



AS RETRIEVABLE BRIDGE PLUG

RIGHT-HAND SET / RIGHT-HAND RELEASE

5" W/ 2-3/8" EUE (PIN DOWN)

Manual No:
DL-725-5000-301

Revision: **M**

Revision Date:
06/26/2023

Authored by: S. White

Approved by: D. Hushbeck

A) DESCRIPTION

The AS Retrievable Bridge Plug is a high pressure plug for multiple zone and selective single zone operations such as acidizing, fracturing, cementing, and testing. It features a large internal by-pass to reduce swabbing when running and retrieving. The by-pass closes during the setting of the plug and opens prior to releasing the upper slips to equalize pressure when unsetting. The by-pass is located directly below the upper slips to help wash debris when the by-pass is open.

This tool can be set in tension and compression. It can be set shallow in unsupported casing to contain pressure while working on wellhead equipment. It can be set in tension making it ideal for setting shallow to test wellhead equipment and deep, high pressure wells.

The ASW Retrievable Bridge Plug is a version of the AS Retrievable Bridge Plug that allows the plug to be set on wireline or with a hydraulic setting tool and retrieved with tubing. It cannot be reset in the wellbore once it is unset, but it can be pulled, re-dressed and run again. A Wireline Adapter Kit is required for this version.

CAUTION₁: When running this tool with a packer, make sure the J-slots in the plug, running/ retrieving tool, and packer are all compatible.

B) RELATED TOOLS (sold separately)

B-1) 5" X 2-3/8" Spring Loaded Retrieving Tool (P/N varies) – refer to technical manual *DL-577-5000-302*.

C) SPECIFICATION GUIDE

CASING			TOOL OD (INCHES)	THREAD CONNECTION PIN DOWN	PART NUMBER
SIZE (INCHES)	WEIGHT (LBS/FT)	RECOMMENDED HOLE SIZE (INCHES)			
5	11.5 – 15.0	4.408 – 4.560	4.125	2-3/8 EUE	72550RR 72550RRH ¹ 72550RRV ²
	15.0 – 18.0	4.276 – 4.408	4.063	2-3/8 EUE	72549RR 72549RRH ¹ 72549RRV ²

Elastomer Trim Options: ¹HSN, ²Viton

NOTE₁: Tool listed is right-hand set / right-hand release. Additional J-slot designs are available.

DIFFERENTIAL PRESSURE (MAX)	HANGING WEIGHT ON SET TOOL (MAX)	TENSILE LOAD THRU TOOL (MAX)	TORQUE THRU TOOL (MAX)
10,000 PSI	64,000 LBS [†]	64,000 LBS	1,300 FT-LBS

[†]Casing must be cemented for this load rating.

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

CAUTION₂: 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

CAUTION₃: Do not run the tool without properly tightening connections. Running the tool with loose connections may damage the tool and cause malfunction.

CAUTION₄: Lift the AS Retrievable Bridge Plug by placing the sling or chain just below the pulling head. **DO NOT** lift the bridge plug by the upper slip body assembly (Fig. 2).



Fig. 2

E-1) TENSION SET

Run to setting depth while latched to its spring loaded retrieving tool. Pick up, rotate 1/4 turn to the right at the plug, and lower tubing to set lower slips. Pull tension to pack-off elements, slack off, and then pick up again to ensure plug setting (10,000 lbs minimum). After setting plug, slack off tubing weight, hold left-hand torque and pick up to free tubing from plug.

E-2) COMPRESSION SET

Run to setting depth while latched to its spring-loaded retrieving tool. Pick up, rotate 1/4 turn to the right at the plug, and lower tubing to set lower slips. Slack off sufficient weight to pack-off elements, then pick up to firmly set upper slips and slack off again (10,000 lbs minimum). After setting plug, slack off tubing weight, hold left-hand torque and pick up the free tubing from plug.



