



DLH PACKER

5-1/2" X 2-7/8"

Manual No:
DL-935-5500-046

Revision: N

Revision Date:
01/05/2021

Authored by: B.Mathis

Approved by: K.Plunkett

A) DESCRIPTION

The DLH Packer is a hydraulic set single-string retrievable packer and may be used in virtually any production application. Tubing pump pressure is used to set the packer and the setting force is locked into the packer by a body lock ring. A large internal by-pass reduces swabbing when running and retrieving. The by-pass closes when the packer is set, and opens during the releasing process to allow pressure equalization. Shear screws are used to control the packer release. The standard DLH Packer is designed for differential pressures up to 7,500 PSI.

B) RELATED TOOLS (sold separately)

B-1) 2-7/8" Pump-Out Plug—refer to technical manual *DL-597-0000-431*.

C) 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)		
5-1/2	13.0 - 15.5	4.950 – 5.044	4.813	2.38	2-7/8 EUE	93558 93558H ¹ 93558V ² 93558C ³ 93558HC ⁴ 93558VC ⁵
	14.0 - 20.0	4.778 – 5.012	4.625	2.38		93556 93556H ¹ 93556V ² 93556C ³ 93556HC ⁴ 93556VC ⁵
	20.0 - 23.0	4.670 – 4.778	4.500	2.38		93559 93559H ¹ 93559V ² 93559C ³ 93559HC ⁴ 93559VC ⁵

Tool Options: ¹HSN, ²Viton, ³Nitrile, Carbide, ⁴HSN, Carbide, ⁵Viton, Carbide

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
7,500 PSI	75,000 LBS

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



DLH PACKER

5-1/2" X 2-7/8"

Manual No:
DL-935-5500-046

Revision: N

Revision Date:
01/05/2021

Authored by: B.Mathis

Approved by: K.Plunkett

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.

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.

E) 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.

E-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. As a guide 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 gauge 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 preset conditions by pressure waves through the fluid. A slow steady running speed should be used and 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. While running in the hole, the packer body is rigidly connected to the packer mandrel and external forces caused by debris or tight spots are transmitted directly to the tubing. These forces load the mandrel through the chamber and body locks. Unless the string sequence is initiated by tubing pressure, the packer will not set.



DLH PACKER

5-1/2" X 2-7/8"

Manual No:
DL-935-5500-046

Revision: N

Revision Date:
01/05/2021

Authored by: B.Mathis

Approved by: K.Plunkett

E) SETTING PROCEDURES (cont'd)

Typically the tubing 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 to the recommended pressure for the given size of packer and hold for 5 minutes. If the well completion allows, apply annulus pressure to test the packer.

CAUTION₃: If the packer is used in a multi-zone completion above a permanent packer and locator type seal, care should be taken to ensure that no set down weight can be exerted on the locator as this will act on the shear system and try to unset the packer.

E-2) SETTING SEQUENCE

Internal tubing pressure enters the setting chamber through the setting port and acts upward on the setting sleeve and downwards on the setting chamber/lower cone. When the applied load acting on these pistons exceeds the value of the setting initiation shear screws, they will shear and allow the setting process to proceed.

The setting sleeve pushes up through the setting shear screws between the rubber mandrel and setting sleeve closing the valve and setting the upper slips. The setting chamber/lower cone pushes down setting the lower slips.

Further pressuring shears the setting shear screws and packs off the packer elements. All this setting force is mechanically locked in place by the packer lock ring as it slides over the threads on the setting sleeve.

NOTE₁: No mandrel movement occurs during the setting sequence. However, some residual tension will remain in the tubing due to the tubing elongation caused by piston effects. This should be taken into consideration when deciding on field shear-out adjustments.

