



PERMAPAK SEAL BORE PACKER 5-1/2" X 2.688"

Manual No:
DL-670-5500-628

Revision: **B**

Revision Date:
09/23/2019

Authored by: B.Mathis

Approved by: J.McArthur

A) DESCRIPTION

The Permapak Packer is a highly versatile tool which may be set on wireline or hydraulically. The Permapak Packer is frequently used on stimulation jobs where excessively high pressures and/or temperatures are encountered. By installing a Knock-out Plug, Pump-out Plug or Screw-out Plug, the Permapak may be used as a temporary bridge plug to isolate a lower zone. The zone may later be produced by removing the plug with the production string and landing the seals.

Optional bottoms are available for the Permapak for accepting Seal Bore Extensions, Non-sealing Extensions, Knock-out Plugs, Screw-out Plugs, Pump-out Plugs and Flapper Valves.

NOTE₁: Bottom sub, Wireline Adapter Kit (WLAK), and setting equipment sold separately to meet customer requirements.

NOTE₂: This packer requires at least a 30 second burn on the wireline setting tool to ensure a proper set. A burn time less than 30 seconds may shear the setting tool from the packer before fully setting the packer.

B) RELATED TOOLS (sold separately)

B-1) 5-1/2" X 2.688" & 3" WLAK (P/N 97055)—refer to technical manual *DL-970-5500-629*.

B-2) 2.688" Seal Bore Accessories—refer to technical manual *DL-5812688-780*.

C) SPECIFICATION GUIDE

CASING			TOOL OD (INCHES)	PACKER SEAL BORE ID (INCHES)	ID THRU SEALS (INCHES)	PART NUMBER
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)				
5-1/2	13.0 – 17.0	4.892 – 5.044	4.532	2.688	1.938	67055 67055H ¹ 67055V ²
	17.0 – 23.0	4.670 – 4.892	4.438	2.688	1.938	67056 67056H ¹ 67056V ²

Elastomer Trim Options: ¹HSN, ²Viton

DIFFERENTIAL PRESSURE (MAX)
10,000 PSI

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

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D) 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.

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.

E) OPERATION PROCEDURES

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

E-1) ON A WIRELINE

In setting the Permapak, the setting forces are transferred from the gun to the packer through the setting adapter kit. The lock ring housing is backed up while the top connection (and thus the inner mandrel) is pulled up. This movement causes the shear pins in the lock ring housing and the cones to shear and the slips to separate and set. Further stroke expands the back-up rings against the casing, packs off the element, and shears the adapter kit free of the packer.

The rubber pack-off is maintained by the slips and the inner mandrel movement is checked by the lock ring. When the packer is milled, there are two rotational locks; the lock ring and the key in the lower cone.

F) 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. Elements 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.



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G) ELASTOMER TRIM TEMPERATURE GUIDE

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

I) DISASSEMBLY

I-1) Clamp top sub (1) in vise.

I-1.1) Remove lower slip ring (5) from inner mandrel (2).

I-1.2) Unscrew and remove shear screws (14) from lower cone (7).

I-1.3) Remove lower cone (11) from inner mandrel (2).

I-1.4) Remove keys (15) from inner mandrel (2).

I-1.5) Remove female expansion rings (8), male expansion rings (7), rubber retainers (9), and element (10) from inner mandrel (2).

I-1.6) Unscrew and remove shear screws (14) from upper cone (6).

I-1.7) Remove upper cone (6) and upper slip ring (5) from inner mandrel (2).

I-1.8) Unscrew and remove shear screws (13) from upper end of lock ring housing (3).

I-1.9) Unscrew and remove set screws (12) from top sub (1).

I-1.10) Unscrew and remove inner mandrel (2) from top sub (1).

I-1.10.1) Unscrew and shear screw (13 or 16) from lower end of lock ring housing (3).

I-1.10.2) Unscrew and remove lock ring housing (3) from lock ring (4).

I-1.10.3) Unscrew and/or slide lock ring (4) from inner mandrel (2) (**NOTE**₅: Left-hand threads).

NOTE₆: Using snap ring spreader pliers, the lock ring (4) may be spread slightly to be removed from inner mandrel (2).

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



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J) ASSEMBLY

NOTE7: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order and orientation.

J-1) Clamp top sub (1) in vise.

J-1.1) Screw and/or slide lock ring (4) onto the upper end of OD threads on inner mandrel (2) (**NOTE5:** Left-hand threads).

NOTE8: Threads on lock ring (4) are directional – it **MUST** be installed in correct direction for tool to work properly.

J-1.2) Install lock ring housing (3) from lower end of inner mandrel (2) and carefully screw onto lock ring (4).

