIATION** (PSI/SCREW)	**MINIMUM SETTING PRESSURE** (PSI)	**RECOMMENDED SETTING PRESSURE** (PSI)
9-5/8	6.95	100	3,200	3,600

G) ELASTOMER TRIM TEMPERATURE GUIDE

NITRILE (STD)			
TEMPERATURE RANGE (F°)	**DUROMETER**		
	END	**MIDDLE**	**END**
40° - 125°	80	70	80
125° - 250°	90	70	90
150° - 250°	90	80	90
250° +	Contact D&L Sales		

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

H) 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
- SCREWDRIVER SET, FLAT-TIPPED
- SOCKET SETS
  - 3/8-INCH DRIVE
  - 1/2-INCH DRIVE
- HAMMERS
  - SLEDGE
  - BALL PEEN
  - DEAD BLOW
- JACK STAND

I) DISASSEMBLY

I-1) Clamp upper end of mandrel (1) in vise.

I-1.1) From lower end of tool, unscrew and remove set screws (22) from tubing bottom (21).

I-1.2) Unscrew and remove tubing bottom (21) from mandrel (1).

I-1.2.1) Remove o-ring (24) from tubing bottom (1).

I-1.3) Unscrew and remove set screws (14) from setting chamber cap (10).

I-1.4) Unscrew and remove shear screws (20) from lock ring housing (13).

I-1.5) Remove setting chamber assembly from mandrel (1) and disassemble:

I-1.5.1) Unscrew and remove setting chamber (9) from setting chamber cap (10).

I-1.5.2) Unscrew and remove shear screws (19) from setting sleeve (8).

I-1.5.3) Separate setting sleeve (8) from setting chamber cap (10).

I-1.5.3.1) Remove o-rings (23, 25) from setting sleeve (8).

I-1.5.3.2) Remove o-rings (23, 25) from setting chamber cap (10).

I-1.6) Unscrew and remove shear screw (12) from lock ring housing (13).

I-1.7) Unscrew and remove lock ring housing (13) from lock ring (11).

I-1.8) Unscrew and remove lock ring (11) from mandrel (1) (**NOTE**$_2$: Left-hand threads).

NOTE$_3$: Using snap ring spreader pliers, lock ring (11) may be spread slightly to be removed from mandrel (1).

I-1.9) Remove slip ring (3) from mandrel (1).

I-1.10) Unscrew and remove shear screws (18) from lower cone (5).

I) DISASSEMBLY

I-1.11) Remove lower cone (5) from mandrel (1).

I-1.12) Remove female and male expansion rings (16, 17), rubber retainer (15), and element (7) from mandrel (1).

I-1.13) Unscrew and remove shear screws (18) from upper cone (4).

I-1.14) Remove upper cone (4) from mandrel (1).

I-1.15) Remove keys (26) from mandrel (1)

I-1.16) Remove slip ring (3) from mandrel (1).

I-1.17) Unscrew and remove set screws (6) from upper gage ring (2).

I-1.18) Unscrew and remove gage ring (2) from mandrel (1).

I-2) Unclamp and remove mandrel (1) from vise.

J) ASSEMBLY

NOTE4: Install parts in proper order, and orientation and tighten/torque all connections properly.

CAUTION3: To ensure tool operates properly, install o-rings in o-ring grooves **NOT** thread reliefs unless stated otherwise (Fig. 2).

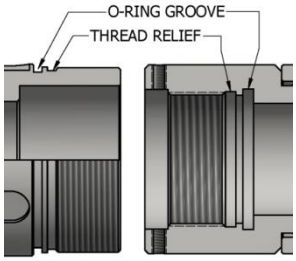


Fig. 2

J-1) Clamp upper end of mandrel (1) in vise.

J-1.1) Screw gage ring (2) onto mandrel (1).

J-1.2) Screw set screws (6) into gage ring (2).

J-1.3) Install slip ring (3) onto mandrel (1).

J-1.4) Place keys (26) on flats on mandrel (1).

J-1.5) Align key slots in upper cone (4) with keys (26) on mandrel. Install upper cone (4) onto mandrel (1). Align threaded holes in upper cone (4) with pocket holes in mandrel (1).

J-1.6) Screw shear screws (18) into upper cone (4). Tighten until shear screws (18) contact mandrel (1). Back shear screws (18) out 1/4 turn.