F) RELEASING PROCEDURES

The packer is released by tension on the tubing string which triggers the following sequence of events:

- The upper and lower shear screws shear as the tension exceeds the shear value. The mandrel begins to move up relative to the packer body. The by-pass valve opens and movement upward raises the upper slip support thereby releasing the upper slips. Continued upward movement lifts the packer body, relaxing the packer elements and pulling the bottom cone upwards releasing the lower slips.
- The final stage of un-setting occurs when the lower section (lower slip body and lower slips) reach the bottom sub. They are then latched down by a split ring snapping into the shoulder/groove on the bottom sub, thus allowing the tool to move freely up or down.
- After unsetting, wait 10 minutes to allow the rubber to relax and then pull out of the hole. The valve will be open allowing fluid to by-pass the rubber through the passage under the rubber mandrel.
- The shear release value is adjustable by adding or removing shear screws from the shear housing, or by using steel screws. The upper brass shear screws (P/N 32045910) are rated to 5,000 lbs/screw, the lower brass shear screws (P/N DL41252) are rated to 6,000 lbs/screw.

NOTE₂: An alternate lower shear screw made of steel is available and is rated to 10,000 lbs/screw.

- Two (2) upper shear screws should always be used in the upper slip support.
- The recommended shear screw arrangement:
 - o Total shear value = 58,000 lbs
 - Upper shear screws = Two (2ea) for 10,000 lbs shear
 - Lower shear screws (brass) = Eight (8ea) for 48,000 lbs shear



DLH PACKER

5-1/2" X 2-7/8"

Manual No:
DL-935-5500-046

Revision: N

Revision Date:
01/05/2021

Authored by: B.Mathis

Approved by: K.Plunkett

G) 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.

H) SETTING AREA GUIDE

VALVE ID (INCHES)	BALANCE AREA UNPLUGGED		SHEAR VALUE (PSI/SCREW)	SETTING AREA (SQ INCHES)	SETTING INITIATION (PSI)	RECOMMENDED SETTING (PSI)
	ABOVE (SQ INCHES)	BELOW (SQ INCHES)				
3.250	1.227	4.271	342	5.842	1,460	3,500

I) 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

J) 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

K) DISASSEMBLY

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

K-1.1) Unscrew and remove bottom sub (28) from inner mandrel (2).

NOTE₃: Place back-up wrench on inner mandrel above bottom sub while wrenching on bottom sub.

K-1.2) Unscrew and remove shear screws (34) from lower slip body (18).

K-1.3) Unscrew and remove snap ring retainer (23) from lower slip body (18).

K-1.4) Remove split ring (31) from inner mandrel (2).

K-1.5) Wedge lower slips (17) outward (if needed). Remove lower slip body assembly and disassemble:



DLH PACKER

5-1/2" X 2-7/8"

Manual No:
DL-935-5500-046

Revision: N

Revision Date:
01/05/2021

Authored by: B.Mathis

Approved by: K.Plunkett

K) DISASSEMBLY (cont'd)

- K-1.5.1) Remove wedges (if needed). Remove lower slips (17) and lower slip springs (25) from lower slip body (18).
- K-1.6) Unscrew setting chamber (30) from lower cone (16). Move setting chamber assembly up and out of way temporarily.
- K-1.7) Unscrew and remove shear screws (19) from lower end of setting sleeve (21).
- K-1.8) Remove lower cone (16) from setting sleeve (21) and off of inner mandrel (2).
 - K-1.8.1) Remove o-rings (40, 42) from lower cone (16).
- K-1.9) Unscrew and remove set screws (36) from upper end of setting chamber (30).
- K-1.10) Unscrew and remove shear screw (45) from setting chamber (30).
- K-1.11) Unscrew and remove setting chamber (30) from lock ring (3).
- K-1.12) Remove snap ring (27) from inner mandrel (2).
- K-1.13) Unscrew and remove shear screws (19) from upper end of setting sleeve (21).
- K-1.14) Unscrew and remove setting sleeve (21) from rubber retainer (15).
- K-1.15) Remove setting sleeve assembly and disassemble.
 - K-1.15.1) Remove setting chamber cap (22) from setting sleeve (21).
 - K-1.15.2) Unscrew and/or slide lock ring (3) from setting sleeve (21) (**NOTE4:** Left-hand threads).
 - NOTE18:** Using snap ring spreader pliers, the lock ring (3) may be spread slightly to be removed from setting sleeve (21).
 - K-1.15.3) Remove o-rings (40, 42) from setting sleeve (21).
- K-1.16) Unscrew rubber mandrel (11) from center coupling (10).
- K-1.17) Remove rubber mandrel assembly and disassemble:
 - K-1.17.1) Remove gage ring (29), elements (13, 14), rubber spacers (12), and rubber retainer (15) from rubber mandrel (11).
- K-1.18) Unscrew and remove center coupling (10) from by-pass housing (20).
 - K-1.18.1) Remove o-rings (39, 41) from center coupling (10).
- K-1.19) Unscrew and remove by-pass housing (20) from upper cone (9).
 - K-1.19.1) Remove bonded seal (24) and o-ring (43) from by-pass housing (20).
 - K-1.19.1.1) Remove o-ring (37) from bonded seal (24).
- K-1.20) Unscrew and remove set screws (35) from valve piston (5).
- K-1.21) Unscrew and remove valve piston (5) from inner mandrel (2).
 - K-1.21.1) Remove o-ring (44) from valve piston (5).
- K-2) Remove top sub (1) from vise and clamp inner mandrel (2) in vise.
 - NOTE5:** Do NOT wrench or clamp on seal surface.
 - K-2.1) Unscrew and remove shear screws (32) from upper slip support (33).
 - K-2.2) Unscrew and remove top sub (1) from inner mandrel (2).
 - K-2.3) Unscrew and remove upper slip support (33) from upper slip body (6).
 - K-2.4) Wedge releasing slip (7) and upper slips (8) outward (if needed). Remove upper slip body assembly and disassemble:
 - K-2.4.1) Remove wedges (if needed). Remove releasing slip (7), upper slips (8), and upper slip springs (26) from upper slip body (6).
 - K-2.5) Remove upper cone (9) from inner mandrel (2).



