## 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) | | |
| 7 | 17.0 – 26.0 | 6.276 – 6.538 | 6.000 | 4.000 | 4-1/2 LTC | 68570<br>68570H[1]<br>68570V[2] |
| | 23.0 – 32.0 | 6.094 – 6.366 | 5.875 | 4.000 | 4-1/2 LTC | 68571<br>68571H[1]<br>68571V[2] |

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

| DIFFERENTIAL PRESSURE (MAX) | TENSILE LOAD THRU UNSET TOOL (MAX) | HANGING WEIGHT ON SET TOOL (MAX) |
|---|---|---|
| 10,000 PSI | 214,500 LBS | 214,500 LBS* |

*casing must be cemented for this load rating.

## C) PRE-INSTALLATION INSPECTION PROCEDURES

**CAUTION$_1$**: 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 |


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

## C) PRE-INSTALLATION INSPECTION PROCEDURES (cont’d)

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.

## D) SETTING PROCEDURES

**CAUTION$_2$**: 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 the lock ring in place.

**NOTE$_1$**: 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) | **RECOMMENDED MINIMUM SETTING PRESSURE** (PSI) | **MAXIMUM SETTING PRESSURE** (PSI) |
|---|---|---|---|---|
| 7 | 5.809 | 2,760 | 3,500 | 4,500 |

## 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** (F°) |
|---|---|
| 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) Unscrew and remove set screws (22) from tubing bottom (14).

I-1.2) Unscrew and remove tubing bottom (14) from mandrel (1).

I-1.2.1) Remove o-ring (26) from tubing bottom (14).

I-1.3) Unscrew and remove set screws (15) from setting chamber cap (10).

I-1.4) Unscrew and remove set screws (6) 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 (24, 25, 26, 27) from setting sleeve (8).

I-1.5.3.2) Remove o-rings (24, 26, 27) from setting chamber cap (10).

I-1.6) Unscrew and remove shear screw (23) 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 Belleville spring (12) from mandrel (1).

I-1.10) Remove slip ring (3) from mandrel (1).

I-1.11) Unscrew and remove shear screws (18) from upper cone (4).

## I) DISASSEMBLY

I-1.12) Remove upper cone (4) from mandrel (1).

I-1.13) Remove male and female expansion rings (17, 16), rubber retainers (21), and element (7) from mandrel (1).

I-1.14) Unscrew and remove shear screws (18) from lower cone (5).

I-1.15) Remove lower cone (5) and keys (20) from mandrel (1).

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

I-1.17) 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 (Fig. 2).

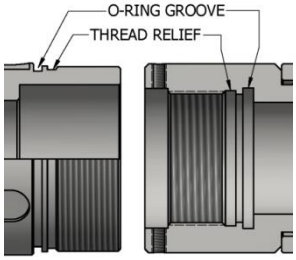



Fig. 2

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

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

J-1.2) Install slip ring (3) onto mandrel (1).

J-1.3) Install keys (20) and lower cone (5) onto mandrel (1). Place and hold keys (20) on flat key surfaces on mandrel (1) while installing lower cone (5) as necessary. Align threaded holes in lower cone (5) with pocket holes in mandrel (1).

J-1.4) Screw shear screws (18) into lower cone (5). Tighten until shear screws (18) make contact with mandrel (1). Back shear screws (18) out 1/4 turn.

J-1.5) Install female and male expansion rings (16, 17), rubber retainers (21), and element (7) from mandrel (1).

J-1.6) Install upper cone (4) onto mandrel. Align threaded holes in upper cone (4) with pocket holes in mandrel (1).

J-1.7) Screw shear screws (18) into upper cone (4). Tighten until shear screws (18) make contact with mandrel (1). Back shear screws (18) out 1/4 turn.

J-1.8) Install slip ring (3) onto mandrel (1) and onto lower cone.

J-1.9) Install Belleville spring (12) onto mandrel (1) against slip ring.

J-1.10) 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-1.11) 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 (23) with gap in lock ring.

J-1.12) Screw shear screw (23) into lock ring housing (13). Tighten until shear screw (23) makes contact with mandrel (1). Back shear screw (23) out 1/4 turn.

J-1.13) Assemble setting chamber assembly and install:

J-1.13.1) Install o-rings (24, 25, 26, 27) in o-ring grooves in setting sleeve (8) (Det. B).

J-1.13.2) Install o-rings (24, 26, 27) in o-ring grooves in setting chamber cap (10) (Det. B).

