



ONE PIECE KELLY VALVES OPERATION AND MAINTENANCE PROCEDURE REV 4 –

06/16

ASSEMBLY PROCEDURE FOR THE ONE PIECE KELLY VALVE

1.0 SCOPE

- 1.1 This procedure will provide general instructions regarding assembling the One Piece Kelly Valve with IDs:
- 1-1/4",
 - 1-3/4"
 - 2-1/4"
 - 2-13/16"
 - 3-1/16"

2.0 REFERENCES

- 2.1 The latest revision of the following specifications may be used to obtain additional information regarding this procedure.
- ISO10424-1 latest edition.
 - Bill of Materials

3.0 TOOLS / CONSUMABLES

- 3.1 NADT
- 3.2 DADT (requires Snap Ring pliers)
- 3.3 BRACE PLATE
- 3.4 ADJUSTABLE WRENCH
- 3.5 LUBRICANTS
- 3.6 REPAIR/SEAL KITS

4.0 ASSEMBLY PROCEDURE

- 4.1 Read either the NADT or the DADT Operation and Use Manual depending upon which Tool is being used during assembly.
- 4.2 Clean the valve Body and the internal components.
- 4.3 Visually inspect all components for signs of damage or wear.
- 4.4 Fit the Operator (Stem), the Lower Seat, and the Upper Seat with new O-rings and Back-ups. O-ring elastomers must be compatible with the drilling environment. Lubricate O-rings after installation.

- 4.5 Attach the Lower Seat to the Assembly Tool with the allthread extending from the lower end of the Lower Seat and pass the allthread first through the box end of the valve.
- 4.6 Place Brace Plate against the pin face and tighten the Nut to pull the Lower Seat into position.
- 4.7 Loosen the Nut and remove the Brace Plate and the Assembly Tool.
- 4.8 Insert the Operator (Stem) in the Body with the key parallel to the centerline of the valve's bore.
- 4.9 Lubricate the Ball, align the slot with the key and install it in the "closed" position.
- 4.10 Use the Operating Wrench to rotate the Ball to the "open" position.
- 4.11 Insert the Lower Split Retainer Ring, installing a short section last.
- 4.12 Attach the Upper Seat to the Assembly Tool from the lower end and pass the allthread first through the box end of the Valve.
- 4.13 Place the Brace Plate against the pin end and tighten the Nut to install the Upper Seat in the correct position.
- 4.14 Insert the Upper Split Retainer Ring, installing a short section last.
- 4.15 Insert the Solid Retainer ring.
- 4.16 Install the Snap Ring.
- 4.17 Loosen the Nut and remove the Brace Plate and the Assembly Tool.
- 4.18 Follow "Maintenance" instructions to lubricate the Valve properly.

4.0 HYDROSTATIC TEST VALVE

- 4.1 Testing shall be performed in accordance with the test pressure and procedures outlined in ISO 10424-1, latest edition.

Note: The test pressure shall be stabilized prior to the timing start for holding pressure.

- 4.2 Install the test plug and cap on both the box and pin connections of the Valve assembly to be tested.
- 4.3 Install the pressure line to the test cap on the bottom (Pin) connection of the valve.
- 4.4 With the bleed valve on the top of the test plug in the open position, fill the assembly with water until the water comes through the open bleed valve. Actuate the Stem open and close several times to eliminate any trapped air in the assembly.
- 4.5 Close the bleed valve.
- 4.6 With the wrench, turn the Operator (Stem) to the half-open position.
- 4.7 Conduct the Hydrostatic test per the latest revision of ISO10424-1.
 - 4.7.1 Engage the pump and increase the pressure to 250 psi and allow the pressure to stabilize. After the stabilization of pressure, the Valve will be held at pressure for three (3) minutes minimum with no detectable pressure drop or leakage.
 - 4.7.2 At the elapse of three minutes, the pressure will be reduced to zero.
 - 4.7.3 Engage pump a second time to increase the pressure to 250 psi and hold for a minimum of 10 minutes.
 - 4.7.4 At the elapse of ten minutes, the pressure will be reduced to zero.
 - 4.7.5 Engage the pump and increase the pressure to the rated Working Pressure and allow the pressure to stabilize. After the stabilization of pressure, the Valve will be held at pressure for five (5) minutes minimum with no detectable pressure drop or leakage.
 - 4.7.6 At the elapse of five minutes, the pressure will be reduced to zero.
- 4.8 Release the pressure on the assembly, assign the serial number, and complete the test chart.

DISASSEMBLY INSTRUCTIONS FOR THE SINGLE PIECE KELLY VALVE

1.0 SCOPE

- 1.1. This procedure will provide general instructions regarding disassembly of the One Piece Kelly Valve.

2.0 REFERENCES

- 2.1. The latest revision of the following specifications may be used to obtain additional information regarding this procedure.
 - ISO10424-1 latest edition.
 - Bill of materials.