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F) RELEASING PROCEDURES

Lower tubing until the retrieving tool automatically latches to the AS Retrievable Bridge Plug. Sand may be washed from the upper slip by circulating through the upper portion of the plug. Slack off weight, hold right-hand torque pick up to open the by-pass valve, and wait until differential pressure has equalized. Continue upward movement to release upper slips, relax packing elements and re-latch. The plug may now be removed or re-located.

F-1) EMERGENCY RELEASE

If the plug will not release conventionally, slack off re-set, then pick straight up to shear J-pins and release the plug (standard J-pins will shear at 30,000 lbs each – refer to Parts List for J-pins with other shear values) Once the J-pins are sheared, the tool cannot be moved down hole.

NOTE₂: Most of the component parts are manufactured from heat-treated alloy steel. Therefore, extended exposure to corrosives can be detrimental to the metallurgy. Care in cleaning the tool soon after removal from the well can help extend the life of component parts. After removal, close inspection of the parts is necessary to identify any parts which require replacement.

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) 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). Depending on the tubing size and weight and the seal area of the packer the force created by differential pressure acts upwards or downwards on the packer mandrel. An upward force, designated as a negative (-) value, acts to push the packer mandrel up hole and must be accounted for when releasing the packer. A downward force, designated as a positive value, acts to push the packer mandrel down hole and must be accounted for when releasing the packer. Other factors (e.g., tubing movement due to temperature change) must be considered separately to determine all the forces acting on the packer.

PACKER SIZE (INCHES)	PRESSURE AFFECTED AREA (SQ. INCHES)	
	ABOVE	BELOW
5	2.895 (DOWN)	-2.895 (UP)

Example: Consider a 5" AS Bridge Plug set on tubing with a differential pressure of 3,000 psi in the annulus around the tubing above the packer. What is the force 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" AS Bridge Plug. In this example, the differential pressure from above the packer acts on the seal area of the packer mandrel across a pressure affected area of 2.895 in². Multiplying the differential pressure (3,000 psi) by the pressure affected area (2.895 in²) results in a force of 8,685 lbs. The piston effect on the packer mandrel is a downward force of 8,685lbs.



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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 TOOLS

J-1) 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

J-2) SPECIAL TOOLS

ITEM	QTY	DESCRIPTION	PART NUMBER
T1	1	DRAG BLOCK ASSEMBLY TOOL	AT055110

K) DISASSEMBLY

CAUTIONS: Lift the AS Retrievable Bridge Plug by placing the catline just below the pulling head. **DO NOT** lift the bridge plug by the upper slip body assembly.

K-1) Clamp center coupling (10) in vise.

NOTE4: If needed, align hole in upper cone (9) with slot in sealing mandrel (27) and insert punch (or other tool) to prevent tool components from rotating during disassembly.

K-1.1) Unscrew and remove changeover sub (28) from J-slot mandrel (20).

K-1.2) Unscrew and remove set screws (33) from body extension (21).

K-1.3) Unscrew and separate body extension (21) from J-pin body (23) (**NOTE5:** Left-hand threads).

NOTE6: Drag block body assembly must be free to rotate.

K-1.3.1) Remove J-pins (15) from J-pin body (23).

K-1.3.2) Remove J-pin body (23) from J-slot mandrel (20).

K-1.4) Unscrew and remove set screws (31) from body extension (21).

K-1.5) Compress drag blocks (22) with drag block assembly tool (T1). Unscrew and remove body extension (21) from drag block body (18) (**NOTE5:** Left-hand threads).

K-1.6) Release drag blocks (22). Remove drag blocks (22) and drag block springs (3) from drag block body (18).

K-1.7) Unscrew and remove rubber mandrel cap (19) from rubber mandrel (11).



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K) DISASSEMBLY (cont'd)

K-1.8) Wedge lower slips (17) outward (if needed). Remove drag block body assembly and disassemble:

K-1.8.1) Remove wedges (if needed). Remove lower slips (17) and lower slip springs (25) from drag block body (18).

