SUBJECT: COUPLING MAKE UP

1.0 SCOPE

1.1. This document sets forth the recommended practice for the mill end make up or bucking of the following Hunting Connection Technology (HCT) connections:

1.1.1. Semi-Premium connections with integral torque shoulder: **SEAL-LOCK BOSS ACCESSORY**, **SEAL-LOCK HT-S**, **TEC-LOCK BTC-S**, **TKC 4040 HOI**

1.1.2. Semi-Premium positional assembled connections: **HYPER-LOCK HELIX2**, **SEAL-LOCK BOSS**, **SEAL-LOCK HT**, **TEC-LOCK BTC** and **TKC 4040 RTC**.

2.0 DEFINITION

2.1. Make up shall be defined as the power tight application of a coupling or box connector to a pin connector.

2.2. Integral shouldered connections are connections that have a shoulder machined into the center of the coupling.

2.2.1. All accessory connections are considered integral shouldered connections.

2.3. Non-integral shouldered connections are connections that rely upon the mill side pin nose as the shouldering feature for field end make up.

3.0 REFERENCE

3.1. API 5CT Specification

4.0 EQUIPMENT

4.1. Approved thread compound

4.1.1. For approved thread compound list visit www.hunting-intl.com.

4.1.2. The use of SealLube™ LTF 4444 for the mill end coupling make up is required by HCT on **HYPER-LOCK HELIX2**.

4.1.3. On **SEAL-LOCK HT**, Hunting recommends the use of SealLube™ LTF 4444 for the mill end coupling for sizes larger than 3.500, and either SealLube™ HTM 1001 or SealLube™ LTF 4444 for sizes smaller than 3.500.

4.2. Calibrated bucking unit with torque-turn monitoring system.

4.2.1. Unit shall be capable of applying the torque required to assemble the connection.

4.2.2. The power and back up tongs shall have sufficient dies evenly spaced along the coupling and pipe circumference such that an even gripping pressure is applied, both axially and circumferentially to prevent distortion of the coupling.

4.2.3. For thin wall products, the use of stiffener, handling plug, or thread protector is recommended to prevent damage to the open end of the coupling.

4.3. Mustache brush P/N 58235 for proper application of thread compound.

4.4. Connection Datasheet (CDS) with specified torque values.

4.5. 0.005" Feeler Gage.

4.6. Molybdenum disulfide spray. Hunting recommends Banner Moly-G-Spray, Jet Lube Moly Mist or DuPont Molykote D-321 R.

4.6.1. **OPTIONAL** – Barrettes are available for **SLHT** and **SL BOSS**.

4.6.2. Hunting field service kit comprised of caliper and pit gauge (four (4) month calibration frequency)

5.0 CERTIFICATION

5.1. The torque unit shall be calibrated for accuracy every six (6) months.

6.0 Dump Test

6.1. Dump test shall be conducted prior to casing run. Failure to verify dump test could result in premature dump of torque prior to acceptable optimal torque and or over torque of connection.

6.2. When conducting a dump test, consideration should be given to thin wall casing (wall thickness of 0.375" or less on 5.500" OD or greater). It is recommended, in questionable thin wall casing dump tests, that 65% of the connection optimal torque be utilized. If the dump test results are questionable, contact HCT Quality Assurance for guidance.

6.3. When conducting multiple dump tests on casing, it is crucial that the Hunting representative have the tong operator release the jaws and remove the tongs from casing. Tongs are to be applied at a different area on the casing for sequential dump tests. Failure to do so may result in excessive die penetration or point loading which can jeopardize the integrity of the casing.

