

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

Manual No: **DL-311-7000-1617**

Revision: A

Revision Date:

09/28/2022

Authored by: J.Anderson

Approved by: E.Visaez

A) DESCRIPTION

The Snubset I HT Packer is a purpose built, wireline set, double grip production packer with a straight pull shear release mechanism. It is designed to offer a few distinct advantages over a more traditional VSI-X HT Packer with Shear Release while offering maximum performance in a compact package. Shorter and lighter, the Snubset isolates the shear release mechanism from setting forces and pressure to prevent accidental shear release while setting the tool or when plugged below. The element is positioned above the slips to maximize resistance to debris downhole. The packer is designed for differential pressures up to 10,000 psi from above or below, even when plugged. A large bypass opens as the tool is released which allows for rapid equalization and reduces swabbing upon retrieval.

The Snubset packer is designed to be run with an On-Off Tool Stinger attached to the top and a Ceramic Disc or Profile Plug installed below. The packer can then be lubricated in the hole and set under pressure. Once set, casing pressure can be bled off and the tubing installed with an On-Off Tool Overshot run downhole and latched onto the packer. The wireline plug can then be removed.

The simple straight pull shear release makes the tool ideal for deviated wells or in multi-packer applications where different zones need to be isolated.

NOTE1: Tool accessories sold separately.

NOTE2: This packer requires at least a 30 second burn time 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 <u>before</u> fully setting the packer.

B) RELATED TOOLS (sold separately)

B-1) Wireline Adapter Kit (WLAK) for 7" Snubset I (P/N 31173-20)—refer to technical manual DL-311-7000-1619.

C) SPECIFICATION GUIDE

	CASIN	G	тс	OOL			
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)	GAGE OD (INCHES)	ID (INCHES)	THREAD CONNECTION BOX UP / PIN DOWN	PART NUMBER	
7	29.0 - 32.0	6.094 - 6.184	5.875	2.50	2-7/8 EUE	31170HTBHC ¹ 31170HTBGVC ² 31170HTBAC ³	

Elastomer Trim Options: ¹ECNER HSN, ²ECNER RGD Viton, ³ECNER Aflas

DIFFERENTIAL	TENSILE LOAD
PRESSURE	THRU TOOL
(MAX)	(MAX)
10,000 PSI	60,000 LBS*

*with all 12 shear releasing screws.

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

GHT		Gl	ENERAL THREAD CO	NNECTION TORQUE RECOM	IMENDATIONS	
		STUB ACME /	INTERNAL TAPI	ERED TUBING THREADS	PREMIUM THREADS	
	ACME 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) OPERATION

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) SETTING PROCEDURES

Run downhole on wireline setting assembly. Follow pressure setting tool manufacturer's recommendations for setting on wireline.

E-2) RELEASING PROCEDURES

CAUTION₆: Packers with ECNER packing elements are single-use tools and must be redressed following initial set.

The packer is released by a straight pick up on the workstring. The number of shear screws will determine the amount of force required to release the packer. A minimum of four (4 qty) shear screws (5,000 lbs/screw) is required.

F) PRESSURE AFFECTED AREA GUIDE

When set downhole, the packer mandrel is subjected to a force created by differential pressure above or below the packer that acts on the pressure affected area (i.e., the piston effect). Plugged below the packer, the Snubset I HT packer is designed to withstand differential pressures up to 10,000 psi below the packer. However, plugged above the packer, pressure from below will exert a force on the upper shear release assembly. The upward force could cause premature shear release of the packer depending on the size of the force and quantity of shear release screws installed on the packer. The running set up of the packer and the anticipated amount of differential pressure the packer will encounter downhole should be considered when calculating the desired shear release value.



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F) PRESSURE AFFECTED AREA GUIDE (cont'd)

CASING	TUBING	PRESSURE AF	FECTED AREA N ²)
(INCHES)	(INCHES)	ABOVE	BELOW
	2.875 (OPEN)	1.80 (DOWN)	-0.63 (UP)
7	PLUGGED BELOW	0.63 (DOWN)	-0.63 (UP)
	PLUGGED ABOVE	8.30 (DOWN)	-8.30 (UP)

Example: Consider a 7" Snubset packer run on 2-7/8" tubing encountering a differential pressure of 3,000 psi from below. The packer is plugged from above. What is the force acting on the shear release assembly of the packer?

To calculate the force (lbs), multiply the differential pressure by the pressure affected area. In this example, the differential pressure from below the packer acts across a pressure affected area of -8.30 in^2 . The differential pressure (3,000 psi) multiplied by the pressure affected area (-8.30 in^2) results in a force of -24,900 lbs. The piston effect on the packer mandrel is an upward force of 24,900 lbs.

