A) DESCRIPTION

The DLT Retrievable Packer is a compression set packer with hydraulic hold down that is designed to provide an extra measure of dependability for rugged service. The hydraulic actuated upper hold-down provides more than the usual surface area to ensure that the packer will not move up the hole. It is ideally suited for high pressure, high temperature service work.

Some unique features of this packer include positive rotational locks on all internal connections, which allow for extreme values of torque (left-hand or right-hand) to be transmitted through the packer. Back-up rings on all the o-rings provide for more reliable sealing at high temperature and pressure.

This packer also comes with extra-long top and bottom subs which allow for hydraulic tong make-up and break out.

B) RELATED TOOLS (sold separately)

B-1) 4-1/2” V-III Unloader— 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)		
9-5/8	32.3 - 43.5	8.755 – 9.001	8.584	3.75	4-1/2 IF TOOL JOINT	68896
	43.5 - 53.5	8.535 – 8.755	8.365	3.75	4-1/2 IF TOOL JOINT	68895
	58.4 - 59.4	8.407 – 8.435	8.250	3.75	4-1/2 IF TOOL JOINT	68894

NOTE$_1$: Tools listed are right-hand set / right-hand release.

NOTE$_2$: Tools listed have standard Nitrile trim. Other elastomer trim is available – contact D&L Oil Tools.

DIFFERENTIAL PRESSURE (MAX)	**TENSILE LOAD THRU TOOL** (MAX)	**HANGING WEIGHT ON SET TOOL** (MAX)	**TORQUE THRU TOOL** (MAX)
10,000 PSI	375,000 LBS	375,000 LBS†	20,000 FT-LBS

†Casing must be cemented for this load rating.

D) PRE-INSTALLATION INSPECTION PROCEDURES

CAUTION$_1$: 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 (General thread torque recommendations not applicable to mated parts specified in SPEC014)			
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* (General screw torque recommendations not applicable to mated parts specified in SPEC014)									
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

*Refer to Assembly instructions for specific torque recommendations as applicable.

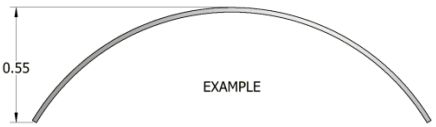
Before first use, D&L recommends disassembly and inspection of the tool unless stated otherwise. Ensure parts have not been damaged during shipping. Replace damaged parts with D&L replacement parts. Contact D&L sales for replacement part information.

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.

DRAG BLOCK SPRING (MIN HEIGHT)	**HOLD DOWN BUTTON SPRING** (MIN HEIGHT)
0.55 INCHES	0.55 INCHES



NOTE$_3$: Before assembly, measure height of drag block springs and hold down button springs. Refer to spring height table – if height of an individual spring is less than the minimum height, replace spring(s).

E) SETTING PROCEDURES

CAUTION$_2$: Do not run the tool without properly tightening connections. Running the tool with loose connections may damage the tool and cause malfunction.

NOTE$_4$: Minimum force required to set 9-5/8” DLT Retrievable Packer is 25,000 lbs.

Run the DLT Packer to setting depth in conjunction with a D&L V-III Unloader. The unloader should remain open while running in. Pick up the work string and rotate it 1/4 turn to the right at the packer. Slack off weight on the packer to set the slips and compress the packing elements. Release the torque after slacking off 6 Ft to allow the unloader to close and lock. The set down weight must remain on the packer throughout well operation.

F) RELEASING PROCEDURES

Rotate the work string 1/4 turn to the right and pick up on the work string to open the D&L V-III Unloader. Allow time for the work string and casing pressures to equalize. Continued upward movement of the work string relaxes the packing elements, un-sets the slips, and automatically re-jays the packer. The tool may now be moved and re-set, or pulled from the well.

NOTE$_5$: Coordination of the unloader and the packer J-slots is imperative. The setting and releasing procedures above represent use of a right-hand open and right-hand close unloader J-slot with a right-hand set, automatic-release packer J-slot.