J-1.3) Align threaded hole in lock ring housing (3) with gap in lock ring (4). Screw shear screw (13 or 16) into lock ring housing (3). Tighten until shear screw (13 or 16) contacts inner mandrel (2). Back shear screw (13 or 16) out 1/4 turn.

J-1.4) Screw inner mandrel (2) into top sub (1). Ensure threaded holes in lock ring housing (3) are aligned with groove in lower end of top sub (1) as well as threaded holes in top sub (1) with groove in inner mandrel (2).

NOTE9: Do NOT wrench or clamp on seal surface.

J-1.5) Screw set screws (12) into top sub (1).

J-1.6) Screw shear screws (13) into lock ring housing (3). Tighten until shear screws (13) contact top sub (1). Back shear screws (13) out 1/4 turn.

J-1.7) Install upper slip ring (5) and upper cone (6) onto inner mandrel (2).

J-1.8) Align threaded holes in upper cone (6) with pocket holes in inner mandrel (2). Screw shear screws (14) into upper cone (5). Tighten until shear screws (14) contact inner mandrel (2). Back shear screws (14) out 1/4 turn.

J-1.9) Install female expansion rings (8), male expansion rings (7), rubber retainers (9), and element (10) onto inner mandrel (2).

J-1.10) Set keys (15) in place on flat surfaces on lower end of inner mandrel (2).

J-1.11) Align key slots in ID of lower cone (7) with keys (15). Install lower cone (7) onto inner mandrel (2) and keys (15).

J-1.12) Align threaded holes in lower cone (7) with pocket holes in inner mandrel (2). Screw shear screws (14) into lower cone (7). Tighten until shear screws (14) contact inner mandrel (2). Back shear screws (14) out 1/4 turn.

J-1.13) Install lower slip ring (5) onto inner mandrel (2).

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



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K) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	13.0 – 17.0# P/N 67055	17.0 – 23.0# P/N 67056
1	1	TOP SUB	DLMS80	67055601	
2	1	INNER MANDREL	DLMS80	67055210	
3	1	LOCK RING HOUSING	DLMS80	67255012-L-80	
4	1	LOCK RING	DLMS80	67255011	
5	2	SLIP	DLMCIG2	67255110	
6	1	UPPER CONE	DLMCIG2	67255014	67256014
7	2	MALE EXPANSION RING	DLM660BRZ	67255020	
8	2	FEMALE EXPANSION RING	DLM660BRZ	67255013	
9	2	RUBBER RETAINER	DLMCIG2	67255015	67256015
10	1	ELEMENT	80 DURO NITRILE	67255512	
11	1	LOWER CONE	DLMCIG2	67255023	67256023
12	4	SET SCREW 3/8-16 UNC X 5/16	STEEL	SSS037C031	
13	-	SHEAR SCREW (750#) #10-32 UNF X 3/8	DLM360BRS	BSSSLT1032F037 (6 EA)	BSSSLT1032F037 (7 EA)
14	8	SHEAR SCREW (1200#) 1/4-20 UNC	DLM360BRS	BSSSLT025C050 (1/2" LONG)	BSSSLT025C037 (3/8" LONG)
15	2	KEY 3/16 X 3/16 X 1"	DLMSKS	KS018X018X100	
16	1	SHEAR SCREW (750#) #10-32 UNF X 1/2	DLM360BRS	BSSSLT1032F050	-
17	6	DRIV-LOK PIN (4800#) 5/16 X 5/8	4140	DLP031062*	
18	1	236 O-RING	90 DURO NITRILE	90236**	
19	1	341 O-RING	90 DURO NITRILE	90341**	
20	6	SET SCREW 3/8-16 UNC X 3/8	STEEL	SSS037C037**	

* Not shown in technical illustration. Refer to WLAK tech manual for placement.

**O-rings and set screws supplied for bottom subs that are sold separately.

ASSEMBLED WEIGHT		50 LBS	49 LBS
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H) PARTS LIST (cont'd)

K-1) ELASTOMER TRIM OPTIONS

NOTE₃: For temperature range, refer to Elastomer Trim Temperature Guide.

K-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	13.0 – 17.0# P/N 67055H	17.0 – 23.0# P/N 67056H
10	1	ELEMENT	80 DURO HSN	67255512H	
18	1	236 O-RING	90 DURO HSN	90236H**	
19	1	341 O-RING	90 DURO HSN	90341H**	

K-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	13.0 – 17.0# P/N 67055V	17.0 – 23.0# P/N 67056V
10	1	ELEMENT	80 DURO VITON	67255512V	
18	1	236 O-RING	90 DURO VITON	90236V**	
19	1	341 O-RING	90 DURO VITON	90341V**	

L) ACCESSORIES - BOTTOM SUBS

NOTE₄: Standard bottom subs are listed. Other tubing sizes/configurations and threads are available. All sold separately.