K-1.9) Unscrew and remove set screws (32) from J-slot mandrel (20). Move rubber mandrel assembly as needed to access set screws (32).

K-1.10) Unscrew and remove J-slot mandrel (20) from sealing mandrel (27).

K-1.11) Unscrew rubber mandrel (11) from center coupling (10).

K-1.12) Remove rubber mandrel assembly and disassemble:

K-1.12.1) Remove elements (13, 14), rubber spacers (12), and lower cone (16) from rubber mandrel (11).

K-1.13) Moving to upper end of tool, unscrew and remove set screws (30) from pulling head (1).

K-1.14) Unscrew and remove pulling head (1) from upper mandrel (2).

CAUTION₆: Compression spring (4) is compressed with spring tension against pulling head (1).

K-1.15) Remove compression spring (4) from upper mandrel (2).

K-1.16) Wedge releasing slip (7) and upper slips (8) outward (if needed). Remove upper slip body assembly and disassemble:

K-1.16.1) Remove wedges (if needed). Remove releasing slip (7), upper slips (8) and upper slip springs (26) from upper slip body (6).

K-1.17) Unscrew and remove set screws (32) from upper mandrel (2).

K-1.18) Unscrew and remove upper mandrel (2) from sealing mandrel (27).

K-1.19) Remove plug (5) from sealing mandrel (27).

K-1.19.1) Remove o-ring (35) from plug (5).

K-1.20) Unscrew and remove set screws (30) from center coupling (10).

K-1.21) Unscrew and remove upper cone (9) from center coupling (10).

K-1.21.1) Remove o-ring (37), bonded seal (24) and seal retaining ring (29) from upper cone (9).

K-1.21.1.1) Remove o-ring (34) from bonded seal (24).

K-1.22) Remove sealing mandrel (27) from center coupling (10).

K-2) Unclamp and remove center coupling (10) from vise.

K-2.1) Remove o-ring (36) and bonded seal (24) from center coupling (10).

K-2.1.1) Remove o-ring (34) from bonded seal (24).

NOTE₇: To redress tool assembly, follow disassembly instructions. It is recommended by D&L Oil Tools to replace all bonded seals, elements, o-rings, shear screws, etc. when redressing tool.

L) ASSEMBLY

NOTE₈: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, orientation and tighten/torque all connections properly.

CAUTION₇: To ensure tool operates properly, install o-rings in o-ring grooves NOT thread reliefs (Fig. 3).

L-1) Install o-ring (36) in groove in center coupling (10).

L-2) Install o-rings (34) in grooves in bonded seals (24).

L-3) Install bonded seal (24) in center coupling (10).

CAUTION₈: Do not rip or tear o-ring during installation.

L-4) Clamp center coupling (10) in vise.

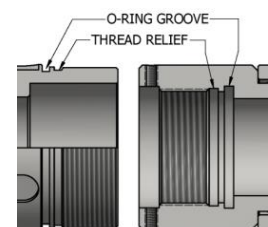


Fig. 3



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L) ASSEMBLY (cont'd)

L-4.1) Install o-ring (37) in groove in upper cone (9).

L-4.2) Install bonded seal (24) and seal retaining ring (29) in upper cone (9).

CAUTION₈: Do not rip or tear o-ring during installation.

L-4.3) Screw upper cone (9) into center coupling (10).

CAUTION₈: Do not rip or tear o-ring during installation.

L-4.4) Screw set screws (30) into center coupling (10).

L-4.5) Install sealing mandrel (27) through bonded seals (24) into center coupling (10).

CAUTION₉: Do not damage bonded seals during installation.

L-4.6) Install o-ring (35) in groove in plug (5).

L-4.7) Install plug (5) into end of sealing mandrel (27).

CAUTION₈: Do not rip or tear o-ring during installation.

L-4.8) Screw upper mandrel (2) onto sealing mandrel (27).

NOTE₄: If needed, align hole in upper cone (9) with slot in sealing mandrel (27) and insert punch (or other tool) to prevent tool components from rotating during disassembly.