DLH PACKER

5-1/2" X 2-7/8"

Manual No:
DL-935-5500-046

Revision: N

Revision Date:
01/05/2021

Authored by: B.Mathis

Approved by: K.Plunkett

K) DISASSEMBLY (cont'd)

K-2.6) Remove balance piston (4) from inner mandrel (2).

K-2.6.1) Remove o-rings (38, 40) from balance piston (4).

K-3) Remove inner mandrel (2) from vise.

L) ASSEMBLY

NOTE6: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order and orientation. Tighten/torque all connections properly.

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

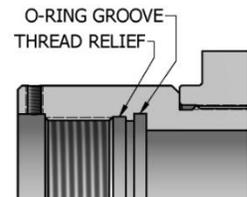


Fig. 2



L-1) Install o-ring (44) in groove in valve piston (5).

L-2) From lower end of inner mandrel (2), slide valve piston (5) onto inner mandrel (2). Screw valve piston (5) onto inner mandrel (2) (Fig. 3). Align threaded holes in valve piston (5) with grooves in inner mandrel (2).

L-3) Screw set screws (35) into valve piston (5).

L-4) Install o-rings (38, 40) into grooves on balance piston (4) (Fig. 4).

L-5) From upper end of inner mandrel (2), slide balance piston (4) onto inner mandrel (2) until it contacts/stops at the first shoulder.



Fig. 4

NOTE7: Stand inner mandrel (2) on end if needed.

L-6) Install upper cone (9) onto inner mandrel (2). Use upper cone (9) to tap balance piston (4) down into position against valve piston (5) (Fig. 4).

CAUTION4: Do not rip or tear o-ring during installation.



Fig. 5



Fig. 6

L-7) Assemble upper slip body assembly and install:

L-7.1) Screw upper slip support (33) into upper slip body (6).

L-7.2) Install top sub (1) into upper slip support (33). Align groove in top sub (1) with threaded holes in upper slip support (33).

L-7.3) Screw shear screws (32) into upper slip support (33). Tighten until shear screws (32) contact top sub (1). Back out 1/4 turn.

L-7.4) Install upper slip springs (26), releasing slip (7), and upper slips (8) into upper slip body (6). Wedge releasing slip (7) and upper slips (8) outwards (Fig. 5).

L-7.5) Install upper slip body assembly onto inner mandrel (2). Screw top sub (1) onto inner mandrel (2) (Fig. 6).

NOTE8: Be sure shear screws were backed out properly allowing top sub to screw on easily.

L-7.6) Remove wedges from slips.



