

1. SCOPE

This document outlines the methods, equipment, and criteria for the field inspection and repair of CTP double shoulder rotary shouldered connections to Complete Tubular Products' requirements.

This document is intended to provide guidelines only for CTP double shoulder connections and is not meant to replace or supersede any documentation specific to any other connections.

Note that the KDM and CTP connection families are identical and 100% compatible.

2. EQUIPMENT

2.1. Hand Tools

- 12-inch (300 mm) steel ruler with 1/64" (0.5mm) graduations
- OD and ID spring calipers
- Long stroke depth caliper with wide extension base attachment
- Triangular file
- Flapper wheel
- Buffing wheel

2.2. Gauges

- V-076 thread profile gauge
- Lead gauge & lead gauge standard

2.3. Documentation

- Connection data sheets as required
- Field inspection dimension drawings – latest revision

Connection Name	Pin Drawing	Box Drawing
CTP 23	T000144F	T000145F
CTP 26	T000234F	T000235F

3. PRE-INSPECTION

- 3.1.1. All threads and shoulder surfaces shall be cleaned and dried adequately to allow for a full visual inspection. Cosmetic corrosion should be removed using a method which will not damage or remove any material from the connection, for example a wire wheel buffer.

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4. VISUAL INSPECTION

4.1. Primary Seal Shoulder

- 4.1.1. The primary seal shoulder must be free of galls, nicks, washes, fins, or any other damages which could compromise pressure holding ability or connection stability after make-up.
- 4.1.2. Damage not exceeding 1/32" (0.8mm) in depth that crosses less than 30% of the radial seal width may be deemed acceptable. Damage above these limits must be repaired by refacing the entire seal surface.
 - 4.1.2.1. Any refacing repair should only remove enough material to repair the damage. A maximum of 1/32" (0.8mm) may be removed in a single refacing operation, and a maximum of 1/16" (1.6mm) may be removed from the connection before re-threading is required. If the connection is furnished with benchmarks, refer to the field inspection drawings for further measurements and details.
 - 4.1.2.2. If the pin and box connection lengths are within inspection tolerances, the primary seal shoulder and the secondary shoulder must be refaced at the same time to ensure the connection length remains constant. Connection length dimensions shall be recorded before and after refacing operations; see sections 5.5 and 5.8.
 - 4.1.2.3. Note that any refacing operation requires reworking of the bevel diameter; see section 5.2.

4.2. Eccentric Wear

- 4.2.1. Evaluate the box connection tool joint OD for eccentric wear. If eccentric wear is suspected, dimensional inspection shall be conducted on the box counterbore wall thickness at the point of minimum thickness; see section 5.4

4.3. Pin Tool Joint ID

- 4.3.1. Examine the ID of the pin tool joint for wear or erosion affecting the overall diameter or concentricity. If a change in concentricity or diameter is detected, a dimensional inspection of the altered ID region shall be conducted; see section 5.6.

4.4. Secondary Shoulder

- 4.4.1. Damage to this surface is not critical unless the damage interferes with make-up, driftability, or torsional capacity of the connection. Washes, dents, scratches and cuts smaller than 1" (25.4mm) in length which do not cause connection rejection due to shortening of the connection length will not affect this surface.
 - 4.4.1.1. Damage which protrudes from this surface may be removed by filing.
- 4.4.2. Use a straight edge across the pin nose to detect deformation of the pin nose geometry including swelling, crushing or tapering of the secondary shoulder face. If there is evidence of such damage, the pin nose OD and ID shall be measured; see section 5.7.

4.5. Threadform

- 4.5.1. Thread flanks shall be free of damages exceeding 1/16" (1.6mm) in depth, or 1/8" (3.2mm) in diameter. Thread roots shall be free of damage extending below the radius of the thread form. Thread crests shall be free of damage which could interfere with proper makeup.
 - 4.5.1.1. Material protruding outside the thread form may be removed by hand with a round-corner triangular file or appropriate soft buffing wheel.
- 4.5.2. The thread profile shall be verified using a thread profile gauge in at least two locations a minimum of 90° apart around the thread axis. If the profile gauge does not mesh evenly in the thread and show normal contact, a dimensional inspection of the thread lead shall be conducted; see section 5.1.

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5. DIMENSIONAL INSPECTION

All dimensional measurements shall be compared to the appropriate field inspection drawings and/or connection data sheets to determine acceptance/rejection of a connection. All dimensions below indicated as **Record** shall be 100% recorded. All dimensions below indicated as **Check** do not require recording unless the dimension is found to be outside of specifications.

