



ASI-X PACKER

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

Manual No:
DL-603-7625-080

Revision: **D**

Revision Date:
05/04/2015

Authored by: B.Mathis

Approved by: J.McArthur

A) DESCRIPTION

The ASI-X Single String Double-Grip Production Packer is the most versatile of the mechanically set retrievable packers and may be used in any production application. This packer is suited for treating, testing, or injection applications, in pumping or flowing wells, either deep or shallow. This packer can be left in tension or compression depending on well conditions and the required application.

A large internal by-pass reduces swabbing when running and retrieving. The by-pass closes when the packer is set and opens prior to releasing the upper slips when retrieving to allow pressure equalization. The J-slot design allows easy setting and releasing; 1/4 turn right-hand set, 1/4 turn right-hand release.

The standard ASI-X Packer is designed for differential pressures up to 7,000 PSI (unless noted otherwise). This packer is also available in an HT version which is designed for differential pressures up to 10,000 PSI (unless noted otherwise). The HT version allows this packer to be utilized in completions where high pressure treating operations are performed and it is desirable to leave the tool in the well for production.

B) RELATED TOOLS (sold separately)

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

B-2) 2-7/8" Stinger—actual P/N varies depending on customer requirements.

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)	DRIFT ID (INCHES)		
7-5/8	24.0 - 29.7#	6.875 - 7.025	6.672	2.50	2.347	2-7/8 EUE	60375 60375H ¹ 60375V ²
	33.7 - 39.0#	6.625 - 6.765	6.453	2.50	2.347	2-7/8 EUE	60376 60376H ¹ 60376V ²

Elastomer Trim Options: HSN¹ Viton²

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

NOTE₂: Use of a Double Hook J-slot Packer is recommended when running with a pumpjack to help prevent the packer from unsetting during well production.

DIFFERENTIAL PRESSURE (MAX)	TENSILE LOAD THRU TOOL (MAX)
7,000 PSI	100,000 LBS

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



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 tools 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.

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 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) COMPRESSION SET

Run the packer to setting depth. Pick up the work string to allow for setting stroke (12-13") plus desired work string load. Rotate the work string 1/4 right-hand turn at the packer, and then lower the work string while releasing torque. Slack off on the work string sufficient weight to set the packer (16,000 lbs minimum). Pull tension to assure that the upper slips are set. The work string 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.

E-2) TENSION SET

Run to setting depth, pick up on the work string and rotate 1/4 turn to the right at the packer then lower the work string slacking off available weight to set the packer lower slips. Pull tension to set upper slips and pack off elements (16,000 lbs minimum). After setting the packer, the work string can be left in compression, tension or neutral.

F) RELEASING PROCEDURES

The releasing procedures are the same whether the packer has been tension or compression set. 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 work string 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.

In the event, the packer will not release in the normal manner, hard right-hand torque can be applied (800-1,000 Ft-lbs) which will break the tack weld on the J-pin ring. Continued rotation of approximately 15 turns will release the J-pin ring and allow the packer to be pulled. When released in this manner, the packer will reset when moved down the hole.

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



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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, 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

PACKER SIZE (INCHES)	TUBING SIZE (INCHES)	PRESSURE (SQ. INCHES)	
		ABOVE	BELOW
7-5/8" X 2-7/8"	2.375	3.87 DOWN	5.17 UP
	2.875	1.80 DOWN	3.62 UP
	3.500	1.33 UP	1.27 UP

Example: Consider a 7-5/8" X 2-7/8" ASI-X Packer set on 2.875" tubing with a differential pressure of 3,000 PSI in the annulus around the work string 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 7-5/8" X 2-7/8" packer set on 2.875" 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 1.80 in². Multiplying the differential pressure (3,000 PSI) by the pressure affected area (1.80 in²) results in a downward force of 5,400 lbs. 5,400 lbs is the force which needs to be overcome when releasing the packer.

I) ELASTOMER TRIM TEMPERATURE 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



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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	DRAW BLOCK ASSEMBLY TOOL	AT070110

K) DISASSEMBLY

NOTE₃: Ensure vise is capable of handling weight of tool.

NOTE₄: Support tool during disassembly and assembly with jack stands as necessary.

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

K-1.1) Unscrew and remove set screws (34) from J-pin bottom sub (23). Move J-body (20) as needed.

K-1.2) Unscrew and remove J-pin bottom sub (23) from inner mandrel (2).

NOTE₅: Drag block body assembly must be free to rotate.

