OIL TOOLS	**PERMAPAK SEAL BORE PACKER** 11-3/4" X 6.000"	Manual No: **DL-672-11750-369** Revision: **A** Revision Date: **09/16/2010**
Written by: B.Mathis		*Approved by: D.Hushbeck*

A) DESCRIPTION

The D&L Permapak Production Packers are highly versatile tools which may be set on wireline or hydraulically. They are 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.

A left-hand release On/Off Tool with a wireline plug profile may be run above the latch sub of the seal assembly. Setting a wireline plug in the profile converts the packer to a bridge plug and allows removal of the tubing string without having to kill the well.

Optional bottoms are available for the Permapak for accepting Seal Bore Extensions, Knock-out Plugs, Screw-out Plugs, Pump-out Plugs and Flapper Valves. This Permapak Production Packer and Accessories is rated at 8,000 PSI pressure differential and 350° F.

B) SPECIFICATION GUIDE

CASING		**RECOMMENDED HOLE SIZE**	**TOOL OD** (INCHES)	**THROUGH SEALS** (INCHES)	**PACKER SEAL BORE** (INCHES)	**PART NUMBER**
SIZE (INCHES)	**WEIGHT** (LBS/FT)					
11-3/4	42 – 65#	10.682 – 11.084	10.430	4.750	6.000	67211

NOTE: Permapak setting equipment, bottoms, and accessories are sold separately.

C) OPERATION PROCEDURES

C-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 locking nut housing is backed up while the top connection (and thus the inner mandrel) is pulled up. This movement causes the shear pins in the locking nut 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 locking nut. When the packer is milled, there are two rotational locks; the locking nut and the key in the lower cone.

D) DISASSEMBLY

D-1) Clamp top sub (1) in vise.
- D-1.1) Unscrew and remove set screws (not shown) from bottom sub (not shown).
- D-1.2) Unscrew and remove bottom sub (not shown) from inner mandrel (2).
  - D-1.2.1) Remove o-ring (not shown) from bottom sub (not shown).
- D-1.3) Remove slip ring (5) from inner mandrel (2).
- D-1.4) Unscrew and remove shear screws (14) from lower cone (11).
- D-1.5) Slide lower cone (11) off of inner mandrel (2).
- D-1.6) Remove keys (15) from inner mandrel (2).
- D-1.7) Remove female expansion rings (7), male expansion rings (8), rubber retainers (9), and element (10) from inner mandrel (2).
- D-1.8) Unscrew and remove shear screws (14) from upper cone (6).
- D-1.9) Slide upper cone (6) and slip ring (5) off of inner mandrel (2).
- D-1.10) Unscrew and remove shear screws (13, 14) from lock nut housing (3).
- D-1.11) Unscrew and remove set screws (12) from top sub (1).
- D-1.12) Unscrew and remove inner mandrel (2) from top sub (1).
  - D-1.12.1) Unscrew and remove lock nut housing (3) from lock nut (4).
  - D-1.12.2) Unscrew and remove lock nut (4) from inner mandrel (2) (**NOTE**: Left-hand threads).

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

E) ASSEMBLY

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

E-1) Clamp top sub (1) in vise.
- E-1.1) Screw lock nut (4) onto inner mandrel (2) (**NOTE**: Left-hand threads).
- E-1.2) Screw lock nut housing (3) onto lock nut (4).
- E-1.3) Screw inner mandrel (2) onto top sub (1).
- E-1.4) Screw set screws (12) into top sub (1).
- E-1.5) Screw shear screws (13, 14) into lock nut housing (3). Tighten and back out 1/4 turn.
- E-1.6) Slide slip ring (5) and upper cone (6) onto inner mandrel (2).
- E-1.7) Screw shear screws (14) into upper cone (6). Tighten and back out 1/4 turn.
- E-1.8) Slide female expansion rings (7), male expansion rings (8), rubber retainers (9), and element (10) onto inner mandrel (2).
- E-1.9) Set keys (15) in place on flats on inner mandrel (2).
- E-1.10) Slide lower cone (11) onto inner mandrel (2) while aligning slots in ID of lower cone (11) with keys (15).
- E-1.11) Screw shear screws (14) into lower cone (11). Tighten and back out 1/4 turn.
- E-1.12) Slide slip ring (5) onto inner mandrel (2).
- E-1.13) Install o-ring (not shown) in groove in bottom sub (not shown).
- E-1.14) Screw bottom sub (not shown) onto inner mandrel (2).
- E-1.15) Screw set screws (not shown) into bottom sub (not shown).

E-2) Unclamp top sub (1) from vise and remove tool assembly.

F) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 67211 (42 - 65#)
1	1	TOP SUB	1026	67211001
2	1	INNER MANDREL	1026	67211210
3	1	LOCK NUT HOUSING	L-80	67211012
4	1	LOCK NUT	L-80	67211011
5	2	SLIP RING	G2 CAST IRON	67211110
6	1	UPPER CONE	G2 CAST IRON	67211014
7	2	FEMALE EXPANSION RING	BRONZE	67211013
8	2	MALE EXPANSION RING	BRONZE	67211020
9	2	RUBBER RETAINER	G2 CAST IRON	67211015
10	1	ELEMENT	80 DURO NITRILE	67211512
11	1	LOWER CONE	G2 CAST IRON	67211024
12	2	SET SCREW 3/8-16 UNC X 1/2	STEEL	SSS037C050
13	1	SHEAR SCREW (750# EA) #10-32 UNF X 1/2	BRASS	BSSSLT1032F050
14	12	SHEAR SCREW (1200# EA) 1/4-20 UNC X 1/2	BRASS	BSSSLT025C050
15	2	KEY 1/4 X 1/4X 1"	1018	KS025X025X100
16	12	DRIV-LOK PIN (4800# EA) 5/16 X 1" (NOT SHOWN IN TECH ILLUSTRATION)	4140	DLP031100

REDRESS KIT		67211050
ASSEMBLED WEIGHT		365 LBS

G) SETTING EQUIPMENT

G-1) ASSEMBLY OF SETTING EQUIPMENT TO BAKER #20 PRESSURE SETTING ASSEMBLY

G-1.1) Grease seal bore of packer. Screw inner adapter mandrel (3) into inner adapter flange (4).

G-1.2) Screw set screws (5) into inner adapter flange (4).

G-1.3) Slide inner adapter assembly into top of Permapak top sub. Align holes and install Driv-Lok pins (9).

G-1.4) Slide setting sleeve assy (2) onto pressure setting assembly.

G-1.5) Screw outer adapter (1) onto cross link sleeve of pressure setting assembly. Make up wrench tight.

G-1.6) Screw set screws (8) into outer adapter (1).

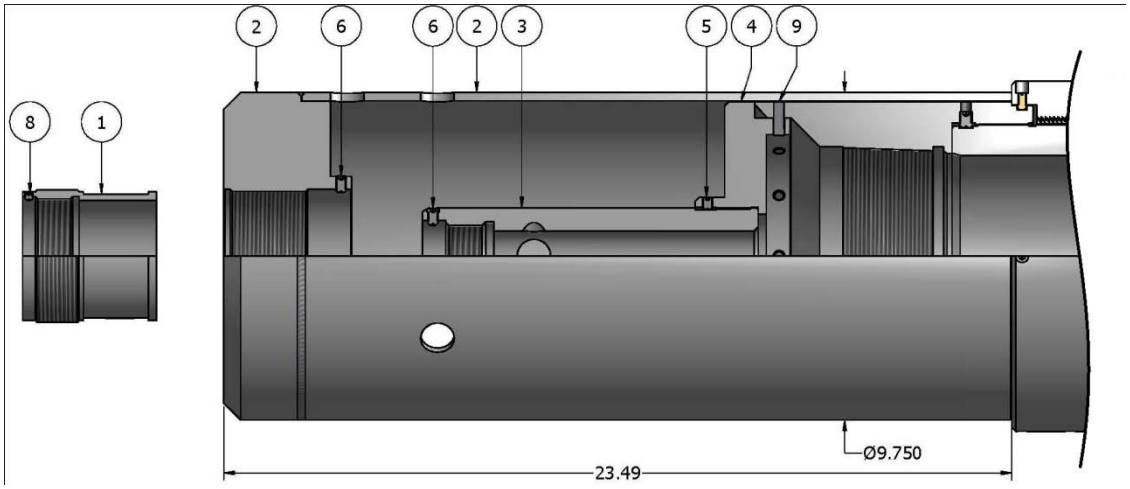
G-1.7) Attach Permapak to pressure setting assembly by screwing inner adapter mandrel (3) onto setting mandrel of pressure setting assembly.

G-1.8) Screw set screws (6) into inner adapter mandrel (3).