CAUTION$_3$: If the DLT Packer is run with a Retrievable Bridge Plug, make sure that the J-slots on the Retrievable Bridge Plug, Retrieving Tool, Unloader and Packer are compatible. Whichever direction the plug is set, the retrieving tool should release and the packer should set in the opposite direction.

Example: Right-hand set/right-hand releasing plug is used with a left-hand release retrieving tool, left-hand set packer and a left-hand close/right-hand open unloader.

G) STORAGE RECOMMENDATION

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) 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** (F°)
NITRILE	40° - 250°F
HSN (HNBR)	70° - 300°F
VITON	100° - 350°F

I) RECOMMENDED TOOLS

I-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
- STRAP WRENCH
- 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

I) RECOMMENDED TOOLS (cont’d)

I-2) SPECIAL TOOLS

ITEM	QTY	DESCRIPTION	PART NUMBER
T1	1	DRAG BLOCK ASSEMBLY TOOL	AT095110 or AT010110
T2	1	BUTTON REMOVAL TOOL	AT-BRT000
T3	1 GAL	KOPR-KOTE ANTI-SEIZE LUBRICANT	DL-KOPR-KOTE-1G

J) DISASSEMBLY

NOTE$_6$: Ensure vise is capable of handling weight of tool.

NOTE$_7$: Support tool during disassembly and assembly with jack stands as necessary.

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

J-1.1) Unscrew and remove set screws (19) from J-pin bottom sub (23). Move J-body (20) as needed.

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

NOTE$_8$: Drag block body assembly must be free to rotate.

J-1.2.1) Remove o-ring (29) and back-up rings (28) from J-pin bottom sub (23).

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

J-1.4) Unscrew and remove set screws (19) from J-body (20).

J-1.5) Unscrew and remove J-body (20) from drag block body (18) (**NOTE$_9$**: Left-hand threads).

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

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

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

J-1.8.1) Remove wedges (if needed). Remove slip assemblies from drag block body (18).

J-1.8.1.1) Unscrew and remove button head screws (24) from slips (17).

J-1.8.1.2) Remove slip springs (25) from slips (17).

J-1.9) Unscrew and remove cone (16) from rubber retainer (15).

J-1.10) Unscrew lower cap (7) from hold down body (6).

J-1.11) Loosen lower cap (7) from hold down body (6) enough to align cut-outs in lower cap (7) with threaded holes in hold down body (6).

J-1.12) Unscrew and remove set screws (19) from lower end of hold down body (6).

J-1.13) Unscrew mandrel (2) from hold down body (6).

J-1.14) Remove mandrel assembly and disassemble:

J-1.14.1) Remove rubber spacers (12), elements (13, 14), and rubber retainer (15) from mandrel (2).

J-1.15) Unscrew and remove lower cap (7) from hold down body (6).

J-1.16) Unscrew and slide upper cap (4) temporarily up to clear hold down straps (9). Upper cap (4) will be removed in later step.

J-1.17) Unscrew and remove flat head cap screws (10) from hold down body (6).

J-1.18) Remove hold down straps (9) from hold down body (6).

J-1.19) Remove hold down button springs (8) from hold down buttons (5).

J-1.20) Using button removal tool (T2), remove hold down buttons (5) from hold down body (6).

J-1.20.1) Remove o-rings (27) and back-up rings (26) from hold down buttons (5).

J) DISASSEMBLY (cont’d)

J-1.21) Unscrew and remove set screws (19) from top sub (1).

J-1.22) Unscrew hold down body (6) from top sub (1).

J-1.23) Remove hold down body (6) and volume tube (11) from top sub (1).

J-1.24) Separate hold down body (6) from volume tube (11).

J-1.24.1) Remove upper cap (4) from hold down body (6).

J-1.24.2) Remove o-ring (33) and back-up rings (32) from lower end of hold down body (6).

J-1.24.3) Remove o-ring (31) and back-up rings (30) from upper end of hold down body (6).

J-2) Unclamp and remove top sub (1) from vise.

J-3) Remove o-ring (35) and back-up rings (34) from top sub (1).

