## A) DESCRIPTION

The Snapset II Packer is a compression set tool requiring only straight set down weight to pack-off. This packer is run above another compression set packer (such as the AS-III Packer) to selectively treat, produce or inject in multiple zone completions. This packer is also used to isolate casing hole perforations.

This packer features a large by-pass area to prevent swabbing when running and retrieving. Once the packer is set, pressure from above or below acts down on the valve to maintain the seal and prevent upward movement of the tubing. When releasing, the valve allows debris to be washed from the upper slips. This packer is equipped with an internal latch to prevent setting prematurely when running in the hole. When releasing, the latch re-engages to allow movement downhole.

## B) SPECIFICATION GUIDE

| CASING | | | TOOL | | THREAD CONNECTION BOX UP / PIN DOWN | PART NUMBER |
|---|---|---|---|---|---|---|
| SIZE (INCHES) | WEIGHT (LBS/FT) | RECOMMENDED HOLE SIZE (INCHES) | OD (INCHES) | NOMINAL ID (INCHES) | | |
| 9-5/8 | 32.3 - 43.5 | 8.755 – 9.001 | 8.500 | 4.00 | 4-1/2 EUE | 63698<br>63698H[1]<br>63698V[2] |
| | | | | | 4-1/2 NUE | 63698-XBBG<br>63698H-XBBG[1]<br>63698V-XBBG[2] |
| | 43.5 – 53.5 | 8.535 – 8.755 | 8.250 | 4.00 | 4-1/2 EUE | 63697<br>63697H[1]<br>63697V[2] |

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

| DIFFERENTIAL PRESSURE (MAX) | TENSILE LOAD THRU TOOL (MAX) |
|---|---|
| 6,000 PSI | 200,000 LBS |

## 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. |

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

| 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) 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.

Run the packer to setting depth with an ASI-X Packer (or other comparable tool) below the Snapset II Packer. Set the lower tool to provide resistance to set the Snapset II Packer. Apply sufficient set down weight to release the internal latch (5,000 – 10,000 lbs). Apply a minimum weight of 25,000 lbs at the packer to pack off the elements and set the slips.

## E) RELEASING PROCEDURES

Pick up on the tubing string. Pull enough tension to relax the elements, release the slips and re-set the internal latch. The packer can now be retrieved or run down hole.

## 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.

## 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
- STRAP WRENCH
- 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) Unscrew and remove set screws (32) from torque sleeve (20).

I-1.2) Unscrew and remove bottom sub (28) from torque sleeve (20).

I-1.2.1) Remove o-ring (36) from bottom sub (28).

I-1.3) Unscrew and remove torque pins (18) from torque ring (17).

I-1.4) Unscrew and remove torque sleeve (20) from rubber retainer adaptor (16).

I-1.5) Unscrew and remove torque ring (17) from lower mandrel (11).

I-1.6) Unscrew and remove collet (3) from rubber retainer adaptor (16).

I-1.7) Unscrew and remove lower mandrel (11) from inner mandrel (2).

I-1.8) Unscrew and remove rubber retainer adapter (16) from rubber retainer (15).

**NOTE1**: For added leverage, insert a rod thru rubber retainer (15) and secondary rubber mandrel (19).

I-1.9) Unscrew and remove secondary rubber mandrel assembly from valve body (25) and disassemble:

I-1.9.1) Remove elements (13, 14), rubber spacers (12) and rubber retainer (15) from secondary rubber mandrel (19).

I-1.10) Unscrew and remove gage ring (29) from valve body (14).

I-1.11) Unscrew and remove valve body (25) from central body (10).

I-1.11.1) Remove o-ring (33) from valve body (25).

I-1.12) Unscrew and remove central body (10) from upper cone (9).

I-1.13) Unscrew and remove seal retainer (30) from seal receptacle (23).

I-1.14) Unscrew and remove seal receptacle (23) from compensating mandrel (21).

I-1.14.1) Remove o-rings (34, 35, 39) and seal (24) from seal receptacle (23).