G) ELASTOMER TRIM TEMPERATURE GUIDE

RUBBER TYPE	TEMPERATURE RANGE
ECNER HSN	$100-300^\circ\ F$
ECNER RGD VITON	100 - 400° F
ECNER AFLAS	100 - 440° F

H) RECOMMENDED HAND TOOLS

• VISE

GLOVES

• PAINT BRUSH, 2-INCH

• CORDLESS DRILL, 18V

- PIPE WRENCH, 3-FT (2 EA)
- ALLEN WRENCHES
- TAPE MEASURE
- O-RING PICK
 - SNAP RING SPREADER PLIERS
 - 1/2-INCH - 3/4-INCH
- ALIGNING PUNCH

• "CHEATER" PIPE, 4-FT LONG

• ADJUSTABLE WRENCH, 12-INCH

- BOLTS, 1/4-20 X 1-1/4" LONG (4EA)
- SCREWDRIVER SET, FLAT-TIPPED
- SOCKET SETS
 - 3/8-INCH DRIVE
 - 1/2-INCH DRIVE
- HAMMERS
 - SLEDGE
 - BALL PEEN
 - DEAD BLOW

I) DISASSEMBLY

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I-1) Clamp coupling (1) in vise.

- I-1.1) Unscrew and remove slip body cap (12) from slip body (13).
- I-1.2) Wedge slips outwards. Unscrew bottom sub (15) from rubber mandrel (4). Remove slip body assembly and disassemble:
 - I-1.2.1) Remove wedges. Remove slips (14) from slip body (13).
 - I-1.2.1.1) Unscrew and remove button head cap screws (18) from slips (14) and remove slip springs (17).
 - I-1.2.2) Remove bottom sub (15) from slip body (13)

I-1.2.2.1) Remove o-ring and back-up rings (25, 26) from bottom sub (15).

- I-1.3) Remove pick-up ring (16) from rubber mandrel (4).
- I-1.4) Unscrew shear screws (20) from upper cone (11).



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I) DISASSEMBLY (cont'd)

- I-1.5) Unscrew upper cone (11) from gage ring (8) and remove from rubber mandrel (4).
 - I-1.5.1) Remove slip body cap (12) from upper cone (11).
- I-1.6) Remove lower gage ring (8) and element array (9) with element supports (10) from rubber mandrel (4).
- I-1.7) Unscrew upper gage ring (8) from body extension (7) and remove from rubber mandrel (4).
- I-1.8) Unscrew body extension (7) from lock ring housing (7) and remove from rubber mandrel (4).
- I-1.9) Unscrew rubber mandrel (4) from shear collar (3). Remove rubber mandrel assembly from inner mandrel (2) and disassemble:
 - I-1.9.1) Unscrew shear screw (19) and shear screws (21) from lock ring housing (5).
 - I-1.9.2) Unscrew lock ring housing (5) from lock ring (6) and remove from rubber mandrel (4).
 - I-1.9.3) Unscrew and/or slide lock ring (6) to remove from rubber mandrel (4). (NOTE4: Left-hand threads) **NOTE2**: Using snap ring spreader pliers, lock ring (6) may be spread slightly to be removed from mandrel.
- I-2) Unclamp and remove coupling (1) from vise.
- I-3) Unscrew and remove coupling (1) from inner mandrel (2).
- I-4) Unscrew and remove shear screws (22) from shear collar (3).
- I-5) Remove shear collar (3) from inner mandrel (2).
 - I-5.1) Remove o-rings and back-up rings (23, 24) from inner mandrel (2).

J) ASSEMBLY

- NOTE₁: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.
- CAUTION₃: To ensure tool operates properly, install o-rings in o-ring grooves NOT thread reliefs (Fig. 2).
- J-1) Install o-rings and back-up rings (23, 24) in o-ring grooves in inner mandrel (2).
- J-2) Install shear collar (3) onto upper end of inner mandrel (2).
- J-3) Screw coupling (1) onto inner mandrel (2).
- J-4) Clamp coupling (1) in vise.
 - J-4.1) Assemble rubber mandrel assembly and install:

J-4.1.1) Install lock ring (6) onto upper portion of rubber mandrel (4).

CAUTION₄: Do not engage ratchet threads.

J-4.1.2) Carefully screw lock ring housing (5) onto lock ring (6). Align threaded hole in lock ring housing (5) with gap in lock ring (6).

CAUTION4: Do not engage ratchet threads.

- J-4.1.3) Screw shear screw (19) into lock ring housing (5). Tighten screw (19) onto rubber mandrel (4) and back of 1/4 turn.
- J-4.1.4) Align threaded holes in lock ring housing (5) with counterbores in rubber mandrel (4). Screw shear screws (21) into lock ring housing (5). Tighten screws (21) onto rubber mandrel (4) and back off 1/4 turn.
- J-4.1.5) Install body extension (7) onto rubber mandrel (4) and screw into lock ring housing (5).
- J-4.1.6) Install element (9) with element supports (10) and lower gage ring (8) onto rubber mandrel (4).
- J-4.1.7) Loosely install slip body cap (12) onto upper cone (11).