DESCRIPTION	MATERIAL	THREAD CONNECTION	13.0 – 17.0# P/N 67055	17.0 – 23.0# P/N 67056
PLAIN BOTTOM	1026	-	67055018	67056018
CONCENTRIC BOTTOM	1026	3-1/4-8 STUB ACME	67055610	67056610
BOX TUBING BOTTOM	1026	2-3/8-8 RD EUE BOX	67055620	67056620
PIN TUBING BOTTOM	1026	2-3/8-8 RD EUE PIN	67055630	67056630



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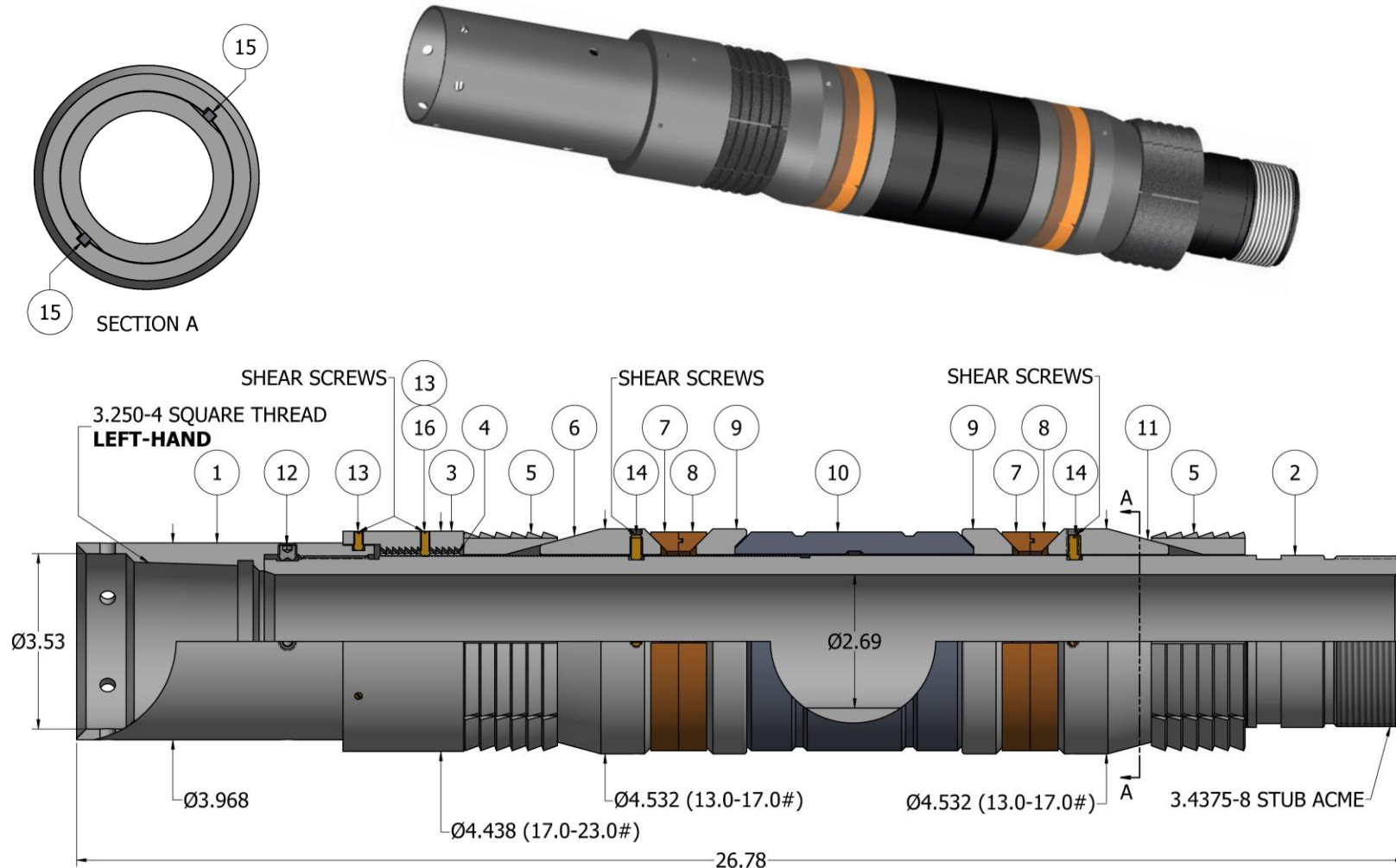
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M) TECHNICAL ILLUSTRATION



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N) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
09/23/2019	B	Added Related Tools, Pre-Installation Inspection Procedures, elastomer trim options, Storage Recommendations; Revised Elastomer Trim Temperature Guide, P/N SSS037C031 was SSS037C037	J.Anderson	D.Hushbeck
10/29/13	A	Created new manual	-	-