J-1.13.3) Install setting sleeve (8) onto setting chamber cap (10). Align threaded holes in setting sleeve with holes in chamber cap.

J-1.13.4) Screw shear screws (19) into setting sleeve (8). Tighten until shear screws (19) are flush with OD surface of setting sleeve (8).

J-1.13.5) Install setting chamber (9) onto setting sleeve (8) and screw onto setting chamber cap (10).

**CAUTION4**: Do NOT rip or tear o-rings during installation.

**J) ASSEMBLY** (cont’d)

J-1.13.6) Install setting chamber assembly onto mandrel (1). Align groove in setting sleeve (8) with threaded holes in lock ring housing (13).

J-1.14) Screw set screws (6) into lock ring housing (13).

J-1.15) Align threaded holes in setting chamber cap (10) with upper set screw groove in lower end of mandrel (1). Screw set screws (15) into setting chamber cap.

J-1.16) Install o-ring (26) in o-ring groove in tubing bottom (14).

J-1.17) Screw tubing bottom (14) onto mandrel (1).

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

J-1.18) Screw set screws (22) into tubing bottom (14).

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

## K) PARTS LIST

| ITEM | QTY | DESCRIPTION | MATERIAL | P/N 68570 | P/N 68571 |
|---|---|---|---|---|---|
| 1 | 1 | MANDREL | DLMS110 | 68570210 | |
| 2 | 1 | GAGE RING | DLMS80 | 68570850 | 68571850 |
| 3 | 2 | SLIP RING | DLMCIG2 | 67070111 | 67071111 |
| 4 | 1 | UPPER CONE | DLMCIG2 | 67070014 | 67071014 |
| 5 | 1 | LOWER CONE | DLMCIG2 | 67070023 | 67071023 |
| 6 | 6 | SET SCREW 5/16-18 UNC X 1/2 | STEEL | SSS031C050 | |
| 7 | 1 | ELEMENT | 80 DURO NITRILE | 67070512 | 67071512 |
| 8 | 1 | SETTING SLEEVE | DLMS80 | 68170751 | |
| 9 | 1 | SETTING CHAMBER | DLMS125 | 68170314 | |
| 10 | 1 | SETTING CHAMBER CAP | DLMS80 | 68170315 | |
| 11 | 1 | LOCK RING | DLMS80 | 67070011 | |
| 12 | 1 | BELLEVILLE SPRING | DLMS110 | 68171910 | |
| 13 | 1 | LOCK RING HOUSING | DLMS80 | 68570012 | 68571012 |
| 14 | 1 | TUBING BOTTOM | DLMS110 | 68570620 | 68571620 |
| 15 | 4 | SET SCREW 5/16-18 UNC X 5/16 | STEEL | SSS031C031 | |
| 16 | 2 | FEMALE EXPANSION RING | DLM660BRZ | 67070013 | 67071013 |
| 17 | 2 | MALE EXPANSION RING | DLM660BRZ | 67070020 | 67071020 |
| 18 | 8 | SHEAR SCREW (1200#) 1/4-20 UNC X 1/2 | DLM360BRS | BSSSLT025C050 | |
| 19 | 8 | SHEAR SCREW (2000#) 5/16-18 UNC X 5/16 | DLM360BRS | BSSSLT031C031 | |
| 20 | 2 | KEY 3/16 X 3/16 X 1" | DLMSKS | KS018X018X100 | |
| 21 | 2 | RUBBER RETAINER | DLMCIG2 | 67070015 | 67071015 |
| 22 | 4 | SET SCREW 3/8-16 UNC X 5/8 | STEEL | SSS037C062 | |
| 23 | 1 | SHEAR SCREW (750#) #10-32 UNF X 3/8 | DLM360BRS | BSSSLT1032F037 | |
| 24 | 2 | 247 O-RING | 90 DURO NITRILE | 90247 | |
| 25 | 1 | 250 O-RING | 90 DURO NITRILE | 90250 | |
| 26 | 3 | 350 O-RING | 90 DURO NITRILE | 90350 | |
| 27 | 2 | 353 O-RING | 90 DURO NITRILE | 90353 | |