## I) DISASSEMBLY (cont'd)

I-2) Remove top sub (1) from vise and clamp on lower mandrel (2) in vise.

**CAUTION$_2$:** Do NOT wrench or clamp on seal surface.

I-2.1) Unscrew and remove spring cage cap (27) from spring cage (5).

**CAUTION$_1$**: Compression spring is compressed with spring tension against upper slip body assembly.

I-2.2) Unscrew and remove top sub (1) from inner mandrel (2).

I-2.3) Slide compression spring (4) off inner mandrel (2).

I-2.4) Slide upper slip body assembly off inner mandrel and disassemble:

I-2.4.1) Unscrew and remove spring cage (5) from upper slip support (31).

I-2.4.2) Wedge releasing slip (7) and upper slips (8) outwards (if needed). Unscrew and remove upper slip support (31) from upper slip body (6).

I-2.4.3) Remove wedges. Remove upper slips (7), releasing slips (8), and upper slip springs (26) from upper slip body (6).

I-2.5) Slide upper cone (9) off inner mandrel (2).

I-2.5.1) Remove o-ring (38) from upper cone (9).

I-2.6) Slide compensating piston (22) off inner mandrel (2).

I-2.6.1) Remove o-rings (37, 39) from compensating piston (10).

I-2.7) Slide compensating mandrel (21) off inner mandrel (2).

I-3) Remove lower mandrel (2) from vise.

## J) ASSEMBLY

**NOTE$_3$:** 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$_3$**: To ensure tool operates properly, install o-rings in o-ring grooves, **NOT** thread reliefs unless stated otherwise (Fig. 2).

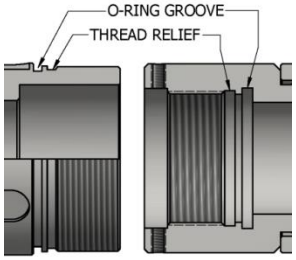



Fig. 2

J-1) Clamp inner mandrel (2) in vise.

**CAUTION$_2$:** Do NOT wrench or clamp on seal surface.

J-1.1) Slide compensating mandrel (21) onto inner mandrel (2).

J-1.2) Install o-rings (37, 39) in grooves in compensating piston (10).

J-1.3) Slide compensating piston (22) onto inner mandrel (2).

**CAUTION$_4$**: Do not rip or tear o-ring during installation.

J-1.4) Install o-ring (38) in groove in upper cone (9).

J-1.5) Slide upper cone (9) onto inner mandrel (2).

**CAUTION$_4$**: Do not rip or tear o-ring during installation.

J-1.6) Assemble upper slip body assembly and install onto inner mandrel:

J-1.6.1) Install upper slips (7), releasing slips (8), and upper slip springs (26) into upper slip body (6). Wedge releasing slip (7) and upper slips (8) outwards (if needed).

J-1.6.2) Screw upper slip support (31) into upper slip body (6). Remove wedges.

J-1.7) Screw spring cage (5) into upper slip support (31).

J-1.8) Slide compression spring (4) onto inner mandrel (2).

J-1.9) Screw top sub (1) onto inner mandrel (2).

**J) ASSEMBLY** (cont'd)

J-1.10) Screw spring cage cap (27) onto spring cage (5).

**CAUTION$_1$**: Compression spring is compressed with spring tension against upper slip body assembly.

J-2) Remove top sub (1) from vise and clamp on lower mandrel (2) in vise.

J-2.1) Install o-rings (34, 35, 39) in grooves in seal receptacle (23).

J-2.2) Install seal (24) on seal receptacle (23).

J-2.3) Screw seal receptacle (23) onto compensating mandrel (21).

**CAUTION$_4$**: Do not rip or tear o-ring during installation.

J-2.4) Screw seal retainer (30) onto seal receptacle (23).

**CAUTION$_4$**: Do not rip or tear o-ring during installation.

J-2.5) Screw central body (10) onto upper cone (9).

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

J-2.6) Install o-ring (33) in groove in valve body (25).

J-2.7) Screw valve body (25) into central body (10).

J-2.8) Screw gage ring (29) onto valve body (14).