K) ASSEMBLY

NOTE$_{10}$: Clean and inspect all parts. Replace all worn and damaged parts. Install parts in proper order, and orientation and tighten/torque all connections properly.

CAUTION$_4$: To ensure tool operates properly, install o-rings in o-ring grooves **NOT** in thread reliefs (Fig. 2).

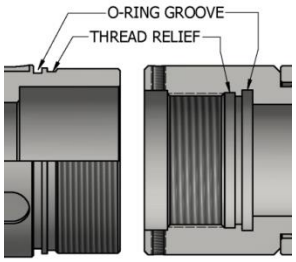


Fig. 2

NOTE$_{11}$: Apply KOPR-KOTE anti-seize lubricant (T3) on STUB ACME and drill pipe connections when making up connections.

NOTE$_6$: Ensure vise is capable of handling weight of tool.

NOTE$_7$: Support tool during disassembly and assembly with jack stands as necessary.

NOTE$_{18}$: If assembling tool with replacement mated parts (items 1 & 6, 2 & 6, 18 & 20, and 2 &23), match counterbore holes (aka drill flat bottom holes) to mating part according to SPEC014.

K-1) Assemble hold down body assembly and test:

K-1.1) Install o-ring (33) and back-up rings (32) (Det. B) in o-ring groove in lower end of hold down body (6).

K-1.2) Assemble and install hold down buttons into hold down body (6):

K-1.2.1) Install o-rings (27) and back-up rings (26) (Det. B) in o-ring grooves in hold down buttons (5).

Fig. 3

K-1.2.2) Install hold down buttons (5) into hold down body (6) (Fig. 3).

CAUTION$_5$: Do not rip or tear o-rings or back-up rings during installation.

K-1.2.3) Align slots in hold down buttons (5) with slots in hold down body (6). Set hold down button springs (8) in place on hold down buttons (5).

NOTE$_{16}$: Measure height of each hold down button spring. Refer to spring height table for minimum height replacement recommendations.

NOTE$_{12}$: Install two (2ea) hold down button springs per hold down button in proper direction (Fig. 4).


Fig. 4

K-1.2.4) Set hold down straps (9) in place on hold down body (6).

K-1.2.5) Screw flat head cap screws (10) into hold down body (6).

K-1.2.6) Screw upper cap (4) onto hold down body (6) capturing ends of hold down straps (9).

K) ASSEMBLY (cont’d)

K-1.2.7) Screw lower cap (7) onto hold down body (6) capturing ends of hold down straps (9). Align cut-outs in lower cap (7) with threaded holes in hold down body (6) (Fig. 5).

K-1.2.8) If pressure testing of the hold down body assembly is desired, install pressure test equipment and test hold down body assembly at this time (refer to technical manual *DL-PTF-9625-1159*).

NOTE20: Pressure testing of the hold down body assembly is not mandatory.

Fig. 5

K-2) Install o-ring (31) and back-up rings (30) (Det. B) in o-ring groove in upper end of hold down body (6).

K-3) Install o-ring (35) and back-up rings (34) (Det. B) in o-ring groove in top sub (1).

K-4) Clamp top sub (1) in vise.

K-4.1) Install volume tube (11) into hold down body (6). Screw hold down body (6) into top sub (1). Align counterbore holes in hold down body (6) with threaded holes in top sub (1).

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

K-4.2) Screw set screws (19) into top sub (1).

K-4.3) Assemble and install mandrel assembly:

K-4.3.1) Install rubber retainer (15), elements (13, 14), and rubber spacers (12) onto mandrel (2).

K-4.3.2) Install mandrel assembly onto volume tube (11).

K-4.3.3) Screw mandrel (2) into hold down body (6). Align counterbore holes in mandrel (2) with threaded holes in hold down body (6).

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

K-4.4) Screw set screws (19) into hold down body (6) (Fig. 5).

K-4.5) Screw cone (16) into rubber retainer (15).

K-4.6) Assemble and install drag block body assembly:

K-4.6.1) Set slip springs (25) in place on slips (17).

