



**RECOMMENDED
PRACTICE
SEAL LOCK
HC, GS**

Approved	Initials	Date
Prepared	GJR	05/31/12
GM Engr	RSS	06/06/12
QA Mgr	GJR	05/31/12
Revision	012	03/19/12

SUBJECT: FIELD RUNNING AND HANDLING PROCEDURES

1.0 SCOPE

1.1 This document sets forth Hunting's recommended practice for the field running and handling procedures that should be used in conjunction with the **SEAL-LOCK HC, GS** casing product line.

2.0 REFERENCES

2.1 The following documents were used for reference in the preparation of this document:

- 2.1.1 API RP 5C1
- 2.1.2 API BUL. 5A2

3.0 EQUIPMENT

3.1 The following list of equipment should be on location when **SEAL-LOCK HC, GS** casing is run:

- 3.1.1 Ample supply of fresh, unopened thread compound.

NOTE: Hunting recommends Best-O-Life PTC, OCR 325, Clear Glide, Jet Lube Seal Guard, Jet Lube Seal Guard ECF, and Topco II as the tested and approved thread compounds for Hunting premium, metal-to-metal sealing products.

NOTE: Hunting recommends Best-O-Life 4010 NM as the thread compounds for Hunting SEAL-LOCK HC and GS products used in extremely cold conditions (below 0^o C to -40^o C/32^o F to -40^o F). If Best-O-Life 4010 NM is not available, use another metal-to-metal seal approved compound cut with a sufficient amount of WD-40 to keep the compound sufficiently viscous whereby the compound can be easily applied to the connection and where the compound sticks to the entire thread surfaces. Please be advised that the thread compound does not provide sealing on the SEAL-LOCK HC and GS products. The function of the thread compound is to prevent galling on make-up and break-out.

NOTE: Hunting does not recommend API modified thread compound for Hunting proprietary connections when environmental considerations apply. However, when an API modified thread compound is used, Hunting has standardized on Best-O-Life 72732/72733 as the API modified thread lubricant used for connection qualification testing. Using another thread lubricant may substantially change the recommended torque range listed on the sales data sheet and/or cause premature galling.

WARNING: Hunting "DOES NOT" recommend any thread lubricant with large particles such as Best-O-Life 2000 on its metal-to-metal sealing connections. It has been proven to compromise connection integrity on Hunting's metal-to-metal sealing connections.

- 3.1.2 Thread lubricant applicators #58235 moustache brush.

NOTE: Hunting does not recommend the bottlebrush commonly used for thread lubricant application as the amount of lubricant cannot be adequately controlled.



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- 3.1.3 Hunting's field service kit.
- 3.1.4 Appropriate Sales Data Sheet. See third note in Section 3.1.1.
- 3.1.5 **VISUAL THREAD INSPECITON**, Ancillary Specification.
- 3.1.6 **STEEL IMPERFECTIONS**, Ancillary Specification.
- 3.1.7 **RECOMMENDED** - Molybdenum disulfide spray.
- 3.1.8 **RECOMMENDED** - WD-40.
- 3.1.9 **RECOMMENDED** - Torque turn monitoring equipment.

4.0 FIELD RUNNING AND HANDLING PROCEDURES

- 4.1 Precaution
 - 4.1.1 Tubulars should not be stacked higher than five tiers at the rig. (API RP 5C1).
 - 4.1.2 Layers should be separated by wooden dunnage so that no weight rests on the connections. (API RP 5C1)
 - 4.1.3 Thread protectors should always remain in place when moving or handling tubulars.
 - 4.1.4 If a mixed string is to be run, ensure proper identification to accommodate sequence of running.
 - 4.1.5 Do not use a welding torch to remove thread protectors. A thread protector removal tool is available from Hunting should weather, handling or other conditions make protector removal a difficult or time-consuming procedure.
 - 4.1.6 Avoid rough handling. Do not unload pipe by dropping.
 - 4.1.7 Do not handle more than three joints at a time unless the pipe is packaged or bundled.
 - 4.1.8 Never use hooks on the ends of pipe. Handle with nylon slings only.

NOTE: For CRA material, pipe racks should be coated with a non metallic material.