7.0 MAKE UP PROCEDURE

7.1. Thoroughly clean and visually inspect both sides of the connection to be made up.

7.1.1. Ensure that the pin thread starts, and full form threads are free from tears or burrs.

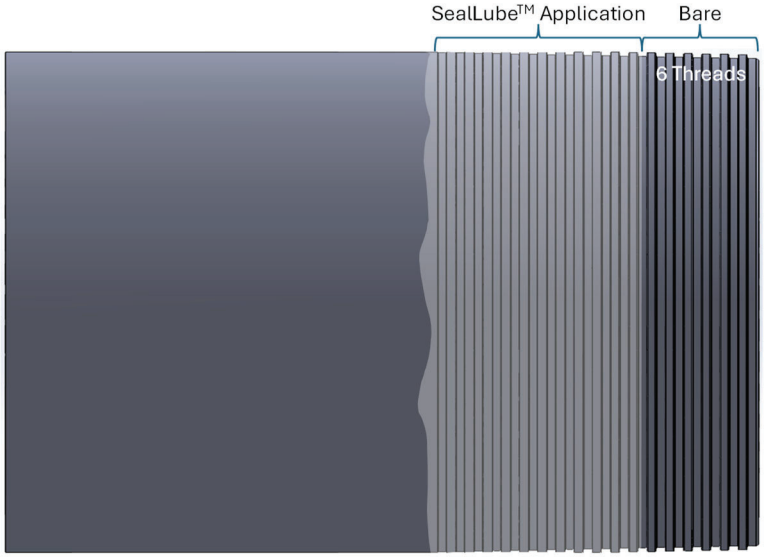
7.1.2. Ensure that the coupling or box connector is free from burrs or tears on the starting threads and throughout the full formed thread length.

7.1.3. Both connectors shall be free from any debris such as chips, shavings, dirt, or other foreign particles that could create galling or damage to the connection during make up.

7.1.4. **OPTIONAL** – For **SLHT** and **SLBOSS**, mark make up lines in accordance with **Ancillary Specification for Make Up Position Using Barrettes.**

7.2. Apply a light to moderate, even coating of approved thread compound to cover the full coupling/box threaded surface and the thread runout of the pin connector per section 4.1.2.

7.2.1. For HLH2 mill end pin, SealLube™ LTF-4444 shall be applied to the threaded area, leaving the first six (6) threads bare.

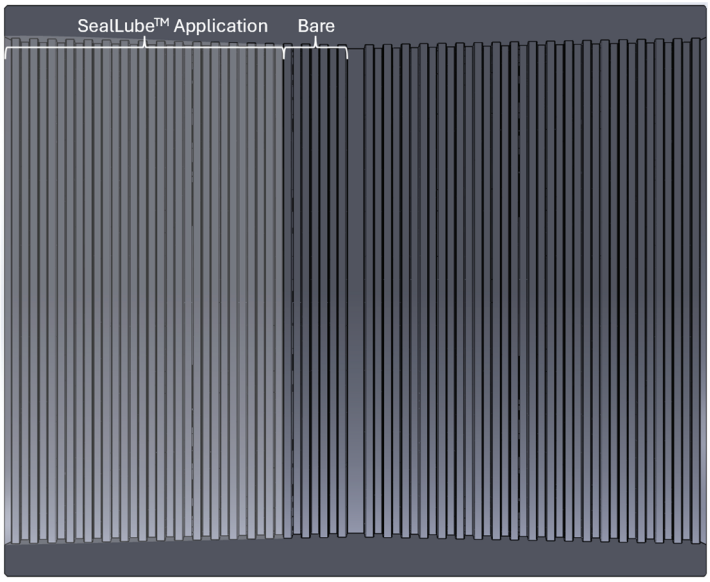


7.2.2. For SLHT, SealLube™ shall be applied to the entire threaded area.

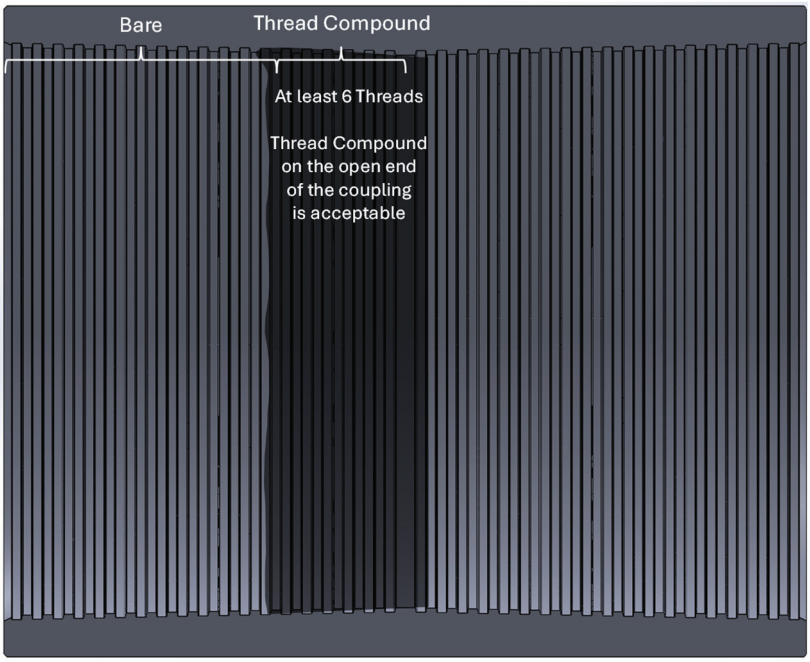
7.3. Coupling end:

7.3.1. A light coat of thread compound shall be applied to the seal and shoulder area of the coupling/box connector only.