K-1.2.1) Remove o-ring (38) from J-pin bottom sub (23).

K-1.3) Compress drag blocks (22) with drag block assembly tool (T1).

K-1.4) Unscrew and remove set screws (35) from drag block body (18). Move drag block retainer (21) as needed.

K-1.5) Unscrew and remove J-body (20) from drag block body (18) (**NOTE₆:** Left-hand threads).

K-1.5.1) Remove retaining ring (31) from J-body (20).

K-1.6) Remove drag block retainer (21) from drag block body (18).

K-1.7) Release drag blocks (22). Remove drag blocks (22) and drag block springs (3) from drag block body (18).

K-1.8) Unscrew and remove rubber mandrel cap (19) from rubber mandrel (11).

NOTE₇: For added leverage, insert rod through rubber retainer (15) and rubber mandrel (11) as needed.

K-1.9) Remove drag block body assembly and disassemble:

K-1.9.1) Unscrew and remove socket cap screws (36) from drag block body (18).

K-1.9.2) Wedge lower slips (17) outward (if needed). Remove the lower slip support (32) from drag block body (18).

K-1.9.3) Remove wedges. Remove lower slips (17) and lower slip springs (25) from drag block body (18).

K-1.10) Unscrew and remove lower cone (16) from rubber retainer (15).

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 gage ring (29), elements (13, 14), rubber spacers (12), and rubber retainer (15) from rubber mandrel (11).

K-1.13) Unscrew and remove center coupling (10) from upper cone (9).

K-1.13.1) Remove o-ring (39) from center coupling (10).



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K) DISASSEMBLY (cont'd)

K-1.13.2) Remove bonded seal (24) from center coupling (10).

K-1.13.2.1) Remove o-ring (37) from bonded seal (24).

K-1.14) Remove upper cone (9) and bearing bushing (30) from inner mandrel (2).

K-2) Unclamp and remove top sub (1) from vise. Clamp lower end of inner mandrel (2) in vise.

CAUTION₄: Do NOT wrench or clamp on seal surface.

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

CAUTION₅: Compression spring (4) is compressed with spring tension against upper slip body assembly.

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

K-2.3) Remove compression spring (4) from spring cage (5).

K-2.4) Unscrew and remove spring cage (5) from upper slip support (33).

K-2.5) Remove upper slip body assembly and disassemble:

K-2.5.1) Remove spring retaining ring (28) from upper slip support (33).

K-2.5.2) Wedge releasing slip (7) and upper slips (8) outwards (if needed). Unscrew and remove upper slip support (33) from upper slip body (6).

K-2.5.3) Remove wedges (if needed). Remove releasing slip (7), upper slips (8), and upper slip springs (26) from upper slip body (6).

K-3) Unclamp and remove inner mandrel (2) from vise.

NOTE₈: To redress tool assembly, follow disassembly instructions. It is recommended by D&L Oil Tools to replace bonded seals, elements, o-rings, shear screws, etc. when redressing tool.

L) ASSEMBLY

NOTE₉: Ensure vise is capable of handling weight of tool.

NOTE₁₀: Support tool during disassembly and assembly with jack stands as necessary.

NOTE₁₁: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.

CAUTION₆: To ensure tool operates properly, install o-rings in o-ring grooves **NOT** thread reliefs (Fig. 2).

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

CAUTION₄: Do NOT wrench or clamp on seal surface.

L-1.1) Assemble upper slip body assembly and install:

L-1.1.1) Install spring retaining ring (28) into upper slip body (6).

L-1.1.2) Screw spring cage (5) into upper slip body (6).

L-1.1.3) Install upper slips (8), releasing slip (7), and upper slip springs (26) into upper slip body (6).

NOTE₁₂: Install two (2ea) springs per slip (Fig. 3).

L-1.1.4) Wedge releasing slip (7) and upper slips (8) outwards. Screw upper slip body onto upper slip support (33). Remove wedges.

L-1.1.5) Install upper slip body assembly onto inner mandrel (2).

L-1.2) Install compression spring (4) into spring cage (5).

L-1.3) Screw top sub (1) onto inner mandrel (2).

L-1.4) Screw spring cage cap (27) onto spring cage (5).

CAUTION₅: Compression spring (4) is compressed with spring tension against upper slip body assembly.