DLH PACKER

5-1/2" X 2-7/8"

Manual No:
DL-935-5500-046

Revision: N

Revision Date:
01/05/2021

Authored by: B.Mathis

Approved by: K.Plunkett

L) ASSEMBLY (cont'd)

L-8) Assemble by-pass housing assembly:

L-8.1) Install o-ring (43) in groove in by-pass housing (20).

L-8.2) Install o-ring (37) in groove in bonded seal (24).

L-8.3) Install bonded seal (24) in by-pass housing (20).

CAUTION₄: Do not rip or tear o-ring during installation.

L-8.4) Install o-rings (39, 41) in grooves in center coupling (10).

L-8.5) Screw center coupling (10) into by-pass housing (20). Hand-tighten until o-ring (41) contacts ID of by-pass housing (20) (Fig. 7).

CAUTION₄: Do not rip or tear o-ring during installation.



Fig. 7



Fig. 8



Fig. 9

L-9) Assemble rubber mandrel assembly:

L-9.1) Stand rubber mandrel (11) on end with threads facing upwards. Install rubber retainer (15), elements (13, 14), rubber spacers (12), and gage ring (29) onto rubber mandrel (11) (Fig. 8).

NOTE₁₂: Do not damage threads - use plastic or rubber hammer as needed.

L-10) Assemble rubber mandrel assembly into by-pass housing assembly:

L-10.1) Clamp by-pass housing assembly in vise - clamp on by-pass housing (20).

L-10.2) Screw rubber mandrel (11) (of rubber mandrel assembly) into center coupling (10) (of by-pass housing assembly). Hand-tighten until rubber mandrel (11) contacts o-ring (39) (Fig. 9).

CAUTION₄: Do not rip or tear o-ring during installation.

L-10.3) Tighten rubber mandrel (11) (of rubber mandrel assembly) by wrenching on rubber mandrel (11) to tighten connections in sub-assembly.

L-11) Assemble setting chamber assembly:

L-11.1) Install o-rings (40, 42) in grooves in setting sleeve (21).

L-11.2) Stand setting sleeve (21) on end with upper end facing upwards.

L-11.3) Install setting chamber (30) over setting sleeve (21).

L-11.4) Install lock ring (3) onto setting sleeve (21) until outer threads contact threads in setting chamber (30). Rotate setting chamber (30) to thread lock ring (3) into setting chamber leaving enough room for setting chamber cap (22) to be installed.

NOTE₉: ID threads **MUST NOT** engage with threads on setting sleeve (21).

NOTE₁₀: Threads on lock ring (3) are directional - it **MUST** be installed in correct direction for tool to work properly.

L-11.5) Align gap in lock ring (3) with threaded hole in setting chamber (30). Screw shear screw (45) into setting chamber (30). Tighten until screw contacts setting sleeve (21). Back off 1/4 turn.

L-11.6) Install setting chamber cap (22) into setting chamber (30).

L-11.7) Align holes in setting chamber (30) with threaded holes in setting chamber cap (22). Screw set screws (36) into setting chamber cap (22) until flush with O.D. of setting chamber (30).

NOTE₁₁: Do not overtighten set screws (36). Setting chamber assembly must be loose enough to slide down to lower cone (16).

L-12) Assemble setting chamber assembly onto rubber mandrel assembly:



DLH PACKER

5-1/2" X 2-7/8"

Manual No:
DL-935-5500-046

Revision: N

Revision Date:
01/05/2021

Authored by: B.Mathis

Approved by: K.Plunkett

L) ASSEMBLY (cont'd)

L-12.1) During the sub-assembly process, the rubber retainer (15) and elements (13, 14) get in a slight bind. Using a plastic or rubber hammer, tap upwards on rubber retainer (15) to unbind them enough to thread onto setting chamber assembly.

NOTE₁₂: Do not damage threads - use plastic or rubber hammer as needed.



Fig. 10

L-12.2) Install setting chamber assembly onto rubber mandrel (11). Screw rubber retainer (15) onto setting sleeve (21) (Fig. 10).

L-12.3) Remove assembly from vise and set aside temporarily.

L-13) Clamp top sub (1) and mandrel assembly in vise.