J-2.9) Assemble secondary rubber mandrel assembly and install:

J-2.9.1) Slide rubber retainer (15), elements (13, 14), and rubber spacers (12) onto secondary rubber mandrel (19).

J-2.9.2) Screw secondary rubber mandrel (19) into valve body (25).

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

J-2.10) Screw rubber retainer adapter (16) into rubber retainer (15).

**NOTE$_4$**: For added leverage, insert a rod thru central body (10).

J-2.11) Screw lower mandrel (11) onto inner mandrel (2).

J-2.12) Screw collet (3) into rubber retainer adaptor (16).

J-2.13) Screw torque ring (17) onto lower mandrel (11). Align threaded holes with groove in torque ring (17).

J-2.14) Screw torque sleeve (20) onto rubber retainer adaptor (16).

J-2.15) Align slots in torque sleeve (20) with threaded holes in torque ring (17). Screw torque pins (18) into torque ring (17).

J-2.16) Install o-ring (36) in groove in bottom sub (28).

J-2.17) Screw bottom sub (28) into torque sleeve (20).

J-2.18) Screw set screws (32) into torque sleeve (20).

J-3) Unclamp top sub (1) from vise and remove assembled tool.

## K) PARTS LIST

| ITEM | QTY | DESCRIPTION | MATERIAL | 43.5 – 53.5# P/N 63697 | 32.3 – 43.5# P/N 63698 | 32.3 – 43.5# P/N 63698-XBBG |
|---|---|---|---|---|---|---|
| 1 | 1 | TOP SUB | DLMS80 | 60095610 | | 60095610-BBBG |
| 2 | 1 | INNER MANDREL | DLMS110 | 63698210 | | |
| 3 | 1 | COLLET | DLMS110 | 63698660 | | |
| 4 | 1 | COMPRESSION SPRING | DLMCRSP | 60395920HT | | |
| 5 | 1 | SPRING CAGE | DLMS60 | 63698311 | | |
| 6 | 1 | UPPER SLIP BODY | - | 60395320 | | |
| 7 | 1 | RELEASING SLIP | DLMS110 | 60095125 | | |
| 8 | 2 | UPPER SLIP | DLMS35 | 60095115 | | |
| 9 | 1 | UPPER CONE | DLMS35 | 63698410 | | |
| 10 | 1 | CENTRAL BODY | DLMS80 | 63698385 | | |
| 11 | 1 | LOWER MANDREL | P-110 | 63698230 | | |
| 12 | 2 | RUBBER SPACER | DLMS35 | 60295840S | 60296840S | |
| 13 | 1 | ELEMENT | 70 DURO NITRILE | 60295511S | 60296511S | |
| 14 | 2 | ELEMENT | 90 DURO NITRILE | 60295513S | 60296513S | |
| 15 | 1 | RUBBER RETAINER | DLMS35 | 63697850 | 63698850 | |
| 16 | 1 | RUBBER RETAINER ADAPTOR | DLMS80 | 63698855 | | |
| 17 | 1 | TORQUE RING | DLMS80 | 63698725 | | |
| 18 | 2 | TORQUE PIN | .50-13 X .50 HSCS | 63570377 | | |
| 19 | 1 | SECONDARY RUBBER MANDREL | DLMS60 | 63698221 | | |
| 20 | 1 | TORQUE SLEEVE | DLMS60 | 63698370 | | |
| 21 | 1 | COMPENSATING MANDREL | DLMS80 | 63698240 | | |
| 22 | 1 | COMPENSATING PISTON | DLMS35 | 63698710 | | |