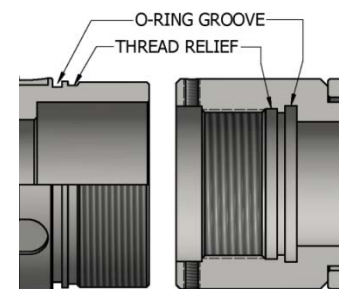


Fig. 2

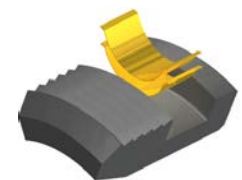


Fig. 3



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L) ASSEMBLY (cont'd)

L-2) Unclamp and remove inner mandrel (2) from vise. Clamp top sub (1) in vise.

L-2.1) Install upper cone (9) and bearing bushing (30) onto inner mandrel (2).

L-2.2) Install o-ring (39) into o-ring groove in center coupling (10).

L-2.3) Install o-ring (37) into o-ring groove in bonded seal (24).

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

CAUTION₇: Do not rip or tear o-ring or bonded seal 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 (29) onto rubber mandrel (11).

L-2.6.2) Install rubber mandrel assembly onto inner mandrel (2). Screw rubber mandrel assembly into center coupling (10).

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

L-2.7) Screw lower cone (16) into rubber retainer (15).

L-2.8) Assemble drag block body assembly and install:

L-2.8.1) Install lower slips (17) and lower slip springs (25) into drag block body (18).
Wedge slips outward.

NOTE₁₂: Install two (2ea) springs per slip (Fig. 4).

L-2.8.2) Install lower slip support (32) into drag block body (18).

L-2.8.3) Align holes in lower slip support (32) with threaded holes in drag block body (18). Screw socket cap screws (36) in drag block body (18).

L-2.8.4) Install drag block body assembly onto rubber mandrel (11).

L-2.9) Screw rubber mandrel cap (19) onto rubber mandrel (11).

NOTE₇: For added leverage, insert rod through rubber retainer (15) and rubber mandrel (11) as needed.

L-2.10) Install drag blocks (22) and drag block springs (3) into drag block body (18). Compress drag blocks (22) with drag block assembly tool (T1).

NOTE₁₃: Install six (6ea) springs per drag block (Fig. 5).

L-2.11) Install drag block retainer (21) onto drag block body (18) to capture ends of drag blocks (22). Align holes in drag block retainer (21) with threaded holes in drag block body (18).

L-2.12) Install retainer ring (31) onto J-body (20).

L-2.13) Screw J-body (20) into drag block body (18) (**NOTE₆:** Left-hand threads).

L-2.14) Screw set screws (35) into drag block body (18). Release drag blocks (22).

L-2.15) Install o-ring (38) into o-ring groove in J-pin bottom sub (23).

L-2.16) Screw J-pin bottom sub (23) onto inner mandrel (2).

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

NOTE₅: Drag block body assembly must be free to rotate.

L-2.17) Screw set screws (34) into J-pin bottom sub (23). Move J-body (20) as needed to access threaded holes (Fig. 6).

L-2.18) Move J-body (20) and drag block body assembly as needed to position J-pin in running position in J-slot (Fig. 7).