7.3.2. For SLHT, the entire box end, SealLube™ shall be applied from the face of the box, leaving an area of approximately 1.000" bare



7.3.3. For HLH2, apply approved thread compound to at least six (6) threads from the center of the coupling, as shown below:



7.4. Apply the coupling to the pin end and make up to the hand tight position.

7.5. The coupling shall be positioned in the bucking unit as defined in Figure A.

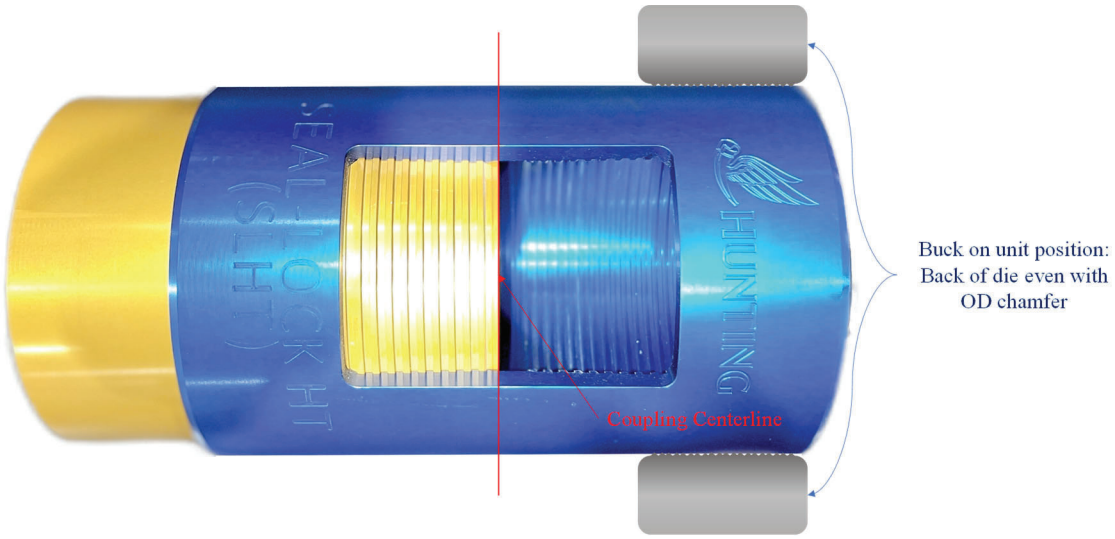


Figure A: Buck on unit die position

7.6. Apply the specified torque to the connection or for position make-up, apply torque until the make-up loss is achieved (see section 8). Make up speed shall not vary excessively during make up and shall be continuous with no gear changing. Assembly speed shall not exceed 5 RPM, as the coupling is already assembled to the hand tight position.

7.7. Clean any residue of SealLube™ that are visible on the open side of the coupling. Failure to clean will result in SealLube™ hardening and interfering with the Field make-up.

7.8. Torque-turn monitoring system shall be utilized.

7.8.1. Monitoring equipment shall be capable of resolving torque to 1/100th of a turn increment as a minimum.

7.8.2. A computer display shall accompany the torque-turn monitoring equipment and shall be utilized to monitor make-up. A copy of the torque-turn graph shall be maintained with the manufacturing order.

7.8.3. The torque-turn equipment shall be capable of releasing the torque when specified assembly parameters are reached.

7.8.4. The load cells used for the torque monitoring equipment shall be calibrated every six (6) months, traceable to the appropriate national standard.

NOTE 6: If an appreciable amount of thread lubricant is being pushed to the tube ID and/or the tube OD during make up, too much thread lubricant is being applied to the connection.

NOTE 7: All semi-premium threaded and coupled connections have a positional make up. For integral shouldered products, and all accessory products the integral shoulder determines the correct make up position.

8.0 MAKE UP ACCEPTANCE AND REJECTION

8.1. An acceptable make up requires that both position and torque requirements be met.

8.1.1. Coupled connections are made up by positioning the mill end pin connector into the middle of the coupling (See Figures A and C). The proper assembly is determined by the make up loss, or half the coupling length. The associated positional tolerance is specified in Table 1.