NOTE: The following precautions should be observed when handling casing and tubing:

- a. Before loading or unloading make sure that the thread protectors are tightly in place. Do not unload pipe by dropping. Avoid rough handling which might damage the threads or ding or dent the body of the pipe. Damaged threads may leak or part. Dents and out-of-roundness may reduce the collapse resistance of the pipe.
- b. Special handling may be required for sour service and CRA material. Impact against adjacent pipe or other objects may cause a local increase in the hardness of the pipe to the extent that they become susceptible to sulfide stress cracking. The owner of pipe that requires special handling should notify his service providers of the applicable special handling requirements and to which pipe the special requirements are applicable.
- c. When unloading by hand, use rope slings to control the pipe. When rolling down skids, roll pipe parallel to the stack and do not allow pipe to gather momentum or to strike the ends, because even with thread protectors in place there is danger of damaging the connector.
- d. When using a crane, the use of spreader-bar with a choker-sling(s) at each end is the recommended method of handling long pipe. Each choker-sling shall be double wrapped.
- e. When rolling pipe on the rack, keep pipe parallel and do not allow pipe to gather momentum or to strike the ends.



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4.2 Preparation

4.2.1 By visual inspection, ensure that all necessary running equipment and accessories (subs, crossovers, nipples, gas lift mandrels, lifting/handling plugs, hangers, pup joints, etc.) are available and in good condition. Document condition in tally book.

NOTE: Following a thorough review of running/accessory equipment, discuss running procedures with drilling supervisor.

4.2.2 Slip type elevators of proper size, in good repair and with the setting plate adjusted properly, should be used.

NOTE: Hunting does not recommend the use of bottleneck or shoulder type elevators.

4.2.3 Ensure that slips are of the correct size to accommodate the size, weight and length of the tube.

4.2.4 Ensure that the safety clamp is the correct size and in serviceable condition.

NOTE: The safety clamp should be used above the table slips for the first 20 lengths.

4.2.5 Check for traveling block alignment and rotary hole alignment.

4.2.6 Ensure that an ample supply of thread compound is available. Only fresh, previously unopened containers of compound shall be used. Stir thoroughly.

NOTE: Hunting recommends the use of non directional inserts for CRA material in elevators and slips.

NOTE: See Section 3.1.1 for recommended thread compounds.

4.2.7 A stabbing board or a yoke may be required to offer stability for ease of make-up.

4.2.8 Ensure that the power tong snub line is at 90° and level with the tong.

NOTE: Ensure that an accurate torque monitoring device (Martin-Decker torque gauge) is available, the load cell is for use in the required torque range, and the load cell has been calibrated within the past four (4) months.

NOTE: Hunting recommends the use of a Dillion gauge to assist in establishing the torque dump on the tong unit.

4.3 Cleaning and Thread Inspection

Unless the connections are provided in the rig-ready condition (ready to run when the tubulars leave the manufacturing facility), all tubular connections shall be thoroughly cleaned and dried at the rig prior to running or inspection.

4.3.1 Immediately before running, remove protectors from both the field end and the coupling. Clean each connection and protector thoroughly.



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4.3.2 All compounds that have been applied to the connections and protectors are to be wiped off or washed off using solvent and a non-metallic bristle brush. Wipe out or blow out the solvent from the connection or protector after washing.

NOTE: If steam is used to clean the connections assure that the connections are thoroughly dried following the steaming operation and that no water remains in the pipe or in the threaded areas. In freezing temperatures be aware that water remaining on the threaded areas will freeze and the ice must be removed prior to thread compound application or galling of the threads may occur.

NOTE: Care must be taken to ensure that the cleaning process does not cause environmental pollution.

4.3.3 Check and clean the inside of the tubulars to eliminate any foreign material that may fall into the box while stabbing. If compressed air is available, air blast from box to pin.

NOTE: Ensure that there are no bristles left on the threads from cleaning.

4.3.4 As required by the operator, drift the pipe and accessory equipment with a clean, properly sized mandrel. Drift shall be performed box to pin, being careful not to damage the box torque shoulder, seal, or threads when placing the mandrel in the joint.

4.3.5 Inspect the threaded connections using Hunting's Ancillary Specifications titled **VISUAL THREAD INSPECTION** and **STEEL IMPERFECTIONS**.

NOTE: Repair as required by VISUAL THREAD INSPECTION and/or STEEL IMPERFECTION ANCILLARY SPECIFICATIONS.

4.3.6 If any joint shows obvious ovality, it should not be run.

4.3.7 Never leave the threads exposed for longer than two hours without corrosion protection. If the connection is cleaned more than two hours but less than twelve hours before the joint is run, a light oil, such as WD-40, should be applied to the threaded surfaces to prevent corrosion. If it will be more than twelve hours until a joint is to be run, reapply thread compound and clean thread protectors.

4.4 Running

4.4.1 Handling plugs or thread protectors must be in place whenever the tubulars are moved.

NOTE: While moving tubulars, do not lift with a hook that may/will contact the box/coupling thread or seal or the pin face.