Fig. 11

L-13.1) While gripping in the element area, slide pre-assembled assemblies (by-pass housing assembly, rubber mandrel assembly, and setting chamber assembly) onto mandrel assembly past contact with o-ring(s) and on upwards to upper cone (9) (Fig. 11).

NOTE₁₃: DO NOT grip on the setting chamber assembly as this may cause the lock ring to prematurely lock in place.

L-13.2) Tap setting chamber assembly upwards to rubber retainer (15).

NOTE₁₂: Do not damage threads. Use plastic or rubber hammer as needed.

L-14) Install snap ring (27) in groove in inner mandrel (2).

L-15) Screw upper cone (9) into by-pass housing (20).

NOTE₁₄: For added leverage, insert a rod or punch tool into holes in by-pass housing (20) as needed.

L-16) Install o-rings (40, 42) in grooves in lower cone (16).



Fig. 12

L-17) Install lower cone (16) onto inner mandrel (2). Tap lower cone (16) into place. Align threaded holes in lower cone (16) with holes in setting sleeve (21).

CAUTION₄: Do not rip or tear o-ring during installation.

L-18) Screw shear screws (19) into setting sleeve (21). Tighten until shear screws (19) contact inner mandrel (2). Back out 1/4 turn.



Fig. 13



DLH PACKER

5-1/2" X 2-7/8"

Manual No:
DL-935-5500-046

Revision: N

Revision Date:
01/05/2021

Authored by: B.Mathis

Approved by: K.Plunkett

L) ASSEMBLY (cont'd)

L-19) Assemble lower slip body assembly and install:

- L-19.1) Install lower slip springs (25) and lower slips (17) into lower slip body (18).
- L-19.2) Wedge lower slips (17) outward. Install lower slip body assembly onto inner mandrel (2).
- L-19.3) Remove wedges from slips.
- L-19.4) Align threaded holes in lower slip body (18) with recessed holes in inner mandrel (2). Screw shear screws (34) into lower slip body (18). Tighten until shear screws (34) contact inner mandrel (2). Back out 1/4 turn.
- L-19.5) Install split ring (31) onto inner mandrel (2) up against lower slip body (18).
- L-19.6) Screw snap ring retainer (23) into lower slip body (18).

L-20) Screw bottom sub (28) onto inner mandrel (2) (Fig. 13).

Fig. 14



L-21) Slide setting chamber assembly down. Tap setting chamber assembly downwards onto lower cone (16) over o-rings (40). Screw setting chamber (30) onto lower cone (16) (Fig. 14).

L-22) Wrench on setting chamber (30) to tighten. Downward pressure may be required to get threads started. Back up on lower cone (16) with wrench as needed.

L-23) Align threaded holes in setting sleeve (21) with holes in rubber mandrel (11). May have to tap setting chamber assembly downwards using hammer and brass block to align holes.

NOTE₁₅: Align large holes in setting sleeve (21) with large holes in rubber mandrel (11).

L-24) Screw shear screws (19) into upper end of setting sleeve (21). Tighten until shear screws (19) contact rubber mandrel (11). Back out 1/4 turn (Fig. 15).

NOTE₁₆: Shear screws (19) **MUST** be below the OD surface of the setting sleeve (21). Adjust shear screws (19) as required.

L-25) Unclamp top sub (1) from vise and remove assembled tool.

NOTE₂₀: If pressure testing of the packer is desired, refer to technical manual *DL-937-5500-1177*. Pressure testing of the packer is not mandatory.



DLH PACKER

5-1/2" X 2-7/8"