3.0 TOOLS / CONSUMABLES

- 3.1 NADT
- 3.2 DADT (requires Snap Ring pliers)
- 3.3 BRACE PLATE
- 3.4 ADJUSTABLE WRENCH
- 3.5 TWO FLAT SCREWDRIVERS
- 3.6 LUBRICANTS
- 3.7 REPAIR/SEAL KITS

4.0 DISASSEMBLY PROCEDURE

- 4.1. Read either the NADT or the DADT Operation and Use Manual depending upon which Tool is being used during disassembly.
- 4.2. With the Valve in the "open" position, attach the Disassembly Tool to the Upper Seat with the allthread protruding from the pin end.
- 4.3. Place the Brace Plate against the pin face and tighten the Nut to pull the Upper Seat away from the Upper Split Retainer Ring.
- 4.4. Remove the Snap Ring using the screwdrivers. Pry the end of the Snap Ring out using the first screwdriver and place the second one between the Ring and the Valve ID. Remove the first screwdriver, twist the second to pry the Ring out further and place the first one behind the

second. Continue this method until enough of the snap ring is exposed to allow removal of the Ring.

- 4.5. Remove the Solid Ring then remove the Upper Split Retainer Ring, a short section first.
- 4.6. Remove the Brace Plate and the Disassembly Tool.
- 4.7. Attach the Disassembly Tool to the Upper Seat with the allthread protruding from the box.
- 4.8. Place the Brace Plate across the box face and tighten the Nut until the Upper Seat comes free.
- 4.9. Remove the Lower Split Retainer Ring, a short section first.
- 4.10. Using the Operating Wrench turn the Stem to the "Close" position and remove the Ball. Attach the Disassembly Tool to the Upper Seat with the allthread protruding from the pin end, and tighten the Nut snugly against the Brace Plate.
- 4.11. Remove the Operator (Stem) by tapping on it gently from the outside of the Valve.
- 4.12. Loosen the Nut and remove the Brace Plate and the Disassembly Tool.
- 4.13. Attach the Disassembly Tool to the Lower Seat with the allthread protruding from the box end.
- 4.14. Place the Brace plate against the box face tighten the Nut against Brace Plate until Lower Seat comes free.
- 4.15. Remove the Brace Plate and the Disassembly Tool.
- 4.16. Thoroughly clean all internal components and the valve Body and inspect all steel components for damage and discard the used O-rings.

MAINTENANCE

1.0 SCOPE

- 1.1 This procedure will provide general instructions regarding the maintenance of the One Piece Kelly Valve.

2.0 REFERENCES

- 2.1 The latest revision of the following specifications may be used to obtain additional information regarding this procedure.
 - ISO 10424-1 latest edition.
 - Bill of materials.

3.0 MAINTENANCE SCHEDULING

- 3.1 If the pressure test fails or the valve becomes difficult to operate, remove the valve from service immediately, disassemble, clean thoroughly, inspect, replace worn parts, reassemble, and test.
- 3.2 Depending upon the drilling factors of pressure, mud weight /composition /contamination, rate of penetration, hook load, the frequency of required maintenance will vary.
- 3.3 In conjunction with the frequency of maintenance, how the maintenance is performed is critical. Basic maintenance should be performed not in response to a failure, it should be performed to avoid a failure. Drilling mud can become contaminated and it hardens with time when it is static. Proper control of the drilling fluid will help reduce corrosion and wear from contamination, but static hardening is the real enemy. The ball is spherical and the cavity it fits into is cylindrical so there is an annular space around the ball and seats where the mud will enter then sit and harden. A more frequent maintenance schedule will avoid failure. Frequent pressure testing of the valve does not affect operation, even if it is tested from above. The internal components are made from premium materials to combat the effects of corrosion, designed to withstand working pressure, processed to ensure extended life, and are tested at final acceptance.
- 3.4 How the valve is used and the frequency of maintenance become the priority in ensuring long operating life. The valve should be operated at balanced pressure. If the valve is closed when the mud pumps are started and it is opened with pressure from above, the operating life will be shortened.