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



Fig. 4

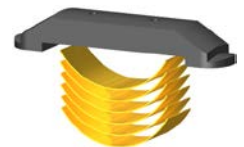


Fig. 5

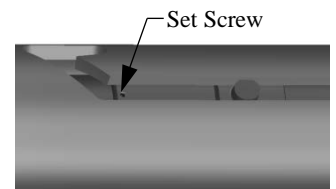


Fig. 6

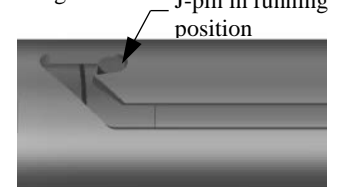


Fig. 7



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M) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	24.0 – 29.7# P/N 60375	33.7 – 39.0# P/N 60376
1	1	TOP SUB	L-80	60170610	
2	1	INNER MANDREL	L-80	60370210	
3	36	DRAG BLOCK SPRING	-	9101900	
4	1	COMPRESSION SPRING	CHROME VANADIUM	60370920	
5	1	SPRING CAGE	1026	60170310	
6	1	UPPER SLIP BODY	1026	60075320	
7	1	RELEASING SLIP	P-110	60075125	
8	2	UPPER SLIP	1026	60075115	
9	1	UPPER CONE	1026	60375410	
10	1	CENTER COUPLING	DLMS35	60370620	
11	1	RUBBER MANDREL	1026	60370220	
12	2	RUBBER SPACER	1026	60275840	60276840
13	1	ELEMENT	70 DURO NITRILE	60275511	60276511
14	2	ELEMENT	90 DURO NITRILE	60275513	60276513
15	1	RUBBER RETAINER	1026	60275850	60276850
16	1	LOWER CONE	1026	60375421	
17	4	LOWER SLIP	1026	60075135	
18	1	DRAG BLOCK BODY	1026	60075335	
19	1	RUBBER MANDREL CAP	1026	60170230	
20	1	J-BODY	1026	60170340	
21	1	DRAG BLOCK RETAINER	1026	60075910	
22	6	DRAG BLOCK	8620	9070900	9060900
23	1	J-PIN BOTTOM SUB	P-110/1026	60370650	
24	1	BONDED SEAL	90 DURO NITRILE	60070520	
25	8	LOWER SLIP SPRING	-	7170901	
26	6	UPPER SLIP SPRING	-	7170902	
27	1	SPRING CAGE CAP	1026	60170810	
28	1	SPRING RETAINING RING	1026	60070820	
29	1	GAGE RING	1026	60275830	60276830
30	1	BEARING BUSHING	1026	60370224	
31	1	RETAINING RING	1026	60075911	
32	1	LOWER SLIP SUPPORT	1026	60075912	
33	1	UPPER SLIP SUPPORT	1026	60075880	
34	2	SET SCREW 1/4-20 UNC X 3/8	STEEL	SSS025C037	



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M) PARTS LIST (cont'd)

ITEM	QTY	DESCRIPTION	MATERIAL	24.0 – 29.7# P/N 60375	33.7 – 39.0# P/N 60376
35	3	SET SCREW 5/16-18 UNC X 1/2	STEEL	SSS031C050	
36	2	SOCKET CAP SCREW 1/2-13 UNC X 3/4	STEEL	SCS050C075	
37	1	153 O-RING	90 DURO NITRILE	90153	
38	1	233 O-RING	90 DURO NITRILE	90233	
39	1	242 O-RING	90 DURO NITRILE	90242	

REDRESS KIT (RDK)		60375050	60376050
ASSEMBLED WEIGHT		330 LBS	325 LBS

M-1) ELASTOMER TRIM OPTIONS

M-1.1) HSN

NOTE₁₄: For temperature range, refer to Elastomer Trim Temperature Guide.

ITEM	QTY	DESCRIPTION	MATERIAL	24.0 – 29.7# P/N 60375H	33.7 – 39.0# P/N 60376H
13	1	ELEMENT	70 DURO HSN	60275511H	60276511H
14	2	ELEMENT	90 DURO HSN	60275513H	60276513H
24	1	BONDED SEAL	90 DURO HSN	60070520H	
37	1	153 O-RING	90 DURO HSN	90153H	
38	1	233 O-RING	90 DURO HSN	90233H	
39	1	242 O-RING	90 DURO HSN	90242H	

REDRESS KIT (RDK)		60375050H	60376050H
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M-1.2) VITON

NOTE₁₄: For temperature range, refer to Elastomer Trim Temperature Guide.

ITEM	QTY	DESCRIPTION	MATERIAL	24.0 – 29.7# P/N 60375V	33.7 – 39.0# P/N 60376V
13	1	ELEMENT	70 DURO HSN	60275511V	60276511V
14	2	ELEMENT	90 DURO HSN	60275513V	60276513V
24	1	BONDED SEAL	90 DURO HSN	60070520V	
37	1	153 O-RING	90 DURO HSN	90153V	
38	1	233 O-RING	90 DURO HSN	90233V	
39	1	242 O-RING	90 DURO HSN	90242V	