Manual No:
DL-935-5500-046

Revision: N

Revision Date:
01/05/2021

Authored by: B.Mathis

Approved by: K.Plunkett

M) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	14.0 - 20.0# P/N 93556	13.0 - 15.5# P/N 93558	20.0 - 23.0# P/N 93559
1	1	TOP SUB - TYPE 1*	DLMS80	93559610		
2	1	INNER MANDREL - TYPE 1	DLMS80	93559210		
3	1	LOCK RING - TYPE 1	DLMS80	93559011		
4	1	BALANCE PISTON - TYPE 1	DLMS60	93559918		
5	1	VALVE PISTON - TYPE 1	DLMSS110	93559960		
6	1	UPPER SLIP BODY - TYPE 1	DLMS80 / DLMS60	93559320	93558320	93559320
7	1	RELEASING SLIP - TYPE 1	DLMSS110	60056125	60058125	60056125
8	2	UPPER SLIP -TYPE 1	DLMS60	60056115	60058115	60056115
9	1	UPPER CONE - TYPE 2†	DLMS80	93559410		
10	1	CENTER COUPLING - TYPE 1	DLMS80	93559230		
11	1	RUBBER MANDREL - TYPE 1	DLMS80	93559220		
12	2	RUBBER SPACER - TYPE 2	DLMS60	60256840	60258840	60259840
13	1	ELEMENT	70 DURO NITRILE	60256511	60258511	60259511
14	2	ELEMENT	90 DURO NITRILE	60256513	60258513	60259513
15	1	RUBBER RETAINER - TYPE 2	DLMS60	93556850	93558850	93559850
16	1	LOWER CONE - TYPE 1	DLMS80	93559420		
17	4	LOWER SLIP - TYPE 1	DLMS60	93559135		
18	1	LOWER SLIP BODY - TYPE 1	DLMS80	93556325	93558325	93559325



DLH PACKER

5-1/2" X 2-7/8"

Manual No:
DL-935-5500-046

Revision: N

Revision Date:
01/05/2021

Authored by: B.Mathis

Approved by: K.Plunkett

M) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	14.0 - 20.0# P/N 93556	13.0 - 15.5# P/N 93558	20.0 - 23.0# P/N 93559
19	12	SHEAR SCREW (342 PSI) 5/16-18 UNC X 3/8	DLM360BRS	BSSSLT031C037		
20	1	BY-PASS HOUSING - TYPE 1	DLMS80	93559311		
21	1	SETTING SLEEVE - TYPE 1	DLMS80	93559751		
22	1	SETTING CHAMBER CAP - TYPE 2	DLMS60	93559315		
23	1	SNAP RING RETAINER - TYPE 2	DLMS80	93559022		
24	1	BONDED SEAL	90 DURO NITRILE	60070520		
25	8	LOWER SLIP SPRING	-	7155901		
26	6	UPPER SLIP SPRING	-	7155902		
27	1	SNAP RING - TYPE 2	DLMS110	93559980		
28	1	BOTTOM SUB - TYPE 1	DLMS80	93559630		
29	1	GAGE RING - TYPE 2	DLMS60	60256830	60258830	60259830
30	1	SETTING CHAMBER - TYPE 1	DLMS110	93559314		
31	1	SPLIT RING - TYPE 2	DLMS25	587CSR325		
32	2	SHEAR SCREW (5000#)	DLM360BRS	32045910		
33	1	UPPER SLIP SUPPORT - TYPE 1	DLMS80	93559810		
34	8	SHEAR SCREW (6000#)	DLM360BRS	DL41252		
35	2	SET SCREW 1/4-20 UNC X 3/8	STEEL	SSS025C037		
36	2	SET SCREW 1/4-20 UNC X 1/4	STEEL	SSS025C025		

	<h1>DLH PACKER</h1> <h2>5-1/2" X 2-7/8"</h2>	Manual No: DL-935-5500-046
		Revision: N
		Revision Date: 01/05/2021
<i>Authored by: B.Mathis</i>		<i>Approved by: K.Plunkett</i>

M) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	14.0 - 20.0# P/N 93556	13.0 - 15.5# P/N 93558	20.0 - 23.0# P/N 93559
37	1	153 O-RING	90 DURO NITRILE		90153	
38	1	234 O-RING	90 DURO NITRILE		90234	
39	1	235 O-RING	90 DURO NITRILE		90235	
40	3	240 O-RING	90 DURO NITRILE		90240	
41	1	241 O-RING	90 DURO NITRILE		90241	
42	2	337 O-RING	90 DURO NITRILE		90337	
43	1	339 O-RING	90 DURO NITRILE		90339	
44	1	342 O-RING	90 DURO NITRILE		90342	
45	1	SHEAR SCREW (1200#) 1/4-20 UNC X 1/4	DLM360BRS		BSSSLT025C025	

REDRESS KIT (RDK)		93556050	93558050	93559050
ASSEMBLED WEIGHT		137 LBS	140 LBS	135 LBS

*Type 1 component isolates pressure and/or may be loaded in tension as the result of axial loads on the packer or bridge plug during run-in, setting, in situ, or retrieval.