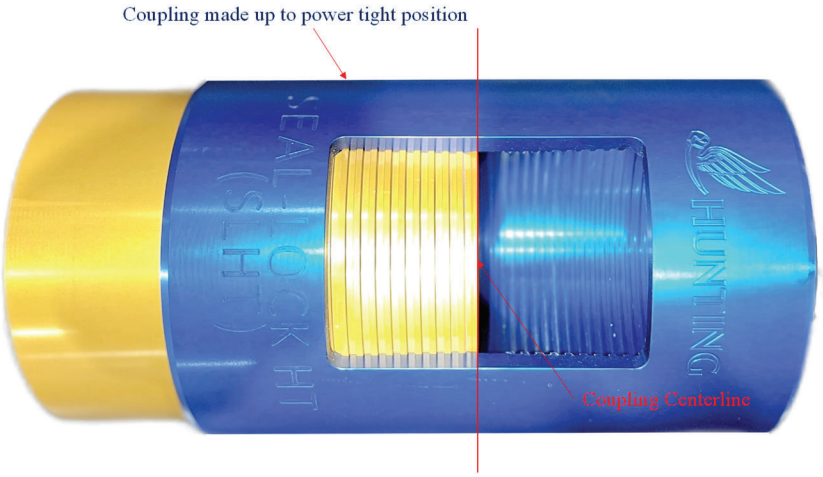


Figure B: Position coupling make up

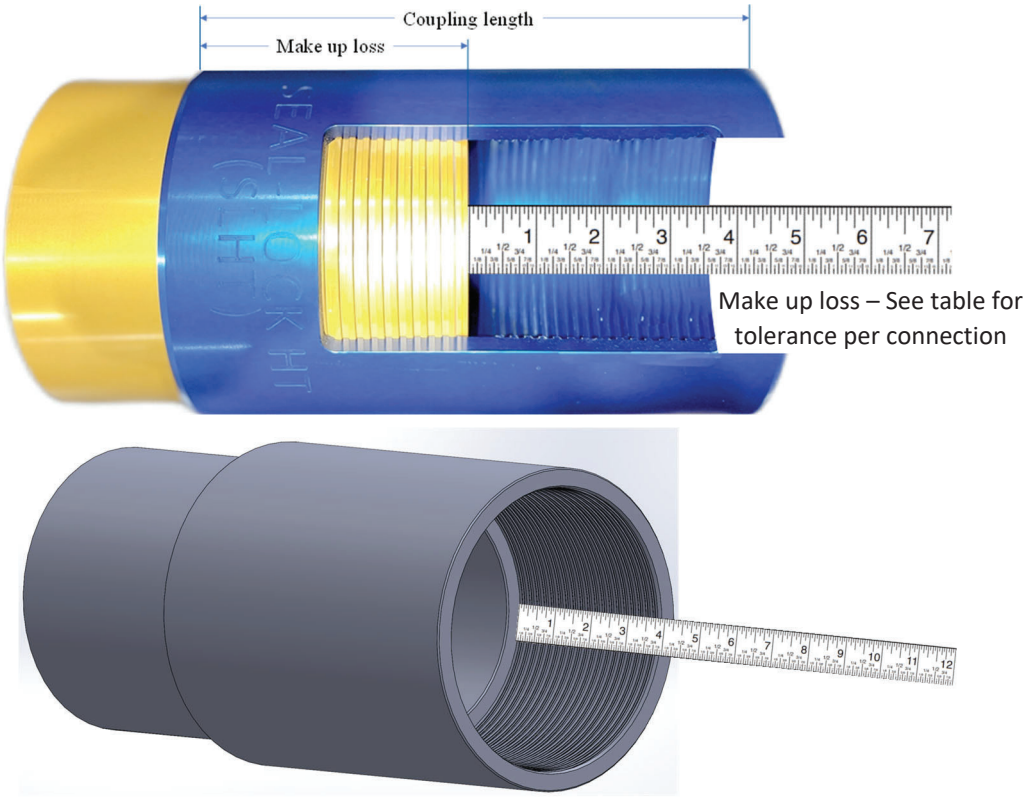


Figure C: Position make up loss measurement

Size Range	Tolerance +	Tolerance -	Connection Type
All	0.000	-0.031	SEAL-LOCK HT
< 13.375	0.000	-0.063	SEAL-LOCK BOSS
13.375 and UP	0.000	-0.125	SEAL-LOCK BOSS
All	0.000	-0.063	TKC 4040 RTC
All	0.000	-0.125	TEC-LOCK BTC
All	0.000	-0.125	HYPER-LOCK HELIX2

Table 1: Make up loss tolerance

8.1.2. OPTIONAL – For SLHT or SL BOSS, if using the **Ancillary Specification for Make Up Position Using Barrettes**, utilize acceptance criteria established in the Ancillary Specification.