4.4.2 Joints should be moved to the V-door via a pick-up machine. If a pick-up machine is unavailable, joints should be moved to the V-door by slings or a pick-up line attached to the box end.

4.4.3 Elevators or pick-up line with or without pick-up line elevators may be used to lift the joint up in the derrick.



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4.4.4 If CRT (casing running tool) is to be used, remove the thread protector and replace it with a Hunting internal tool guide / handling plug.

NOTE: Hunting connections are not interchangeable with any other connections in the industry. The use of an internal tool guide / handling plug different than the ones designed by Hunting Energy Services for specific connections or applications may result in property damage, injury, or death. Hunting will not be held accountable nor accept any liability if the proper equipment is not utilized for its intended purpose.

4.4.5 As each length is suspended vertically, remove the thread protectors and clean both pin and box connectors to be made-up. Unless the connections are provided rig-ready, remove any thread compound, solvent or moisture remaining on the connection after removing the protector.

4.4.6 Visually inspect to assure no damage to either connector has occurred.

4.4.7 Recommended - after the connection is clean and dry, apply a light to moderate, even coating of molybdenum disulfide spray to the pin and coupling connector.

4.4.8 After the connection is clean and dry, apply a *light*, even coating of the thread compound to the pin and coupling connectors. Assure that the thread compound has been thoroughly and adequately stirred and is of uniform consistency.

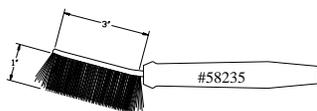
NOTE: Assure that the coupling relief groove is not filled with thread compound. If excess thread lubricant is in the groove, remove the excess with a clean, dry rag or paper towel.

NOTE: Adjust the amount of lubricant applied to the pin and coupling connectors to cause a gradual increase in torque throughout the make-up.

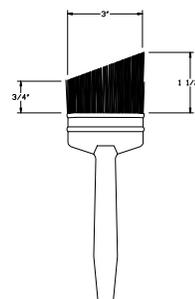
NOTE: An indicator of connection over-lube is during the last one-half of a turn to final make-up position there is no gradual increase of torque even though the pin is continuing to advance into the coupling.



Do Not Use
Bottle Brush



Preferred Moustache Brush #58235



Alternate Acceptable
Modified Paint Brush



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NOTE: A *light*, even coating of thread compound is defined as all thread surfaces, root and crest, seal surfaces and pin face/torque shoulder covered with an even coat of thread compound. However, the thread form should remain clearly visible. It should be noted that in severe service situations thread compound may be applied only to the box seal and the entire pin threaded surfaces.

4.4.9 A stabbing guide is recommended to limit damage during the stabbing process.

NOTE: Without the stabbing guide in place on the box connector, have the driller position the first pin to be made-up over the box connector (stump) and check the pin to box alignment. The pin should be allowed to hang free in the elevators while the alignment is being determined. The pin should be able to be stabbed directly into the box without assistance from one of the drilling crew members.

4.4.10 Replace the stabbing guide and stab the pin connector into the box connector carefully to avoid damage to the connectors. Request assistance from the man on the stabbing board as needed.

4.4.11 If the connection is mis-stabbed, pick up the joint, wipe away the thread compound on the pin and the box connectors and inspect for damage. Repair if necessary.

4.5 Make-up

NOTE: The normal published torque window is based on dimensional tolerances and friction factors. Other factors affecting torque are texture of phosphate coating, type of thread lubricant, make-up speeds, temperature, etc. The important feature of the SEAL-LOCK HC and GS connections is for the connection to achieve a shoulder with approximately 1,000 ft/lbs of shoulder (delta) torque prior to reaching 80% of the published minimum yield torque value stated on the appropriate connection data sheet. In severe service applications, such as very low temperature situations, the recommended torque range may be increased by 50% without consequences.

NOTE: SEAL-LOCK HC and GS are 5 ¼ turn make-up connections from stab to the shouldered condition. The first 3 ½ -to 4 make-up turns should be below the 250 ft/lb reference torque. If the connection begins to show over the 250 ft/lbs torque prior to the 3 ½ turns, stop the make-up, recheck the alignment, if possible make a revolution using a chain tong and resume the make-up. There should be no more than 1 ½ turns of building torque until the connection shoulders. Small torque excursions that exceed the maximum torque are not cause for rejection of the make-up.