5.1. Check Lead

5.1.1. If the profile gauge does not mesh properly in the thread form, the thread lead shall be measured over a 2" interval and may not deviate by more than 0.006".

5.1.1.1. Connections failing this inspection shall be inspected for cracking and be re-threaded, provided no cracks are detected.

5.2. Check Bevel Diameter

5.2.1. Bevel diameter of the box and pin shall be verified. If the OD is less than the standard bevel diameter and an alternative smaller OD bevel diameter is not presented in field inspection literature, the bevel diameter becomes void and a 1/32" (0.8mm) x 45° chamfer becomes effective.

5.3. Record Box OD

5.3.1. The OD of the box tool joint shall be measured at a distance 5/8" ± 1/4" (15.9mm ± 6.4mm) from the primary seal shoulder. At least two independent measurements shall be taken to determine the minimum diameter value. This value shall be compared to the minimum acceptable OD for the connection being inspected – refer to the specific connection literature for more information.

5.3.1.1. Box OD measurements shall be evaluated for indications of out-of-roundness. No box OD measurement may deviate from the average box OD by more than 1/32" (0.8mm).

5.4. Check Box Counterbore

5.4.1. The ID of the box counterbore shall be verified, but this dimension is not to be used for acceptance/rejection. It is required to test for box swelling and evaluate the need to verify the connection length.

5.4.2. If eccentric wear is suspected, the box counterbore wall thickness shall be measured.

5.5. Record Box Connection Length

5.5.1. The distance between the primary seal shoulder and secondary shoulder shall be verified. If found to be out of specification, the measurement shall be taken in at least two locations 180° apart around the thread axis.

5.5.1.1. The depth caliper/micrometer extension base must span completely across the box connection counterbore.

5.5.1.2. If the connection length is found to be outside of the required inspection dimensions, repair may be made by refacing the connection. Refacing limits are the same as for repairing damaged surfaces; see section 4.1.

5.6. Check Pin Tool Joint ID

5.6.1. If a visual inspection warrants, the pin tool joint ID shall be verified in the region approximately under the last full depth thread nearest the primary shoulder approximately 1-2" (25-50mm) from the primary seal.

5.7. Check Pin Nose OD and ID

5.7.1. The OD of the pin nose shall be verified, but this dimension is not to be used for acceptance/rejection.

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5.7.1.1. The majority of CTP connections have a tapered pin nose making this dimension difficult to properly evaluate thus this measurement is only to test for indications of pin nose swelling/crushing and evaluate the need to verify the connection length.

5.8. Record Pin Connection Length

5.8.1.1. The distance between the primary seal shoulder and secondary shoulder shall be verified. If found to be out of specification, the measurement shall be taken in at least two locations 180° apart around the thread axis.

5.8.1.2. The depth caliper/micrometer extension base must span completely across the pin connection nose.

5.8.1.3. If the connection length is found to be outside of the required inspection dimensions, repair may be made by refacing the connection. Refacing limits are the same as for repairing damaged surfaces; see section 4.1.

5.9. Tool Joint Tong Space

5.9.1. A minimum tong space of 6" (150mm) is required for box and pin tool joints. In addition, the minimum box tong space shall ensure that hardbanding is not present over the box threads and shall be at least equal to the connection length + 1" (+25mm).

6. POST-INSPECTION/REPAIR

6.1. Protection

6.1.1. Threadform elements and shoulders should always be phosphate coated; however, lightly worn coating is acceptable and can be repaired with a molybdenum disulfide repair kit. (i.e. – Molycote products or similar).

6.1.2. Threadform elements and shoulders field repaired by filing or refacing and exposing raw metal shall be evenly coated in an appropriate oilfield thread spray (i.e. – Garco “oil country” thread spray or similar) after inspection to prevent corrosion during storage.

6.1.3. Thread protectors shall be inspected to be free and clean of debris and foreign materials and reinstalled tightly.

6.2. Rethreading

6.2.1. All connections that fail to meet the requirements stipulated in this or any other relevant field inspection documents shall be rethreaded by an approved Complete Group/Complete Tubular Products repair facility.

6.2.1.1. All torque shoulders, seal surfaces, and thread elements must be machined back to raw metal.

6.2.1.2. After rethreading, connections must be phosphate coated.

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