8.1.3. The torque applied to the non-integral shouldered connection shall meet the Mill End torque requirements specified in the connection data sheet.

8.1.4. Integral shouldered connections including all accessory connections must exhibit a clear and distinct shoulder on the torque turn graph.

8.1.5. The torque applied to integral shouldered connections and all accessory connections shall meet the minimum requirements published in the connection data sheet. The maximum published torque may be exceeded on thick wall accessories but shall not exceed 80% of the published minimum yield torque.

8.2. Connections which do not meet the acceptance criteria shall be quarantine. Contact an HCT Quality Assurance representative for disposition.

8.3. End drift the assembled connection and pipe body past all clamping areas in accordance with the **AS-004 Drifting** Ancillary Specification.

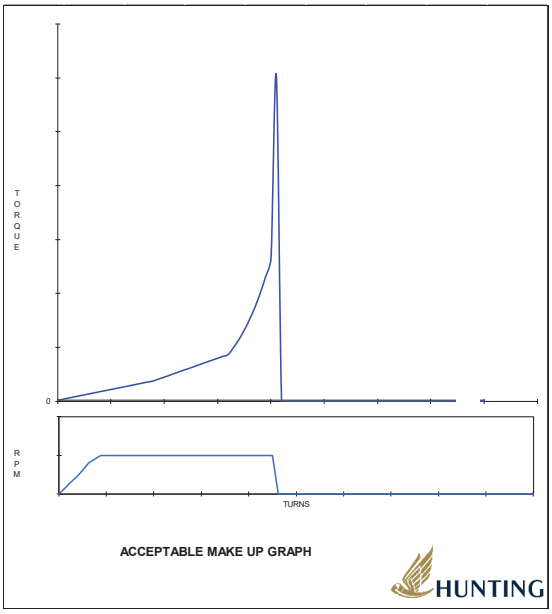
8.4. The proper jaw/insert size with enough contact area with the pipe shall be used to minimize insert marks. Power and backup tong dies shall be clean and not worn down. The maximum acceptable insert mark depth on carbon steel or low alloy steel pipe is 12.5% of the pipe nominal wall thickness and 5% or 0.012” (lesser value) on sour service and CRA material.

8.5. The maximum acceptable insert mark depth on all standard couplings shall not exceed 0.025” for carbon and low alloy steel and 0.015” for sour service and CRA material.

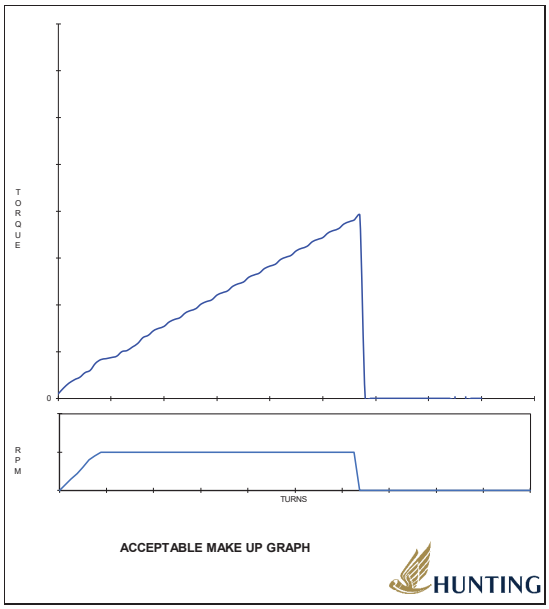
8.6. The maximum acceptable insert mark depth on all special clearance couplings shall not exceed the OD tolerance of the product or 0.025” (lesser value) for carbon and low alloy steel and shall not exceed the OD tolerance of the product or 0.015” (lesser value) for sour service and CRA material. Low stress dies shall be used for special clearance coupling assembly.

8.7. The following graphs set forth the typical torque-turn signature criteria for coupling make up and shall be referenced to determine final acceptance. If the torque-turn graphs are questionable, contact HCT Quality Assurance for guidance.

8.7.1. Shouldered connections:



8.7.2. Position make up:



9.0 REWORK

9.1. If the connection does not reach the proper position during make up, remove the coupling, clean, and visually examine both pin and box for damage. If no damage is found, re-make up as directed in section 7.0.

9.2. Connections which will not meet the criteria of section 8.0 should be set aside and contact should be made with an HCT Quality Assurance representative for disposition.