



AS-5 PACKER

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

Manual No:
DL-608-5500-690

Revision: **A**

Revision Date:
07/11/2014

Authored by: *J.Anderson*

Approved by: *K.Plunkett*

A) DESCRIPTION

The AS-5 Packer is a compression set tool with a J-slot to control pack-off. It is run above other packers - such as the AS-III Packer - to selectively treat, produce or inject in multiple zone completions. It is also used to isolate casing hole perforations. This packer features a large by-pass area to prevent swabbing when running and retrieving. When releasing, the valve allows debris to be washed from the upper slips.

B) RELATED TOOLS

B-1) 2-7/8" DT-2 On/Off Tool and Stinger—refer to technical manual *DL-512-2875-146*.

C) 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)	DRIFT ID (INCHES)		
5-1/2	14.0 – 20.0	4.778 – 5.012	4.625	2.38	2.347	2-7/8 EUE	60856 60856H ¹ 60856V ²
	20.0 – 23.0	4.670 – 4.778	4.500	2.38	2.347		60859 60859H ¹ 60859V ²

¹HSN Option ²Viton Option

NOTE₁: Tools listed are right-hand set / right-hand release.

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
7,000 PSI	65,665 LBS

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.



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.

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.

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 (cont'd)

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.

Run the packer to setting depth. Pick up the tubing to allow for setting stroke (12-13") plus desired tubing load. Rotate the tubing 1/4 right-hand turn at the packer, and then lower the tubing while releasing torque. Slack off on the tubing sufficient weight to set the packer (11,000 lbs). Pull tension to assure that the upper slips are set. The tubing can then be left in tension, compression or neutral. If insufficient weight is available to set the packer with compression, tension can be applied after slack-off to pack off the elements.

F) RELEASING PROCEDURES

Set down weight on the packer to unseat the J-pin from the tension shoulder of the J-slot. Refer to the Pressure Affected Area Guide to determine necessary set down weight on the packer. Rotate the tubing 1/4 right-hand turn at the packer and pick up while holding right-hand torque. Weight in addition to pipe weight may be required to pick up on packer - refer to Pressure Affected Area Guide. The internal by-pass will open, allowing pressure to equalize. After pressure is equalized, continue to pick up to release the upper slips, relax the elements and release the lower slips thus allowing the packer to be re-set or removed from the well.

CAUTION₃: High differential pressure below the packer may cause the upper slips to wedge in tighter, requiring an extra amount of tension to release the upper slips.

G) STORAGE PROCEDURES

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 or other 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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H) PRESSURE AFFECTED AREA GUIDE

PACKER SIZE (INCHES)	TUBING SIZE (INCHES)	PRESSURE (SQ. INCHES)	
		ABOVE	BELOW
5-1/2 X 2-7/8	2.375	2.06 DOWN	3.22 UP
	2.875	0.00 UP	1.81 DOWN

Example: Consider a 5-1/2" X 2-7/8 ASI-5 Packer set on 2.375" tubing with a differential pressure of 3,000 PSI in the annulus around the tubing above the packer. How much force is acting on the seal area of the mandrel?

To calculate the force (lbs) acting on the seal area of the mandrel, refer to the pressure affected area guide for a 5-1/2" X 2-7/8 ASI-5 Packer set on 2.375" tubing. In this example, the differential pressure from above the packer acts down on the seal area of the mandrel area across a pressure affected area of 2.06 in². Multiplying the differential pressure (3,000 PSI) by the pressure affected area (2.06 in²) results in a downward force of 6,180 lbs. 6,180 lbs is the force which needs to be overcome when releasing the packer.

I) ELEMENT SELECTION GUIDE

NITRILE (STD)			
TEMPERATURE RANGE (F°)	DUROMETER		
	END	MIDDLE	END
70° - 125°	80	70	80
125° - 250°	90	70	90
250° - 300°	90	80	90
300° +	Contact D&L Sales		

RUBBER TYPE	TEMPERATURE RANGE
NITRILE	70° - 300°F
HSN (HNBR)	70° - 325°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 set screws (22) from J-body (20).

K-1.2) Unscrew and remove bottom sub (21) from J-body (20).

K-1.2.1) Remove o-ring (27) from bottom sub (21).

K-1.3) Unscrew and remove torque screws (18) from lower mandrel (23).

K-1.4) Unscrew and remove J-body (20) from rubber retainer (15) (**NOTE**₄: Left-hand threads).