NOTE13: Install three (3ea) slip springs per slip (Fig. 6).

K-4.6.2) Screw button head screws (24) into slips (17).

K-4.6.3) Install slips (17) into drag block body (18). Wedge slips outward.

K-4.6.4) Install drag block body assembly onto mandrel (2). Remove wedges.

Fig. 6

K-4.7) Install drag blocks (22) and drag block springs (3) into drag block body (18).

NOTE14: Install six (6ea) drag block springs per drag block (Fig. 7).

NOTE17: Measure height of each drag block spring. Refer to spring height table for minimum height replacement recommendations.

K-4.8) Compress drag blocks (22) with drag block assembly tool (T1).

K-4.9) Install drag block retainer (21) onto drag block body (18) capturing ends of drag blocks (22).

K-4.10) Screw J-body (20) onto drag block body (18) (**NOTE9**: Left-hand threads). Align threaded holes in J-body (20) with counterbores in drag block body (18).

K-4.11) Screw set screws (19) into J-body (20).

K-4.12) Release drag blocks and remove drag block assembly tool (T1).

K-4.13) Install o-ring (29) and back-up rings (28) (Det. B) in o-ring groove in J-pin bottom sub (23).

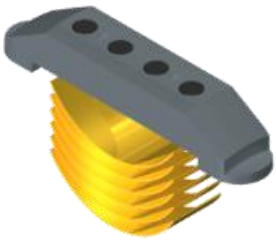


Fig. 7

K) ASSEMBLY (cont’d)

K-4.14) Screw J-pin bottom sub (23) onto mandrel (2). Align threaded holes in J-pin bottom sub (23) with counterbore holes in mandrel (2).

NOTE$_8$: Drag block body assembly must be free to rotate.

CAUTION$_5$: Do not rip or tear o-ring or back-up rings during installation.

K-4.15) Screw set screws (19) into J-pin bottom sub (23). Move J-body (20) as needed to access threaded holes for set screws (19).

NOTE$_{21}$: Torque set screws (19) to a maximum of 80 in-lbs to prevent damage to mandrel (2).

K-5) Unclamp top sub (1) from vise and remove assembled tool.

L) PARTS LIST

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 68896	P/N 68895	P/N 68894
1	1	TOP SUB **	DLMS110	68895612		
2	1	MANDREL **	DLMS125	68895210		
3	60	DRAG BLOCK SPRING *	-	9101900		
4	1	UPPER CAP	DLMS110	68895370		
5	8	HOLD DOWN BUTTON W/CARBIDE *	DLMSSP	68895976		68894976
6	1	HOLD DOWN BODY **	DLMS110	68895310		
7	1	LOWER CAP	DLMS110	68896820	68895820	68894820
8	16	HOLD DOWN BUTTON SPRING *	-	9101900		
9	4	HOLD DOWN STRAP	DLMSFB4	68095360		
10	12	FLAT HEAD CAP SCREW 5/16-18 UNC X 3/4 *	STEEL	FHSC031C075		
11	1	VOLUME TUBE	DLMS110	68895220		
12	2	RUBBER SPACER	DLMS110	68896840	68895840	
13	1	ELEMENT *	70 DURO NITRILE	60296511	60295511	
14	2	ELEMENT *	90 DURO NITRILE	60296513	60295513	
15	1	RUBBER RETAINER	DLMS110	68896850	68895850	68894850
16	1	CONE	DLMS110	68895410		

* Common repair parts
** Mated parts cannot be replaced separately without field adaptation.