L-4.9) Screw set screws (32) into upper mandrel (2).

L-4.10) Assemble upper slip body assembly and install:

L-4.10.1) Install releasing slips (7), upper slips (8) and upper slip springs (26) into upper slip body (6).

NOTE₉: Install one (1ea) spring per slip (Fig. 4).

L-4.10.2) Wedge releasing slip (7) and upper slips (8) outward. Install upper slip body assembly onto upper mandrel (2).

L-4.11) Install compression spring (4) onto upper mandrel (2).

L-4.12) Screw pulling head (1) onto upper mandrel (2).

CAUTION₆: Compression spring (4) is compressed with spring tension against pulling head (1).

L-4.13) Screw set screws (30) into pulling head (1).

L-4.14) Moving to lower end of tool, assemble rubber mandrel assembly and install:

L-4.14.1) Install lower cone (16), elements (13, 14) and rubber spacers (12) onto rubber mandrel (11).

L-4.14.2) Install rubber mandrel assembly onto sealing mandrel (27).

L-4.15) Screw rubber mandrel (11) into center coupling (10).

L-4.16) Screw J-slot mandrel (20) onto sealing mandrel (27).

L-4.17) Screw set screws (32) into J-slot mandrel (20). Move rubber mandrel (11) as required to access threaded holes in J-slot mandrel (20).

L-4.18) Assemble drag block body assembly and install:

L-4.18.1) Install lower slips (17) and lower slip springs (25) into drag block body (18). Wedge lower slips (17) outward.

NOTE₉: Install one (1ea) spring per slip (Fig. 5).

L-4.18.2) Install drag block body assembly onto rubber mandrel (11). Remove wedges.

L-4.19) Screw rubber mandrel cap (19) onto rubber mandrel (11).

L-4.20) Install drag blocks (22) and drag block springs (3) in drag block body (18). Compress drag blocks (22) with drag block assembly tool (T1).

NOTE₁₀: Install three (3ea) springs per drag block (Fig. 6).



Fig. 4

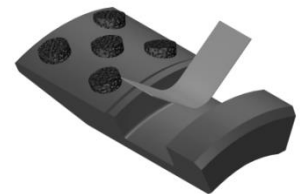


Fig. 5



Fig. 6



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L) ASSEMBLY (cont'd)

L-4.21) Back up drag block body (18) with wrench. Screw body extension (21) onto drag block body (18) capturing ends of drag blocks (**NOTE**s: Left-hand threads).

L-4.22) Screw set screws (31) into body extension (21). Release drag blocks (22).

L-4.23) Install J-pin body (23) onto J-slot mandrel (20).

L-4.24) Align holes in J-pin body (23) with slot in J-slot mandrel (20). Install J-pins (15) into J-pin body (23).

L-4.25) Slide drag block body assembly down and screw body extension (21) onto J-pin body (23) (**NOTE**s: Left-hand threads).

NOTE6: Drag block body assembly must be free to rotate.

L-4.26) Screw set screws (33) into body extension (21).

L-4.27) Screw changeover sub (28) onto J-slot mandrel (20).

L-5) Unclamp center coupling (10) from vise and remove assembled tool.

M) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 72549RR	P/N 72550RR
1	1	PULLING HEAD	DLMS110	72545710	
2	1	UPPER MANDREL	DLMS125	72545211	
3	12	DRAG BLOCK SPRING		9100900	
4	1	COMPRESSION SPRING	DLMCRSP	60345920	
5	1	PLUG	DLMS110	72555216	
6	1	UPPER SLIP BODY	DLMS110	72550355	
7	1	RELEASING SLIP	DLMS110	60050125	
8	2	UPPER SLIP W/ CARBIDE	DLMS110	60050115C	
9	1	UPPER CONE	DLMS110	72545410	
10	1	CENTER COUPLING	DLMS110	72449620	72450620
11	1	RUBBER MANDREL	DLMS110	72545220	
12	2	RUBBER SPACER	DLMS60	72049851	72050851
13	1	ELEMENT	70 DURO NITRILE	72050511	
14	2	ELEMENT	90 DURO NITRILE	72050513	
15	2	J-PIN	DLMS110	72545870-30	
16	1	LOWER CONE	DLMS110	72049420	72050420
17	4	LOWER SLIP W/ CARBIDE	DLMS110	60050135C	
18	1	DRAG BLOCK BODY	DLMS60	60050335	
19	1	RUBBER MANDREL CAP	DLMS110	61345230	
20	1	J-SLOT MANDREL	DLMS125	72545230	
21	1	BODY EXTENSION	DLMS110	72545370	
22	4	DRAG BLOCK W/ CARBIDE	DLMSDB4	9057900C	