| | | | |
|---|---|---|---|
| ASSEMBLED WEIGHT | | 175 LBS | 166 LBS |

## K) PARTS LIST (cont’d)

### K-1) ELASTOMER TRIM OPTIONS

**NOTE$_2$**: For temperature range, refer to Elastomer Trim Temperature Guide.

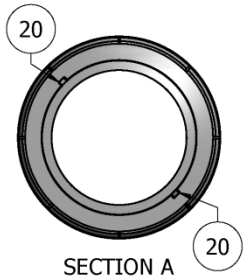
K-1.1) HSN

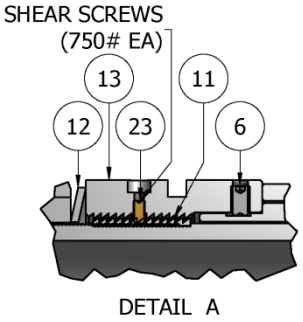
| ITEM | QTY | DESCRIPTION | MATERIAL | P/N 68570H | P/N 68571H |
|---|---|---|---|---|---|
| 7 | 1 | ELEMENT | 80 DURO HSN | 67070512H | 67071512H |
| 24 | 2 | 247 O-RING | 90 DURO HSN | 90247H | |
| 25 | 1 | 250 O-RING | 90 DURO HSN | 90250H | |
| 26 | 3 | 350 O-RING | 90 DURO HSN | 90350H | |
| 27 | 2 | 353 O-RING | 90 DURO HSN | 90353H | |

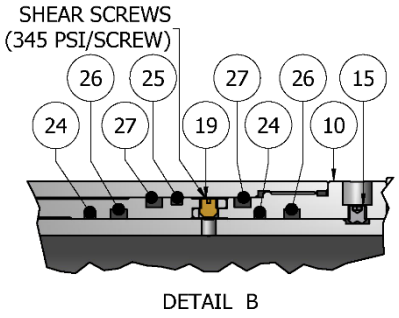
K-1.2) VITON

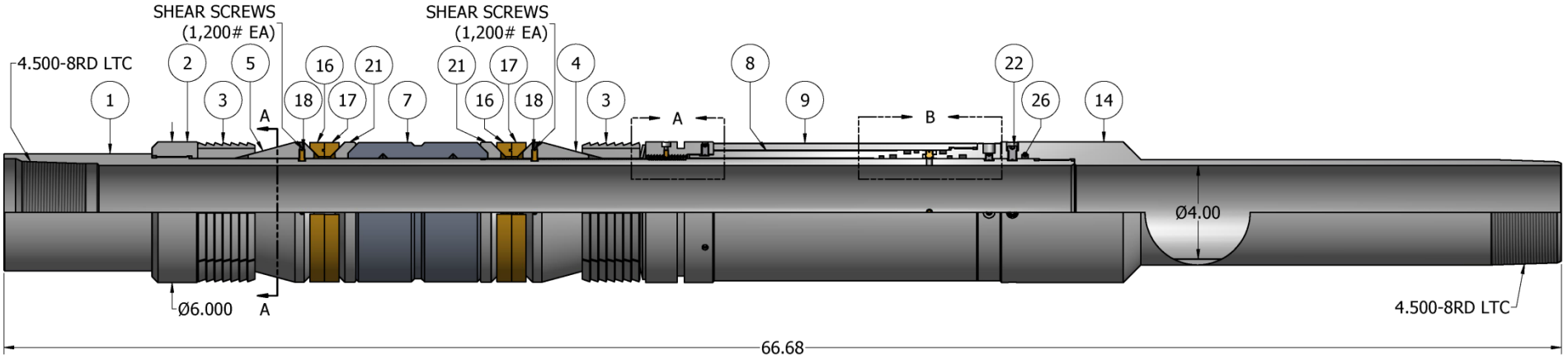
| ITEM | QTY | DESCRIPTION | MATERIAL | P/N 68570V | P/N 68571V |
|---|---|---|---|---|---|
| 7 | 1 | ELEMENT | 80 DURO VITON | 67070512V | 67071512V |
| 24 | 2 | 247 O-RING | 90 DURO VITON | 90247V | |
| 25 | 1 | 250 O-RING | 90 DURO VITON | 90250V | |
| 26 | 3 | 350 O-RING | 90 DURO VITON | 90350V | |
| 27 | 2 | 353 O-RING | 90 DURO VITON | 90353V | |

## L) TECHNICAL ILLUSTRATION



## M) REVISION HISTORY

| DATE | REVISION | DESCRIPTION OF CHANGES | REVISED BY | APPROVED BY |
|---|---|---|---|---|
| 05/02/2023 | C | Removed drift ID; added HSN and Viton options, screw torque recommendations; revised temp. ratings | J.Anderson | E.Visaez |
| 07/14/2015 | B | Revised Setting Area Guide setting initiation pressure | J.Anderson | K.Riggs |
| 06/16/2015 | A | Created new manual | - | - |