- 3.5 If the valve is used for twelve weeks, and it still operates smoothly, it should be removed from service and the basic maintenance routine should be performed. If, at the twelve week interval, it does not still operate smoothly, the interval should be shortened to nine weeks. At nine weeks, if it is still operating smoothly, the interval should remain nine weeks. If it is not operating smoothly, the interval should be shortened to six weeks.
- 4.0 REPAIR AND SEAL KIT USAGE ORDER**
- 4.1 Repair Kits include a Ball, an Upper Seat, a Lower Seat, Spring(s) and a Seal Kit.
- 4.2 Seal Kits include all elastomers and the Anti-friction Ring.
- 4.3 At each maintenance interval the types of kits should be alternated: Seal Kit, then Repair Kit, then Seal Kit, then Repair Kit, and so on, unless the Ball and Seats are damaged, in that case, a Repair Kit must be used.
- 5.0 MAINTENANCE ROUTINE**
- 5.1 Once a valve is removed from service, it should be cleaned immediately. The longer a valve sits with mud inside, the harder the mud will become and it will become more difficult to repair.
- 5.2 Disassemble, per the previous section, clean every internal component, as well as the inside of the valve thoroughly, preferably with a high pressure and / or temperature washer or using a mild solvent with a stiff nylon brush, to remove all contaminants. Use of highly abrasive pads or power tools is not recommended on sealing areas as these areas are critical surface finishes and dimensions.
- 5.3 Once everything is cleaned, parts should be inspected for damage or wear in the seal areas. The seal areas are: the OD of the ball, the areas of the Seats that touch the Ball, the areas of the Stems and Seats in contact with the elastomeric seals, and the Stem and Seat cavities in the valve body. Worn or damaged parts and all O-rings must be replaced.
- 5.4 Stem and Sleeve O-rings and Back-ups should be installed then coated with Liquid-O-Ring PM600 Military Grease. After installing the O-rings in their grooves, a small blob of grease should be put in one spot and pushed around the rings and into the open spaces in the O-ring grooves between the O-rings and Back-up Rings.
- 5.5 Seat and Body O-rings and Back-ups should be installed then coated with Liquid-O-Ring 600/1 Valve Life grease. After installing the O-rings in their grooves, a small blob of grease should be put in one spot and pushed around the rings and into the open spaces in the O-ring grooves between the O-rings and their complementing back-up rings.
- 5.6 Liberally coat the sealing areas of the seats and the spherical surface of the ball with Liquid-O-Ring 600/1 Valve Life grease.
- 5.7 After assembly, the valve should be pressure tested at low pressure (1.7 MPa) and at working pressure per the previous instructions. Hydrostatic shell test need only be performed once on each valve, by Packard, during the Final Acceptance Testing.
- 5.8 Once the valve passes hydrostatic test, the end connections should be coated with Liquid-O-Ring ZN-50 Tool Joint and Drill Collar Compound, and thread protectors should be installed immediately.
- 5.9 The valve can then be placed back into service or stored for later use.
- 5.10 If the valve is not put into service, store the valve in a dry place standing on its pin end or laying on its side.
- 5.11 In summation, control of the drilling fluid, proper use, control of the maintenance interval, and proper maintenance routines will ensure long service life.
- NOTE: Failure to follow the above procedures may result in damage and subsequent premature valve failure.**

**PREPARING THE ONE PIECE KELLY VALVE FOR
INSTALLATION**

1.0 SCOPE

1.1 This procedure will provide general instructions regarding installation of the One Piece Kelly Valve.

2.0 REFERENCES

2.1 The latest revision of the following specifications may be used to obtain additional information regarding this procedure.

- Packard Quality Procedures Manual.
- API Specification 7 latest edition.
- Bill of materials.

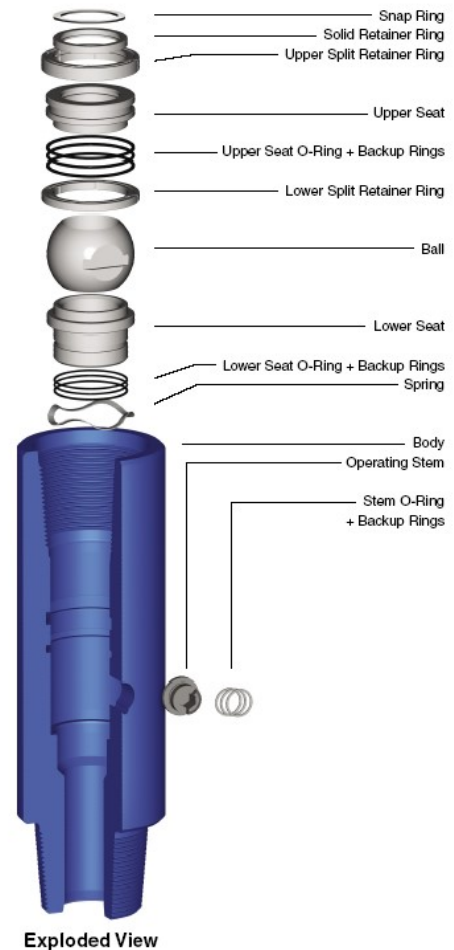
3.0 INSTALLATION PROCEDURE

- 3.1 Clean shipping thread dope from threaded connections and apply thread dope suitable for drill string use.
- 3.2 Recommended: Dope base to include 40% to 60% (by weight) finely powdered zinc or lead.

STORAGE

After assembly, store equipment in a controlled environment free from debris or contamination with the body standing up on the pin end nose with thread protector installed.

NOTE: Failure to follow the above procedure explicitly may result in damage and subsequent premature valve failure.



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