†Type 2 component does not meet the criteria of a type 1 component.

	DLH PACKER 5-1/2" X 2-7/8"	Manual No: DL-935-5500-046
		Revision: N
		Revision Date: 01/05/2021
<i>Authored by: B.Mathis</i>		<i>Approved by: K.Plunkett</i>

M) PARTS LIST (cont'd)

M-1) ELASTOMER TRIM OPTIONS

NOTE₁₉: For temperature range, refer to Elastomer Trim Temperature Guide.

M-1.1) HSN

ITEM	QTY	DESCRIPTION	MATERIAL	14.0 - 20.0# P/N 93556H	13.0 - 15.5# P/N 93558H	20.0 - 23.0# P/N 93559H
13	2	ELEMENT	70 DURO HSN	60256511H	60258511H	60259511H
14	1	ELEMENT	90 DURO HSN	60256513H	60258513H	60259513H
24	1	BONDED SEAL	90 DURO HSN	60070520H		
37	1	153 O-RING	90 DURO HSN	90153H		
38	1	234 O-RING	90 DURO HSN	90234H		
39	1	235 O-RING	90 DURO HSN	90235H		
40	3	240 O-RING	90 DURO HSN	90240H		
41	1	241 O-RING	90 DURO HSN	90241H		
42	2	337 O-RING	90 DURO HSN	90337H		
43	1	339 O-RING	90 DURO HSN	90339H		
44	1	342 O-RING	90 DURO HSN	90342H		

REDRESS KIT (RDK)		93556050H	93558050H	93559050H
-------------------	--	-----------	-----------	-----------



DLH PACKER

5-1/2" X 2-7/8"

Manual No:
DL-935-5500-046

Revision: N

Revision Date:
01/05/2021

Authored by: B.Mathis

Approved by: K.Plunkett

M) PARTS LIST (cont'd)

M-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	14.0 - 20.0# P/N 93556V	13.0 - 15.5# P/N 93558V	20.0 - 23.0# P/N 93559V
13	1	ELEMENT	70 DURO VITON	60256511V	60258511V	60259511V
14	2	ELEMENT	90 DURO VITON	60256513V	60258513V	60259513V
24	1	BONDED SEAL	90 DURO VITON	60070520V		
37	1	153 O-RING	90 DURO VITON	90153V		
38	1	234 O-RING	90 DURO VITON	90234V		
39	1	235 O-RING	90 DURO VITON	90235V		
40	3	240 O-RING	90 DURO VITON	90240V		
41	1	241 O-RING	90 DURO VITON	90241V		
42	2	337 O-RING	90 DURO VITON	90337V		
43	1	339 O-RING	90 DURO VITON	90339V		
44	1	342 O-RING	90 DURO VITON	90342V		

REDRESS KIT (RDK)		93556050V	93558050V	93559050V
-------------------	--	-----------	-----------	-----------

M-2) CARBIDE OPTIONS

ITEM	QTY	DESCRIPTION	MATERIAL	14.0 - 20.0# P/N 93556C	13.0 - 15.5# P/N 93558C	20.0 - 23.0# P/N 93559C
8	2	CARBIDE UPPER SLIP -TYPE 1	DLMS60	60056115C	60058115C	60056115C
17	4	CARBIDE LOWER SLIP - TYPE 1	DLMS60	93559135C		



DLH PACKER

5-1/2" X 2-7/8"