## K) PARTS LIST (cont’d)

| ITEM | QTY | DESCRIPTION | MATERIAL | 43.5 – 53.5# P/N 63697 | 32.3 – 43.5# P/N 63698 | 32.3 – 43.5# P/N 63698-XBBG |
|---|---|---|---|---|---|---|
| 23 | 1 | SEAL RECEPTACLE | DLMS80 | 63698730 | | |
| 24 | 1 | SEAL | 90 DURO NITRILE | 61395520 | | |
| 25 | 1 | VALVE BODY | DLMS110 | 61395350 | | |
| 26 | 6 | UPPER SLIP SPRING | - | 7170902 | | |
| 27 | 1 | SPRING CAGE CAP | DLMS35 | 60095810 | | |
| 28 | 1 | BOTTOM SUB | DLMS80 | 63698630 | | 63698630-VBBG |
| 29 | 1 | GAGE RING | DLMS35 | 60295830 | 60296830 | |
| 30 | 1 | SEAL RETAINER | DLMS110 | 61395530 | | |
| 31 | 1 | UPPER SLIP SUPPORT | DLMS80 | 60395880 | | |
| 32 | 3 | SET SCREW 3/8-16 UNC X 5/8 | STEEL | SSS037C062 | | |
| 33 | 1 | 160-90 O-RING | 90 DURO NITRILE | 90160 | | |
| 34 | 1 | 253-90 O-RING | 90 DURO NITRILE | 90253 | | |
| 35 | 1 | 256-90 O-RING | 90 DURO NITRILE | 90256 | | |
| 36 | 1 | 350-90 O-RING | 90 DURO NITRILE | 90350 | | |
| 37 | 1 | 351-90 O-RING | 90 DURO NITRILE | 90351 | | |
| 38 | 1 | 352-90 O-RING | 90 DURO NITRILE | 90352 | | |
| 39 | 2 | 363-90 O-RING | 90 DURO NITRILE | 90363 | | |

| | | | | |
|---|---|---|---|---|
| REDRESS KIT (RDK) | | 63697050 | 63698050 | |
| ASSEMBLED WEIGHT | | 471 LBS | 476 LBS | 475 LBS |

## K) PARTS LIST (cont’d)

### K-1) ELASTOMER TRIM OPTIONS

**NOTE2**: For temperature range, refer to Elastomer Trim Temperature Guide.

K-1.1) HSN

| ITEM | QTY | DESCRIPTION | MATERIAL | 43.5 – 53.5# P/N 63697H | 32.3 – 43.5# P/N 63698H | 32.3 – 43.5# P/N 63698H-XBBG |
|---|---|---|---|---|---|---|
| 13 | 1 | ELEMENT | 70 DURO NITRILE | 60295511SH | 60296511SH | |
| 14 | 2 | ELEMENT | 90 DURO NITRILE | 60295513SH | 60296513SH | |
| 24 | 1 | SEAL | 90 DURO NITRILE | 61395520H | | |
| 33 | 1 | 160-90 O-RING | 90 DURO NITRILE | 90160H | | |
| 34 | 1 | 253-90 O-RING | 90 DURO NITRILE | 90253H | | |
| 35 | 1 | 256-90 O-RING | 90 DURO NITRILE | 90256H | | |
| 36 | 1 | 350-90 O-RING | 90 DURO NITRILE | 90350H | | |
| 37 | 1 | 351-90 O-RING | 90 DURO NITRILE | 90351H | | |
| 38 | 1 | 352-90 O-RING | 90 DURO NITRILE | 90352H | | |
| 39 | 2 | 363-90 O-RING | 90 DURO NITRILE | 90363H | | |

| | | | |
|---|---|---|---|
| | | 63697050H | 63698050H |

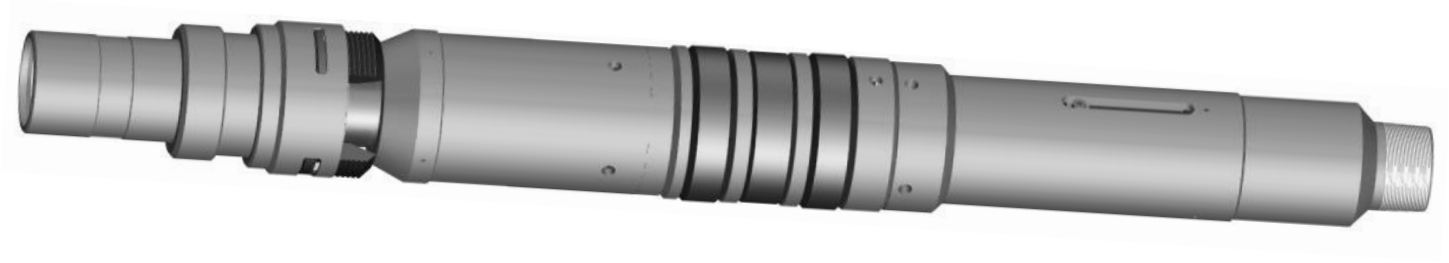
## K) PARTS LIST (cont’d)