M) PARTS (cont’d)

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 68896	P/N 68895	P/N 68894
17	5	SLIP W/CARBIDE *	DLMS110	68896110	68894110	
18	1	DRAG BLOCK BODY **	DLMS110	68895335		
19	16	FULL DOG POINT SET SCREW 5/8-11 UNC X 3/4	STEEL	DPS062C075§		
20	1	J-BODY **	DLMS110	68895355		
21	1	DRAG BLOCK RETAINER	DLMS110	68095910		
22	10	DRAG BLOCK W/CARBIDE *	DLMSDB4	9080900C		
23	1	J-PIN BOTTOM SUB **	DLMS110	68895636		
24	5	BUTTON HEAD CAP SCREW #10-24 UNC X 3/8 *	STEEL	BHSC1024C037		
25	15	SLIP SPRING *	-	32070950		
26	16	236 PARBAK 8-SERIES BACK-UP RING *	TEFLON	04500236***		
27	8	236 O-RING *	90 DURO NITRILE	90236		
28	2	349 PARBAK 8-SERIES BACK-UP RING *	TEFLON	04500349		
29	1	349 O-RING *	90 DURO NITRILE	90349		
30	2	351 PARBAK 8-SERIES BACK-UP RING *	TEFLON	04500351		
31	1	351 O-RING *	90 DURO NITRILE	90351		
32	2	355 PARBAK 8-SERIES BACK-UP RING *	TEFLON	04500355		
33	1	355 O-RING *	90 DURO NITRILE	90355		

* Common repair parts
** Mated parts cannot be replaced separately without field adaptation.
*** Optional Replacement - 8 Qty, 152 O-Ring, P/N 90150 (refer to Det. C for placement).
§Set screw (P/N SSS062C075) used in Rev. G.

M) PARTS (cont’d)

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 68896	P/N 68895	P/N 68894
34	2	363 PARBAK 8-SERIES BACK-UP RING *	TEFLON	04500363		
35	1	363 O-RING *	90 DURO NITRILE	90363		

* Common repair parts
** Mated parts cannot be replaced separately without field adaptation.

REDRESS KIT (RDK)		68896050	68895050	68894050
ASSEMBLED WEIGHT		921 LBS	912 LBS	909 LBS

L-1) ELASTOMER TRIM OPTIONS

L-1.1) HSN REDRESS KIT

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 68896050H	P/N 68895050H	P/N 68894050H
13	1	ELEMENT	70 DURO HSN	60296511H	60295511H	
14	2	ELEMENT	90 DURO HSN	60296513H	60295513H	
26	16	236 PARBAK 8-SERIES BACK-UP RING	TEFLON	04500236		
27	8	236 O-RING	90 DURO HSN	90236H		
28	2	349 PARBAK 8-SERIES BACK-UP RING	TEFLON	04500349		
29	1	349 O-RING	90 DURO HSN	90349H		
30	2	351 PARBAK 8-SERIES BACK-UP RING	TEFLON	04500351		
31	1	351 O-RING	90 DURO HSN	90351H		
32	2	355 PARBAK 8-SERIES BACK-UP RING	TEFLON	04500355		
33	1	355 O-RING	90 DURO HSN	90355H		
34	2	363 PARBAK 8-SERIES BACK-UP RING	TEFLON	04500363		
35	1	363 O-RING	90 DURO HSN	90363H		

L-1.2) VITON REDRESS KIT

ITEM	QTY	DESCRIPTION	MATERIAL	P/N 68896050V	P/N 68895050V	P/N 68894050V
13	1	ELEMENT	70 DURO VITON	60296511V	60295511V	
14	2	ELEMENT	90 DURO VITON	60296513V	60295513V	
26	16	236 PARBAK 8-SERIES BACK-UP RING	TEFLON	04500236		
27	8	236 O-RING	90 DURO VITON	90236V		
28	2	349 PARBAK 8-SERIES BACK-UP RING	TEFLON	04500349		
29	1	349 O-RING	90 DURO VITON	90349V		
30	2	351 PARBAK 8-SERIES BACK-UP RING	TEFLON	04500351		
31	1	351 O-RING	90 DURO VITON	90351V		
32	2	355 PARBAK 8-SERIES BACK-UP RING	TEFLON	04500355		
33	1	355 O-RING	90 DURO VITON	90355V		
34	2	363 PARBAK 8-SERIES BACK-UP RING	TEFLON	04500363		
35	1	363 O-RING	90 DURO VITON	90363V		

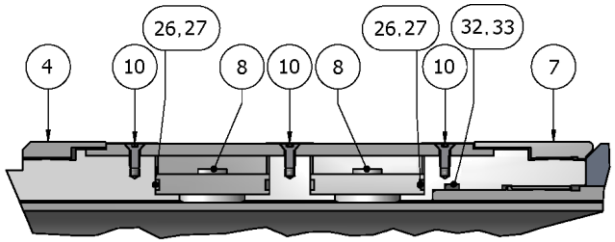
L-1.3) 80 DUROMETER

NOTE15: For temperature range, refer to Elastomer Trim Temperature Guide.