Manual No:
DL-935-5500-046

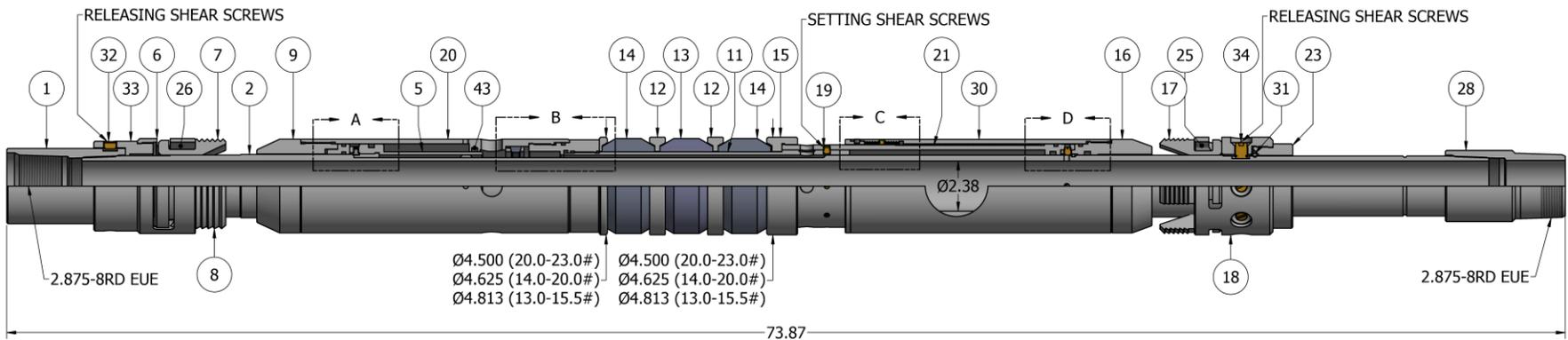
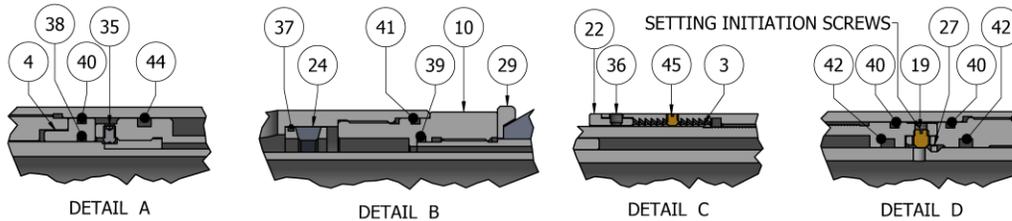
Revision: N

Revision Date:
01/05/2021

Authored by: B.Mathis

Approved by: K.Plunkett

N) TECHNICAL ILLUSTRATION



	DLH PACKER 5-1/2" X 2-7/8"	Manual No: DL-935-5500-046
		Revision: N
		Revision Date: 01/05/2021
<i>Authored by: B.Mathis</i>		<i>Approved by: K.Plunkett</i>

O) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
01/05/2021	N	Revised 90240 qty 3 was 2, Removed 90238; Added carbide options	J.Anderson	E.Visaez
02/28/2020	M	Removed tool drift ID, Pressure Test, Added General Screw Torque Recommendation, Note20, P/N BSSSLT025C025; Revised Elastomer Trim Temp. Guide temp ratings	J.Anderson	H.Bringham
12/04/2015	L	Revised: Elastomer Durometer Temperatures – Nitrile (90/80/90 Duro) was 250° - 300°F, Nitrile (Contact D&L Sales) was 300°F +, Rubber Type Temperature Ranges – Nitrile was 70° - 300°F, HSN was 70° - 325°F	J.Anderson	H.Bringham
08/24/2015	K	Revised Parts List for parts description and material	J.Anderson	C.Colvin
08/21/2015	J	Revised tool tensile load was 81,000 lbs	J.Anderson	C.Colvin
09/03/14	H	Revised technical illustration, step L-2	J.Anderson	J.McArthur
08/06/14	G	Revised P/N 32045910 was DL51775; 7155901 was 7170901 (qty 8 was 4); Added tool drift ID, max tensile load, related tools, pre-installation inspection and storage procedures	J.Anderson	J.McArthur
12/18/12	F	Revised technical illustration; Added HSN and Viton assembly options (P/Ns 93558H, 93558V, 93556H, 93556V, 93559H, 93559V), element selection guide, recommended hand tools and options parts lists sections; Rewrote disassembly and assembly instructions.	J.Anderson	B.Oligschlaeger