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M) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 72549RR	P/N 72550RR
23	1	J-PIN BODY	DLMS110	72545875	
24	2	BONDED SEAL	DLMS60 / 90 DURO NITRILE	60040520	
25	4	LOWER SLIP SPRING		7145901	
26	3	UPPER SLIP SPRING		7145902	
27	1	SEALING MANDREL	DLMS125	72545215	
28	1	CHANGEOVER SUB	DLMS110	CH1900E2375EHT	
29	1	SEAL RETAINING RING	DLMS60	72055830	
30	6	SET SCREW 3/8-16 UNC X 1/2	STEEL	SSS037C050	
31	4	SET SCREW 1/4-20 UNC X 3/8	STEEL	SSS025C037	
32	3	SET SCREW 5/16-18 UNC X 5/16	STEEL	SSS031C031	
33	6	SET SCREW 3/8-16 UNC X 3/8	STEEL	SSS037C037	
34	2	140 O-RING	90 DURO NITRILE	90140	
35	1	211 O-RING	90 DURO NITRILE	90211	
36	1	229 O-RING	90 DURO NITRILE	90229	
37	1	233 O-RING	90 DURO NITRILE	90233	

REDRESS KIT (RDK)		72549050	72550050
ASSEMBLED WEIGHT		135 LBS	135 LBS



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M) PARTS LIST (cont'd)

M-1) ELASTOMER TRIM OPTIONS

NOTE₃: For temperature range, refer to Elastomer Trim Temperature Guide.

M-1.1) HSN

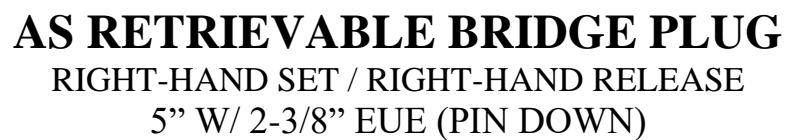
ITEM	QTY	DESCRIPTION	MATERIAL	P/N 72549RRH	P/N 72550RRH
13	1	ELEMENT	70 DURO HSN	72050511H	
14	2	ELEMENT	90 DURO HSN	72050513H	
24	2	BONDED SEAL	DLMS60 / 90 DURO HSN	60040520H	
34	2	140 O-RING	90 DURO HSN	90140H	
35	1	211 O-RING	90 DURO HSN	90211H	
36	1	229 O-RING	90 DURO HSN	90229H	
37	1	233 O-RING	90 DURO HSN	90233H	