REDRESS KIT (RDK)		60375050V	60376050V
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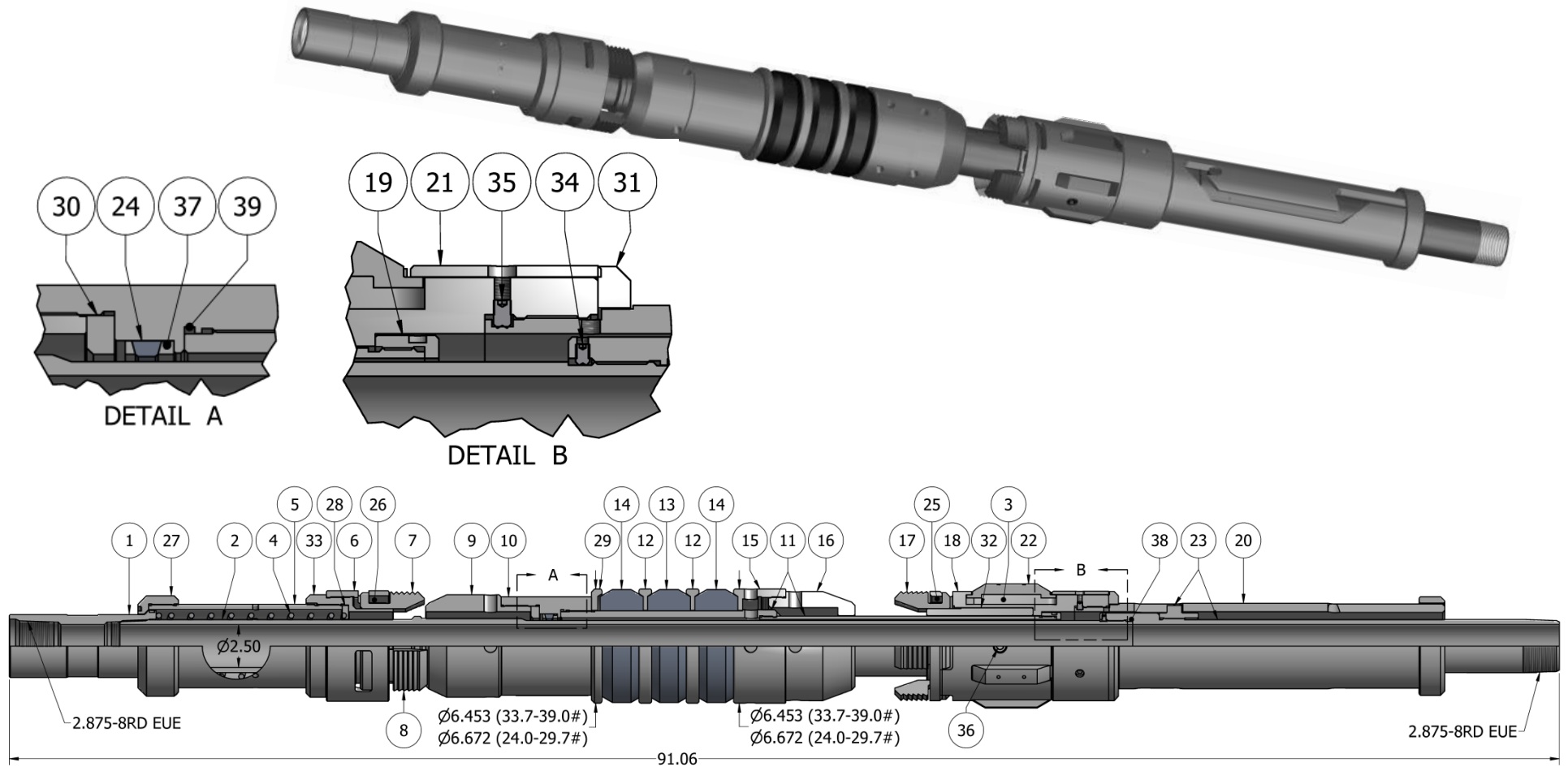
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N) TECHNICAL ILLUSTRATION



	<h1>ASI-X PACKER</h1> <h2>7-5/8" X 2-7/8"</h2>	Manual No: DL-603-7625-080
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O) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
05/04/2015	D	Added – Related Tools, Drift ID, Pre-Installation Procedures, Caution 2, Storage Procedures, Note3, Note4, Note7, Note 8, Note9, Note10, Caution6, Fig. 2, Fig. 6, Fig. 7; Revised – Description, ELASTOMER TRIM TEMPERATURE GUIDE was ELEMENT SEECTION GUIDE, Note10, Fig. 3, Material was 1026 (P/N's 60170610, 60370620), P/N 90153 was 90152, P/N 90153H was 90152H, P/N 90153V was 90152V;	B.Mathis	K.Riggs
06/27/2013	C	Added - HSN and Viton options, recommended hand tools, double hook j-slot note; Revised - P/N 60170610 was 60070610, P/N 60170310 was 60370310, P/N 60170230 was 60070230, P/N 60170340 was 60370340, P/N 60170810 was 60070810, P/N 60375 assembled weight was 327 lbs, P/N 60376 assembled weight was 323 lbs; Removed - AFLAS from element selection guide;	J.Anderson	J.McArthur