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K) DISASSEMBLY (cont'd)

- K-1.5) Unscrew and remove lower mandrel (23) from inner mandrel (2).
 - K-1.5.1) Remove o-ring (25) from lower mandrel (23).
- K-1.6) Unscrew rubber mandrel (11) from center coupling (10).
- K-1.7) Remove rubber mandrel assembly and disassemble:
 - K-1.7.1) Remove gage ring (17), elements (13, 14), rubber spacers (12) and rubber retainer (15) from rubber mandrel (11).
- K-1.8) Unscrew and remove center coupling (10) from upper cone (9).
 - K-1.8.1) Remove bonded seal (24) and o-ring (26) from center coupling (10).
 - K-1.8.1.1) Remove o-ring (24) from bonded seal (24).
- K-1.9) Remove upper cone (9) and bearing bushing (6) from inner mandrel (2).
- K-2) Remove top sub (1) from vise. Clamp lower part of inner mandrel (2) in vise.
 - CAUTION₆:** Do **NOT** wrench or clamp on seal surface.
 - K-2.1) Unscrew and remove spring cage cap (3) from spring cage (5).
 - CAUTION₄:** Compression spring (4) is compressed with spring tension against spring cage assembly.
 - K-2.2) Unscrew and remove top sub (1) from inner mandrel (2).
 - K-2.3) Remove compression spring (4) from inner mandrel (2).
 - K-2.4) Wedge releasing slip (7) and upper slips (8) outwards (if needed). Remove spring cage assembly and disassemble:
 - K-2.4.1) Remove wedges (if needed). Remove releasing slip (7), upper slips (8) and upper slip springs (19) from spring cage assembly (5).
- K-3) Remove inner mandrel (2) from vise.

L) ASSEMBLY

NOTE₃: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.

CAUTION₇: To ensure tool operates properly, install o-rings in o-ring grooves **NOT** thread reliefs unless stated otherwise (Fig. 2).

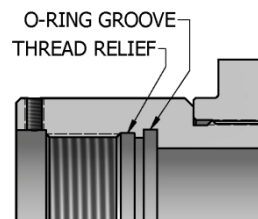


Fig. 2

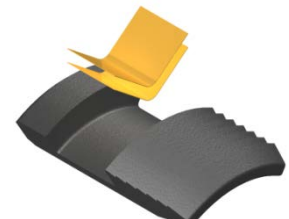


Fig. 3

- L-1) Clamp inner mandrel (2) in vise.
 - CAUTION₆:** Do **NOT** wrench or clamp on seal surface.
 - L-1.1) Assemble spring cage assembly and install:
 - L-1.1.1) Install upper slips (8), releasing slip (7), and upper slip springs (19) into spring cage (5).
 - NOTE₆:** Install two (2ea) springs per slip (Fig. 3).
 - L-1.1.2) Wedge releasing slip (7) and upper slips (8) outwards. Install spring cage assembly onto inner mandrel (2) and remove wedges.
 - L-1.2) Install compression spring (4) onto inner mandrel (2).
 - L-1.3) Screw top sub (1) onto inner mandrel (2).
 - L-1.4) Screw spring cage cap (3) into spring cage (5).
 - CAUTION₄:** Compression spring (4) is compressed with spring tension against spring cage assembly.
- L-2) Remove inner mandrel (2) from vise. Clamp top sub (1) in vise.
 - L-2.1) Install upper cone (9) and bearing bushing (6) onto inner mandrel (2).



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L) ASSEMBLY (cont'd)

L-2.2) Install o-ring (26) in groove in center coupling (10).

L-2.3) Install o-ring (24) in groove in bonded seal (24).

L-2.4) Install bonded seal (24) into center coupling (10).

CAUTION₅: Do not rip or tear o-ring during installation.

L-2.5) Screw center coupling (10) onto upper cone (9).

L-2.6) Assemble rubber mandrel assembly and install:

L-2.6.1) Install rubber retainer (15), elements (13, 14), rubber spacers (12), and gage ring (17) onto rubber mandrel (11).

L-2.6.2) Install rubber mandrel assembly onto inner mandrel (2).

L-2.6.3) Screw rubber mandrel (11) into center coupling (10).

L-2.7) Install o-ring (25) in groove in lower mandrel (23).

L-2.8) Screw lower mandrel (23) onto inner mandrel (2).

CAUTION₅: Do not rip or tear o-ring during installation.

L-2.9) Screw J-body (20) into rubber retainer (15) (**NOTE₄:** Left-hand threads).

L-2.10) Align upper tension shoulder of J-slot in J-body with threaded hole in lower mandrel (23). Screw torque screw (18) into lower mandrel (23).

L-2.11) Install o-ring (27) in groove in bottom sub (21).

L-2.12) Screw bottom sub (21) into J-body (20).

CAUTION₅: Do not rip or tear o-ring during installation.

L-2.13) Screw set screws (22) into J-body (20).