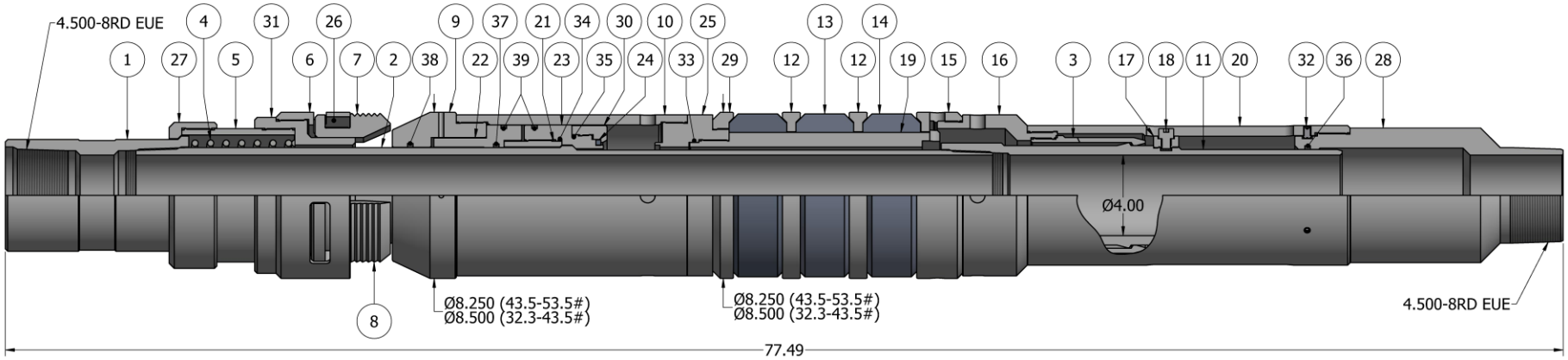
K-1.2) VITON

| ITEM | QTY | DESCRIPTION | MATERIAL | 43.5 – 53.5# P/N 63697V | 32.3 – 43.5# P/N 63698V | 32.3 – 43.5# P/N 63698V-XBBG |
|---|---|---|---|---|---|---|
| 13 | 1 | ELEMENT | 70 DURO NITRILE | 60295511SV | 60296511SV | |
| 14 | 2 | ELEMENT | 90 DURO NITRILE | 60295513SV | 60296513SV | |
| 24 | 1 | SEAL | 90 DURO NITRILE | 61395520V | | |
| 33 | 1 | 160-90 O-RING | 90 DURO NITRILE | 90160V | | |
| 34 | 1 | 253-90 O-RING | 90 DURO NITRILE | 90253V | | |
| 35 | 1 | 256-90 O-RING | 90 DURO NITRILE | 90256V | | |
| 36 | 1 | 350-90 O-RING | 90 DURO NITRILE | 90350V | | |
| 37 | 1 | 351-90 O-RING | 90 DURO NITRILE | 90351V | | |
| 38 | 1 | 352-90 O-RING | 90 DURO NITRILE | 90352V | | |
| 39 | 2 | 363-90 O-RING | 90 DURO NITRILE | 90363V | | |

| | | | |
|---|---|---|---|
| | | 63697050V | 63698050V |

## L) TECHNICAL ILLUSTRATION





## M) REVISION HISTORY

| DATE | REVISION | DESCRIPTION OF CHANGES | REVISED BY | APPROVED BY |
|---|---|---|---|---|
| 02/19/2019 | C | Revised entire manual | J.Anderson | J.Johnson |