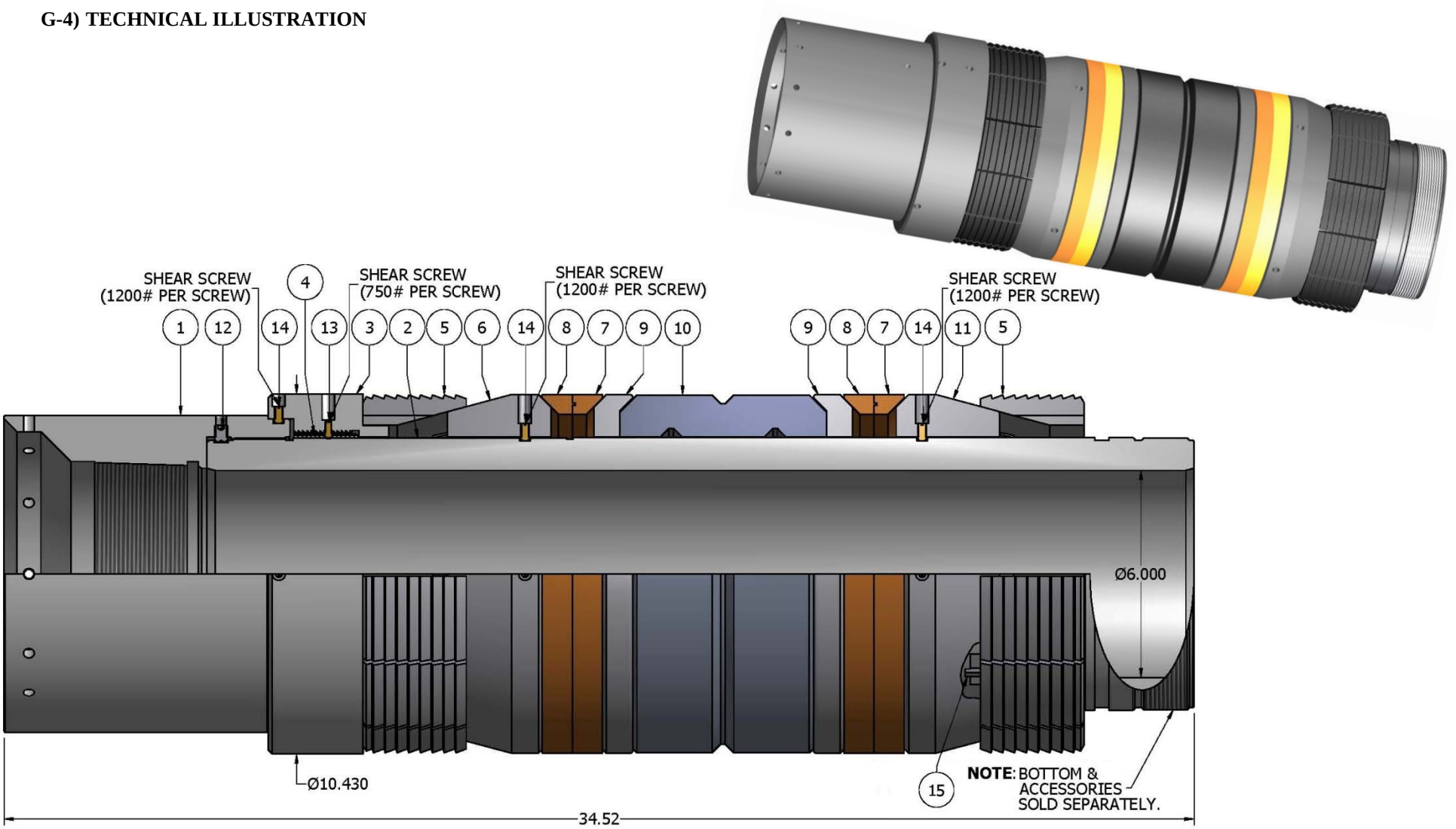
G-1.9) Slide setting sleeve (2) over outer adapter (1). Screw setting sleeve down until it contacts lock nut housing of Permapak. Make up hand tight only.

G-1.10) Screw set screws (6) into setting sleeve (2) tightening onto outer adapter (1).

G-2) TECHNICAL ILLUSTRATION



G-3) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 97211
1	1	OUTER ADAPTER	P-110	97120102
2	1	SETTING SLEEVE ASSEMBLY		97211470
3	1	INNER ADAPTER MANDREL	P-110	97295461
4	1	INNER ADAPTER FLANGE	P-110	97211460
5	3	SET SCREW 1/4-20 UNC X 3/8	STEEL	SSS025C037
6	3	SET SCREW 5/16-18 UNC X 1/2	STEEL	SSS031C050
7	2	SET SCREW 5/16-18 UNC X 7/8	STEEL	SSS031C087
8	2	SET SCREW 1/4-20 UNC X 1/4	STEEL	SSS025C025
9	12	DRIV-LOK PIN 5/16 X 1"	STEEL	312100DLP

G-4) TECHNICAL ILLUSTRATION