J-1.7) Install male and female expansion rings (17, 16), rubber retainer (15), and element (7) from mandrel (1).

J-1.8) Install lower cone (5) onto mandrel. Align threaded holes in lower cone (5) with pocket holes in mandrel (1).

J-1.9) Screw shear screws (18) into lower cone (5). Tighten until shear screws (18) contact mandrel (1). Back shear screws (18) out 1/4 turn.

J-1.10) Install slip ring (3) onto mandrel (1) and onto lower cone (4).

J-1.11) Install lock ring (11) onto mandrel (1). Screw and/or slide lock ring (11) onto the lower end of ratchet threads on mandrel (1) (**NOTE2**: Left-hand threads).

J-1.12) Carefully screw lock ring housing (13) onto lock ring (11) without pushing lock ring further up mandrel ratchet threads. Align threaded hole for shear screw (12) with gap in lock ring.

J-1.13) Screw shear screw (12) into lock ring housing (13). Tighten until shear screw (12) contacts mandrel (1). Back shear screw (12) out 1/4 turn.

J-1.14) Assemble setting chamber assembly and install:

J-1.14.1) Install o-rings (23, 25) in o-ring grooves in setting sleeve (8).

J-1.14.2) Install o-rings (23, 25) in o-ring grooves in setting chamber cap (10).

J-1.14.3) Install setting sleeve (8) onto setting chamber cap (10). Align threaded holes in setting sleeve with holes in chamber cap.

J-1.14.4) Screw shear screws (19) into setting sleeve (8). Tighten until shear screws (19) are flush with OD surface of setting sleeve (8).

J) ASSEMBLY (cont’d)

J-1.14.5) Install setting chamber (9) onto setting sleeve (8) and screw onto setting chamber cap (10).

CAUTION$_4$: Do NOT rip or tear o-rings during installation.

J-1.14.6) Install setting chamber assembly onto mandrel (1) and carefully screw setting chamber (8) into lock ring housing (13) without pushing lock ring further up mandrel ratchet threads.

J-1.15) Screw shear screws (20) into lock ring housing (13). Tighten until shear screws (20) contact setting sleeve (8). Back shear screws (20) out 1/4 turn.

J-1.16) Align threaded holes in setting chamber cap (10) with upper set screw groove in lower end of mandrel (1). Screw set screws (14) into setting chamber cap.

J-1.17) Install o-ring (24) in o-ring groove in tubing bottom (21).

J-1.18) Screw tubing bottom (21) onto mandrel (1).

CAUTION$_4$: Do NOT rip or tear o-rings during installation.

J-1.19) Screw set screws (22) into tubing bottom (21).

J-2) Unclamp and remove mandrel (1) from vise.

K) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 68595-XBCE
1	1	MANDREL	DLMS110	68595211-YBCE
2	1	UPPER GAGE RING	DLMS35	68395012
3	2	SLIP	DLMCIG2	67295110
4	1	UPPER CONE	DLMCIG2	67295024
5	1	LOWER CONE	DLMCIG2	67295014
6	8	#10-32 UNF X 1/2 SOCKET SET SCREW	STEEL	SSS1032F050
7	1	ELEMENT	80 DURO NITRILE	67295512
8	1	SETTING SLEEVE	DLMS80	68195751
9	1	SETTING CHAMBER	DLMS110	68195314
10	1	SETTING CHAMBER CAP	DLMS80	68195315
11	1	LOCK RING	DLMS80	67295005
12	1	#10-32 UNF X 3/8 SLOTTED SHEAR SCREW (750#)	DLM360BRS	BSSSLT1032F037
13	1	LOCK RING HOUSING	DLMS80	67295006
14	6	5/16-18 UNC X 3/8 SOCKET SET SCREW	STEEL	SSS031C037
15	2	RUBBER RETAINER	DLMCIG2	67295015
16	2	FEMALE EXPANSION RING	DLM660BRZ	67295013
17	2	MALE EXPANSION RING	DLM660BRZ	67295020
18	8	1/4-20 UNC X 3/8 SLOTTED SHEAR SCREW (1200#)	DLM360BRS	BSSSLT025C037
19	12	#10-32 UNF X 1/4 SLOTTED SHEAR SCREW (750#)	DLM360BRS	BSSSLT1032F025
20	4	1/4-20 UNC X 1/2 SLOTTED SHEAR SCREW (1200#)	DLM360BRS	BSSSLT025C050

K) PARTS LIST (cont’d)

