



## TWO PIECE KELLY VALVES OPERATION AND MAINTENANCE PROCEDURE REV 2 –

01/2012

### ASSEMBLY PROCEDURE FOR THE TWO PIECE KELLY VALVES

#### 1.0 SCOPE

- 1.1 This procedure will provide general instructions regarding assembling the Two Piece Kelly valves with the IDs:
- 2"
  - 2-7/16"
  - 2-3/4"
  - 3-1/4"

#### 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 7-1 latest edition.
  - Bill of materials.

#### 3.0 ASSEMBLY PROCEDURE

- 3.1 Clean valve body & sub and all internal parts.
- 3.2 Visually Inspect for sign of damage or wear.
- 3.3 If a stem with one ear is used on the valve, discard it and use the new style two ears stem with the supplied stop ring  
Note: there is no need for the stop ring To be installed if the valve was delivered with the new stem style installed in the body.
- 3.4 Fit Operator (stem), both Seats and Sub with new O rings. O ring elastomer must be compatible with drilling environment. Seats should include new Teflon seal.
- 3.5 If needed (refer to 3.3) insert the stop ring into the body until it is fully seated in the ball pocket against the shoulder.
- 3.6 Insert Seat into the Body. The Ball will ride on radial surface of Seat.
- 3.7 Insert Operator (stem). The V mark on the stem should be towards the close mark on the valve, representing closed position of Ball.
- 3.8 Insert Ball in closed position.

- 3.9 Insert wave Spring into the Sub.
- 3.10 Insert Seat into the Sub with radial surface toward Ball.
- 3.11 Use operating wrench to turn ball to the half open position.
- 3.12 Apply suitable thread dope to the middle connection of Sub and Body.
- 3.13 Recommended: Dope base to include 40% to 60% (by weight) finely powdered zinc or lead.
- 3.14 Screw Upper Sub into the Lower Sub. Make-up shoulders by hand with chain tongs or equivalent.
- 3.15 Torque Lower Sub to Upper Sub:

- For Standard / H2S Trim Service:

| ID      | OD     | Middle Connection<br>TORQUE IN FT/LBS<br>+500 / -0 |
|---------|--------|--|
| 2"      | 4.5"   | 7,500  |
|         | 5"     | 16,960   |
| 2-7/16" | 4-7/8  | 9,800  |
| 2-3/4"  | 6-3/8" | 33,350   |
|         | 6-3/4" | 41,500   |
| 3-1/4"  | 6-3/4" | 26,250   |
|         | 7-1/2" | 54,500   |
|         | 7-3/4" | 61,750   |
|         | 8-1/2" | 83,700   |

This is a generic table for products with Standard API service connections. Request make-up torque value information from Packard when the valve has Proprietary high torque service connections.

#### 4.0 HYDROSTATIC TEST VALVE

- 4.1 Testing shall be performed in accordance with the test pressure and procedures outlined in API Specification 7-1 latest edition.

Table 1.1

| HYDROSTATIC TESTING PRESSURES   |       |   |       |
|---------------------------------|-------|---|-------|
| MAXIMUM WORKING PRESSURE RATING |       | MAXIMUM HYDROSTATIC SHELL TEST PRESSURE |       |
| psi                             | MPa   | psi                                     | MPa   |
| 5000                            | 34.5  | 10,000                                  | 68.9  |
| 10,000                          | 68.9  | 15,000                                  | 103.4 |
| 15,000                          | 103.4 | 22,500                                  | 155.1 |

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



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### **SHELL Test (new valves only not required in the field):**

- 4.2 Install the test plug and cap on both box and pin connections of the valve assembly to be tested.
- 4.3 Install the pressure line to the bottom (Pin) connection of the valve (test cap).
- 4.4 With bleed valve on the top of the test plug (box connection of the valve) in the open position, fill the body with water until it bleeds through the open bleed valve. Actuate the valve several times to eliminate any trapped air in the valve body.
- 4.5 Close the bleed valve.
- 4.6 With the wrench turn the Kelly valve to the half-open position.
  - 4.6.1 Engage pump and increase pressure to 250 psi and stabilize. After stabilization of pressure, the valve will be held at pressure for three (3) minutes minimum with no detectable pressure drop.
  - 4.6.2 At the elapse of three minutes, the pressure will be reduced to zero.
  - 4.6.3 Engage pump a second time to increase the pressure 250 psi and hold for a minimum of 10 minutes.
- 4.7 Repeat 4.6.1 to 4.6.3 at the Shell Test pressure per Table 1.1.
- 4.8 Release pressure on the assembly

### **Seat Test :**

- 4.9 Install the test cap on the pin connection of the valve assembly to be tested.
- 4.10 Install the pressure line to the bottom of the cap
- 4.11 Fill up the body with water until all the internals are submerged. Actuate the valve several times to eliminate any trapped air in the valve body.

- 4.12 With the wrench turn the Kelly valve to the closed position.

- 4.12.1 Engage pump and increase the pressure to 250 psi and stabilize. After stabilization of pressure, the valve will be held at pressure for five (5) minutes minimum with no detectable pressure drop or leakage.

- 4.12.2 At the elapse of five minutes, the pressure will be reduced to zero.

- 4.12.3 Engage pump a second time to increase the pressure to the Working Pressure per Table 1.1 and hold for a minimum of 5 minutes.

- 4.13 Release the pressure on the assembly.
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## **DISASSEMBLY PROCEDURE FOR THE TWO PIECE KELLY VALVE**

### **1.0 SCOPE**

- 1.1. This procedure will provide general instructions regarding disassembly of the Two 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 7-1 latest edition.
  - Bill of materials.

### **3.0 DISASSEMBLY PROCEDURE**

- 3.1. Break Lower Sub from Upper Sub.
- 3.2. Unscrew Upper Sub from Lower Sub.
- 3.3. Remove all internal parts. Ball will need to be in closed position.

Thoroughly clean all parts and valve body. Used parts should be inspected prior to re-use. All Elastomers should be discarded and replaced regardless of their condition

## **PREPARING THE TWO PIECE LOWER KELLY VALVE FOR INSTALLATION**

### **1.0 SCOPE**

- 1.1. This procedure will provide general instructions regarding installation of the Two 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 7-1 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.



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## MAINTENANCE

### 1.0 SCOPE

- 1.1 This procedure will provide general instructions regarding the maintenance of the two 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 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 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, 2 seats, spring, stem, stop ring and a seal kit.

- 4.2 Seal kits include all elastomers

- 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, seats or stem 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 seats near the rubber seals, and the seat cavities in the valve body. Worn or damaged parts and all rubber o-rings must be replaced. Prior to assembly, new parts should be inspected and coated with the proper greases.
- 5.4 Stem O-ring should be installed then coated with Liquid-O-Ring PM600 Military Grease. After installing the ring in its groove, a small blob of grease should be put in one spot and pushed around the ring and into the open space in the o-ring groove
- 5.5 Seats and Sub O-rings should be installed then coated with Liquid-O-Ring 600/1 Valve Life grease. After installing the 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
- 5.6 Liberally 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, at 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 procedure explicitly may result in damage and subsequent premature valve failure.**



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