Fig. 2



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J) ASSEMBLY (cont'd)

- J-4.1.8) Install upper cone (11) onto rubber mandrel (4) and screw into gage ring (8). Align threaded holes in upper cone (11) with groove in rubber mandrel (4).
- J-4.1.9) Screw shear screws (20) into upper cone (11). Tighten screws (20) onto rubber mandrel (4) and back off 1/4 turn.
- J-4.1.10) Install rubber mandrel assembly onto inner mandrel (2). Screw shear collar (3) onto rubber mandrel (4).

CAUTION5: Do NOT rip or tear o-ring(s) and/or back-up rings while installing.

- J-4.2) Align threaded holes in shear collar (3) with counterbores in inner mandrel (2).
- J-4.3) Screw shear screws (22) into shear collar (3). Tighten screws (22) onto mandrel (2) and back off 1/4 turn.
- J-4.4) Install pick-up ring (16) into rubber mandrel (4).
- J-4.5) Assemble slip body assembly and install:
 - J-4.5.1) Install o-ring and back-up rings (25, 26) in o-ring groove in bottom sub (15).
 - J-4.5.2) Install bottom sub (15) into slip body (13).
 - J-4.5.3) Assemble slip assemblies and install:
 - J-4.5.3.1) Install slip springs (17) into slips (14).
 - NOTE₃: Install two (2 ea) springs per slip (Fig. 3).

J-4.5.3.2) Screw button head cap screws (18) into slips (14) to secure springs (17).



- J-4.5.3.3) Install slip assemblies into slip body (13). Wedge slips outwards.
- J-4.5.4) Install slip body assembly onto rubber mandrel (4). Screw bottom sub (15) onto rubber mandrel (4).

CAUTION₅: Do NOT rip or tear o-ring(s) and/or back-up rings while installing.

J-4.6) Screw slip body cap (12) into slip body (13).

J-5) Unclamp coupling (1) from vise and remove assembled tool.



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K)PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	Р/N 31170НТВНС
1	1	COUPLING	DLMS110	CP-BAC-C
2	1	INNER MANDREL	DLMS125	31170210HT
3	1	SHEAR COLLAR	DLMS80	31170620
4	1	RUBBER MANDREL	DLMS125	31170220HT
5	1	LOCK RING HOUSING	DLMS110	31171012
6	1	LOCK RING	DLMS110	31173011
7	1	BODY EXTENSION	DLMS80	31171800
8	2	GAGE RING	DLMS80	31173830
9	1	ECNER ELEMENT ARRAY	80 DURO HSN	OEM71BH
10	2	ELEMENT SUPPORT	95 DURO HSN	66770550
11	1	UPPER CONE	DLMS110	31173410
12	1	SLIP BODY CAP	DLMS80	31173910
13	1	SLIP BODY	DLMS110	31173335
14	7	CARBIDE SLIP	DLMS110	31173110C
15	1	BOTTOM SUB	DLMS110	31170630HT
16	1	PICK-UP RING	DLMS110	31173915
17	14	SLIP SPRING	DLMINC625	32045950
18	7	#8-32 UNC X 1/4 BUTTON HEAD SOCKET CAP SCREW	STEEL	BHSC832C025
19	1	#10-24 UNC X 5/16 SLOTTED SHEAR SCREW (700#)	DLM360BRS	BSSSLT1024C031
20	2	1/4-20 UNC X 1/4 SLOTTED SHEAR SCREW (1200#)	DLM360BRS	BSSSLT025C025
21	8	SHEAR SCREW (2375#)	DLM360BRS	60100990
22	12	SHEAR SCREW	DLM360BRS	32045910
23	2	234 O-RING	90 DURO HSN	90234H
24	4	SCARF CUT BACK-UP RING	PEEK	06500234
25	1	235 O-RING	90 DURO HSN	90235H
26	2	SCARF CUT BACK-UP RING	PEEK	06500235
27	8	1/2-13 UNC X 7/16 SLOTTED SHEAR SCREW (5500#)	DLM360BRS	BSSSLT050C043

REDRESS KIT (RDK)	31170050HTBH
ASSEMBLED WEIGHT	188 LBS



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K) PARTS LIST (cont'd)

K-1) ELASTOMER TRIM OPTIONS

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

K-1.1) ECNER RGD Viton

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 31170HTBGVC
9	1	ECNER ELEMENT ARRAY	80 DURO VITON	OEM71BGV
10	2	ELEMENT SUPPORT	95 DURO VITON	66770550V
23	2	234 O-RING	90 DURO VITON	90234V
25	1	235 O-RING	90 DURO VITON	90235V

K-1.2) ECNER Aflas

ITEM	QTY	DESCRIPTION	MATERIAL	Р/N 31170HTBAC
9	1	ECNER ELEMENT ARRAY	80 DURO AFLAS	OEM71BHA
10	2	ELEMENT SUPPORT	95 DURO ALFAS	66770550A
23	2	234 O-RING	90 DURO AFLAS	90234A
25	1	235 O-RING	90 DURO AFLAS	90235A

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L) TECHNICAL ILLUSTRATION



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M) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
09/28/2022	А	Created manual	-	-