REDRESS KIT (RDK)		72549050H	72550050H
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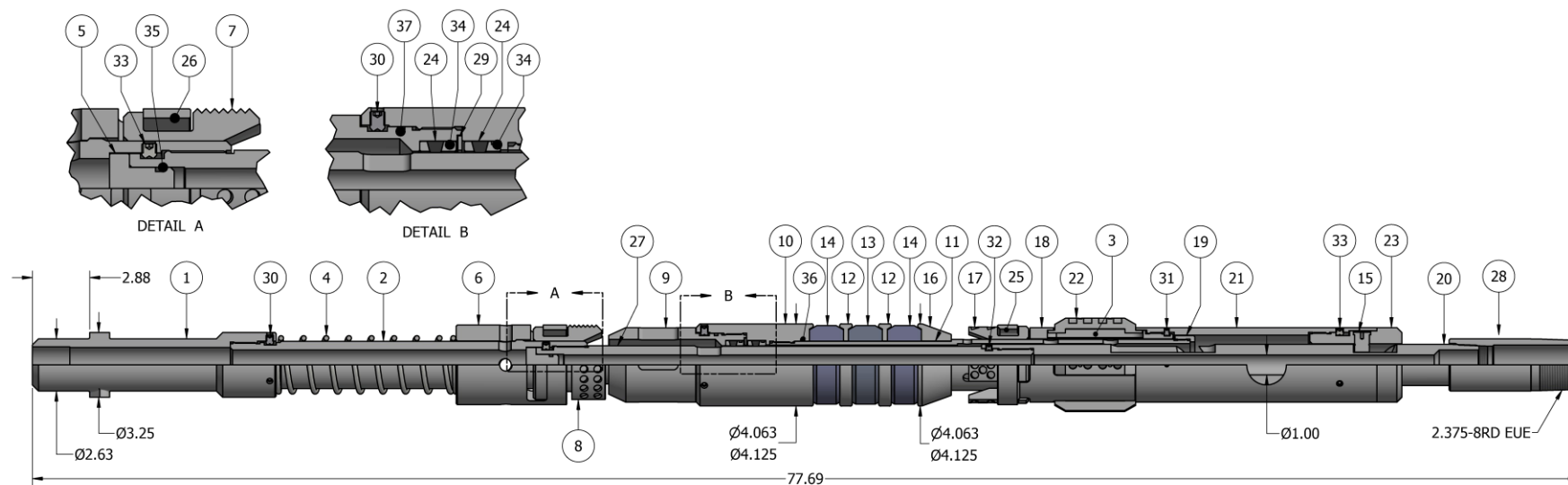
M-1.2) VITON

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 72549RRV	P/N 72550RRV
13	1	ELEMENT	70 DURO VITON	72050511V	
14	2	ELEMENT	90 DURO VITON	72050513V	
24	2	BONDED SEAL	DLMS60 / 90 DURO VITON	60040520V	
34	2	140 O-RING	90 DURO VITON	90140V	
35	1	211 O-RING	90 DURO VITON	90211V	
36	1	229 O-RING	90 DURO VITON	90229V	
37	1	233 O-RING	90 DURO VITON	90233V	

REDRESS KIT (RDK)		72549050V	72550050V
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O) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
06/26/2023	M	Revised Related Tools	J.Anderson	E.Visaez
06/25/2021	L	Added P/N 72549RR	J.Anderson	E.Visaez
04/04/2019	K	Removed P/N 72552RR, P/N SSS037C031; Revised P/N SSS037C037 qty was 3, Parts List item numbering, Assembly, Disassembly, Technical Illustration	J.Anderson	K.Riggs
12/08/2017	J	Added P/N 57752 to Related Tools, General Screw Torque Recommendations, Pressure Affected Area Guide; Revised Nitrile temp. rating for minimum temperature 40° F was 70° F, tensile load was 67,000 lbs, torque rating was 2,000 ft-lbs	J.Anderson	K.Riggs
12/15/2015	H	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	B.Oligschlaeger
10/22/2015	G	Added max. torque thru tool, max. hanging weight on set tool, max. tensile load thru tool, Pre-Installation Inspection Procedures, Storage Recommendations	J.Anderson	K.Riggs
12/18/13	F	Revised SSS037C037 was qty 6 and SSS031C031 was qty 6 for P/N 72550RR; Added HSN and Viton options (P/N 72550RRH, 72552RRH, 72550RRV, 72552RRV), max. differential pressure, caution for lifting plug with catline, Element Selection Guide, Recommended Hand Tools, Qty (6) SSS037C050 for P/N 72550RR, Options Parts List, Revision History	S. McEntire	K. Riggs