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

M) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60856 (14.0 – 20.0#)	P/N 60859 (20.0 – 23.0#)
1	1	TOP SUB	1026	60070610	
2	1	INNER MANDREL	L-80	60856210	60859210
3	1	SPRING CAGE CAP	1026	60056810	60059810
4	1	COMPRESSION SPRING	CHROME VANADIUM	60356920	
5	1	SPRING CAGE	1026	60056325	60859325
6	1	BEARING BUSHING	1026	60056224	
7	1	RELEASING SLIP	P-110	60056125	
8	2	UPPER SLIP	1026	60056115	
9	1	UPPER CONE	1026	60056410	



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M) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60856 (14.0 – 20.0#)	P/N 60859 (20.0 – 23.0#)
10	1	CENTER COUPLING	1026	60056620	
11	1	RUBBER MANDREL	L-80	60856220	
12	2	RUBBER SPACER	1026	60256840	60259840
13	1	ELEMENT	70 DURO NITRILE	60256511	60259511
14	2	ELEMENT	90 DURO NITRILE	60256513	60259513
15	1	RUBBER RETAINER	1026	60856850	60859850
16	1	BONDED SEAL	90 DURO NITRILE	60056520	
17	1	GAGE RING	1026	60256830	60259830
18	2	SLOTTED TORQUE SCREW	P-110	60856912	
19	6	UPPER SLIP SPRING	ELGILOY	7155902	
20	1	J-BODY	1026	60856340	
21	1	BOTTOM SUB	1026	60856630	
22	2	SET SCREW 3/8-16 UNC X 3/8	STEEL	SSS037C037	
23	1	LOWER MANDREL	L-80	60856216	
24	1	151 O-RING	90 DURO NITRILE	90151	
25	1	233 O-RING	90 DURO NITRILE	90233	
26	1	237 O-RING	90 DURO NITRILE	90237	
27	1	336 O-RING	90 DURO NITRILE	90336	

REDRESS KIT (RDK)		60856050	60859050
ASSEMBLED WEIGHT		128 LBS	122 LBS



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N) OPTIONS PARTS LIST

N-1) HSN

NOTE₇: For temperature range, refer to element selection guide.

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60856H (14.0 – 20.0#)	P/N 60859H (20.0 – 23.0#)
13	1	ELEMENT	70 DURO HSN	60256511H	60259511H
14	2	ELEMENT	90 DURO HSN	60256513H	60259513H
16	1	BONDED SEAL	90 DURO HSN	60056520H	
24	1	151 O-RING	90 DURO HSN	90151H	
25	1	233 O-RING	90 DURO HSN	90233H	
26	1	237 O-RING	90 DURO HSN	90237H	

REDRESS KIT (RDK)		60856050H	60859050H
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N-2) VITON

NOTE₇: For temperature range, refer to element selection guide.

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 60856V (14.0 – 20.0#)	P/N 60859V (20.0 – 23.0#)
13	1	ELEMENT	70 DURO VITON	60256511V	60259511V
14	2	ELEMENT	90 DURO VITON	60256513V	60259513V
16	1	BONDED SEAL	90 DURO VITON	60056520V	
24	1	151 O-RING	90 DURO VITON	90151V	
25	1	233 O-RING	90 DURO VITON	90233V	
26	1	237 O-RING	90 DURO VITON	90237V	

REDRESS KIT (RDK)		60856050V	60859050V
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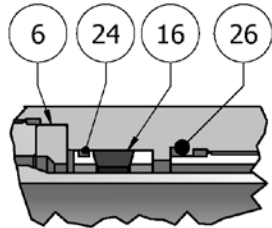
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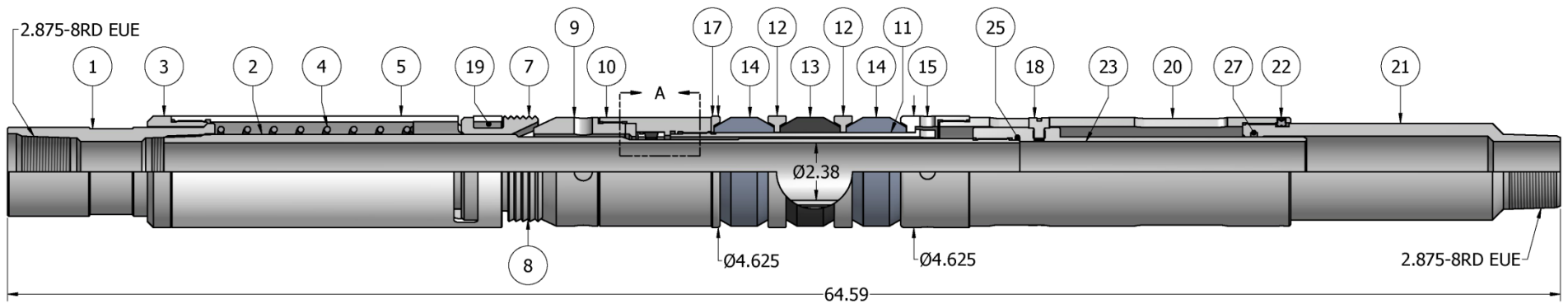
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O) TECHNICAL ILLUSTRATION



DETAIL A



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P) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
07/11/14	A	Created new manual	-	-