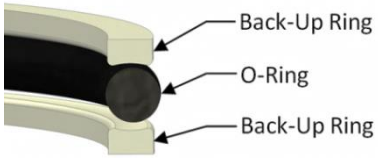
ITEM	QTY	DESCRIPTION	MATERIAL	P/N 68896	P/N 68895	P/N 68894
13, 14	†	ELEMENT*	80 DURO NITRILE	60296512	60295512	

† Quantity varies per selected Temperature Range.
* Common repair parts

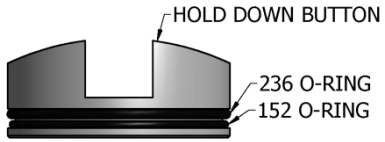
M) TECHNICAL ILLUSTRATION



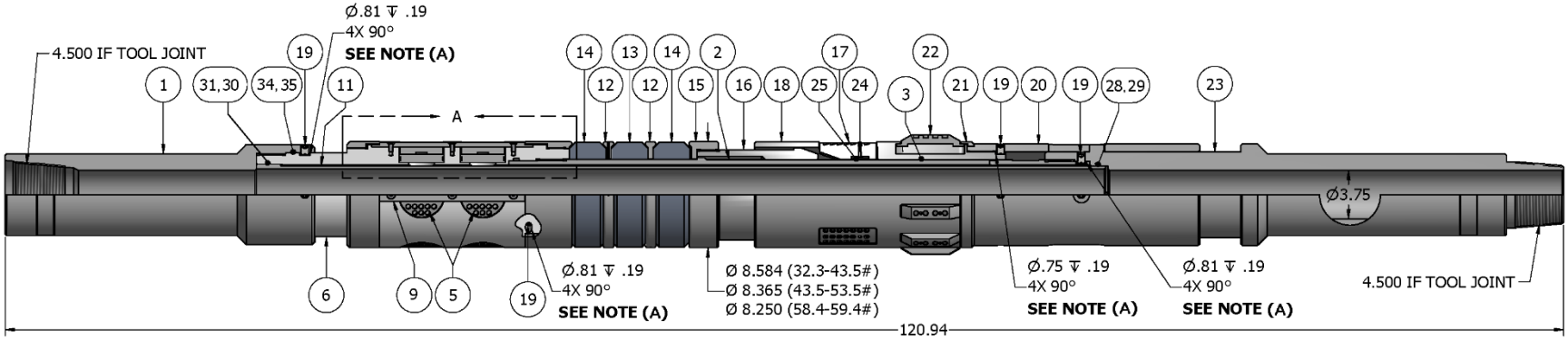
DETAIL A



DETAIL B (TYP.)
NOTE: INSTALL WITH CURVED FACE ON BACK-UP RING TOWARDS O-RING.



DETAIL C (OPTIONAL)



NOTE(A): If assembling tool with replacement mated parts (items 1 & 6, 2 & 6, 18 & 20, and 2 &23), match counterbore holes (aka drill flat bottom holes) to mating part according to SPEC014.

N) REVISION HISTORY

DATE	REVISION	DESCRIPTION OF CHANGES	REVISED BY	APPROVED BY
05/04/2023	T	Added HSN and Viton redress kits	J.Anderson	K.Plunkett
05/06/2019	S	Revise P/N 68895weight range in Parts List tables	J.Anderson	D.Hushbeck
09/21/2018	R	Addded K-1.2.8; Revised note20	J.Anderson	D.Hushbeck