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 68595-XBCE
21	1	TUBING BOTTOM	DLMS110	68595621-YBCE
22	4	1/4-20 UNC X 1/2 SOCKET SET SCREW	STEEL	SSS025C050
23	4	261 O-RING	90 DURO NITRILE	90261
24	1	260 O-RING	90 DURO NITRILE	90260
25	4	262 O-RING	90 DURO NITRILE	90262
26	2	KEY	DLMSKS	KS018X018X100

ASSEMBLED WEIGHT		338 LBS

K-1) ELASTOMER TRIM OPTIONS

NOTE$_5$: For temperature range, refer to Elastomer Trim Temperature Guide.

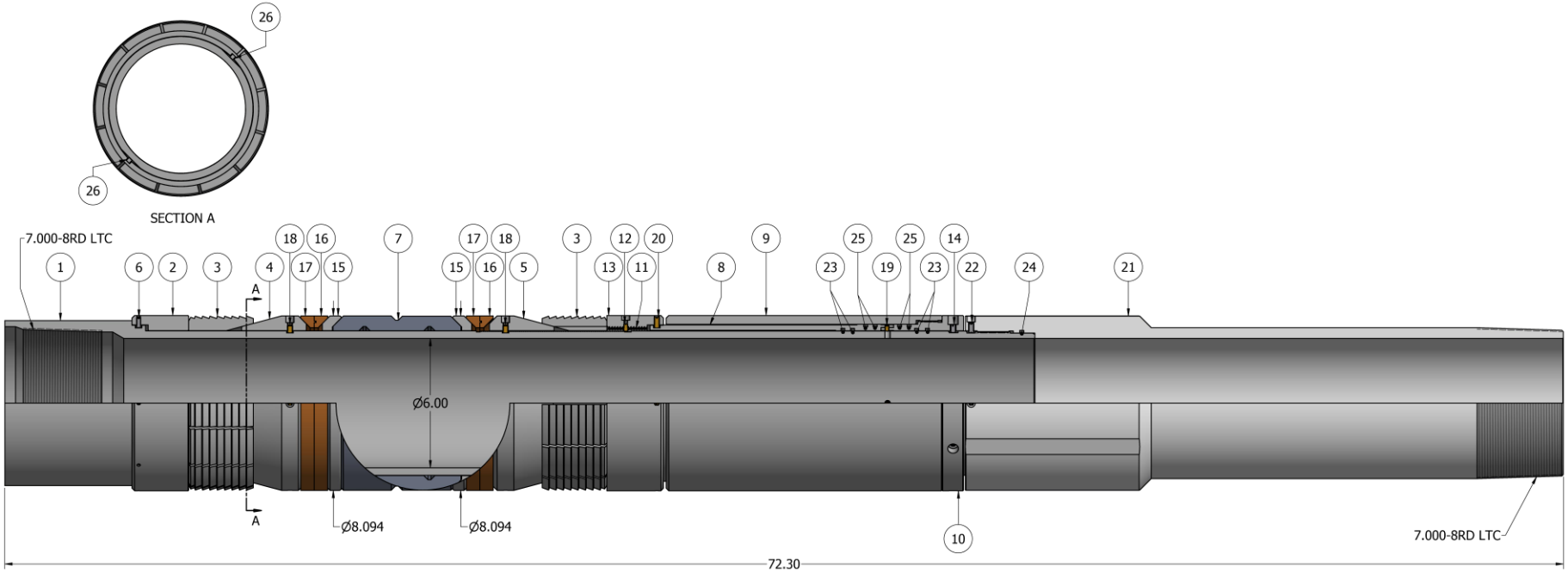
K-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 68595H-XBCE
7	1	ELEMENT	80 DURO HSN	67295512H
23	4	261 O-RING	90 DURO HSN	90261H
24	1	259 ORING	90 DURO HSN	90259H
25	4	262 O-RING	90 DURO HSN	90262H

K-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 68595V-XBCE
7	1	ELEMENT	80 DURO VITON	67295512V
23	4	261 O-RING	90 DURO VITON	90261V
24	1	259 ORING	90 DURO VITON	90259V
25	4	262 O-RING	90 DURO VITON	90262V

L) TECHNICAL ILLUSTRATION



M) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
01/27/2023	B	Revised setting area guide, added HSN, Viton options	J.Anderson	E.Visaez
08/27/2021	A	Created manual	-	-