NOTE: Hunting recommends that the operator determine the appropriate torque range by making up the first 25 connections on each run to determine the average torque to achieve the shoulder point. The optimum makeup torque or dump point should be set at 35% greater than the maximum shoulder torque value. When using torque turn monitoring equipment, for connections not achieving a recognizable shoulder



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position, back off the connection 3 revolutions, re-set the torque at 35% greater than the existing dump point and remake-up; however, do not exceed 80% of the published minimum yield torque value. For connections that indicate a galled connection condition on the graph, the connection should be broken out, cleaned and inspected for damage. If no visible damage is visible, remake as indicated above.

NOTE: If a spider is used in conjunction with the slips and above the Kelly bushing/rig floor, following the alignment procedure, the spider should be chained in place.

4.5.1 Optional Torque-Turn Equipment.

A torque-turn/time or torque/turn monitoring system may be utilized. Monitoring equipment should be capable of resolving torque to 1/100th of a turn increments as a minimum but equipment capable of resolving torque to 1/1000th of a turn should be utilized when available. An enhanced computer display should be part of the torque-turn monitoring equipment and should be utilized to monitor make up. The monitoring equipment should be capable of dumping during the make-up by either the computer technician or when maximum parameters are reached. As the torque enters the acceptable window, the technician should be able to depress a function key to manually terminate the make-up. The system should be capable of automatic dumping as input parameters are met. The load cells used with the torque monitoring equipment should be calibrated every four months, traceable to the appropriate national standard.

4.5.2 Back-up tongs should be placed below the coupling. Use back-up tongs for the first 10 joints or until sufficient weight is generated in the slips to prevent the entire string from rotating.

NOTE: Power and backup tong dies shall be clean and not worn down and shall not leave marks exceeding 0.015" in depth. Excessive marks or sharp-bottomed marks must be removed. Removal may be by filing only; grinding is prohibited.

4.5.3 Position the power tongs approximately 7" above the coupling.

NOTE: Do not allow the stabber to rock the tube during make-up.

NOTE: If the connection is mis-stabbed, do not back out the connection with the tongs. If a connection is mis-stabbed, remove the power tong and make the connection up with a chain tong for 1 to 1 1/2 turns, then proceed with the make-up. If the connection cannot easily be made-up with the chain tong, fully break out the connection, visually inspect for damage, re-stab and proceed with the make-up.

4.5.4 Make up the connection power-tight using a make-up speed between 3 and 12 rpm in low gear only. In any case the make up speed should never exceed 14 rpm. Make-up speed should not vary excessively and should be continuous with no gear changing.



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TARGET MAKE-UP RPM

4 1/2"	-	12 RPM	9 5/8"	-	6 RPM
5"	-	12 RPM	9 3/4"	-	5 RPM
5 1/2"	-	12 RPM	9 7/8"	-	4.5 RPM
6 5/8"	-	10 RPM	10 3/4"	-	5 RPM
7"	-	10 RPM	11 3/4"	-	5 RPM
7 5/8"	-	8 RPM	11 7/8"	-	4.5 RPM
7 3/4"	-	7 RPM	13 3/8"	-	4.5 RPM
8 5/8"	-	7 RPM	13 5/8"	-	3 RPM

NOTE: 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: If shoulder torques are high or low, adjust the thread compound application to give good make up torque curves. For high torque, apply more compound. For very high torque, apply Molybdenum disulfide to both pin and box connectors prior to the application of the thread compound.

NOTE: Hunting running specifications state that the connection must shoulder prior to reaching maximum assembly torque.

- 4.5.5 If the optional torque/turn monitoring equipment is used, a make-up torque/turn graph should be generated for every connection.
- 4.5.6 Pipe should be vertical and spin freely during make-up. Elevators should not interfere with this process.
- 4.5.7 In the event torque/turn or torque turn/time equipment is used at the rig site, the following procedure should be used to set acceptance criteria:
 - a) Prior to the job, the operating company representative should review the Hunting sales data sheet for this connection.
 - b) A torque curve showing a small wave shall be acceptable. However, the connection with a wave in the torque curve exceeding the shouldering torque shall be broken out and visually inspected. If no damage is found, the connection may be made up again.
 - c) A connection with final torque in excess of 80% of the minimum yield torque or delta torque less than 1,000 ft-lb should be broken out and visually inspected. If no damage is found, the connection may be made up again.

4.6 Pulling

4.6.1 Preparation

- a) Slip type elevators are required.
- b) Use an alignment yoke and weight compensator when pulling casing.
- c) Use power tongs with acceptable torque read-out and back-up tongs.
- d) A wooden platform must be used for standing back tubulars. (Refer to API 5C1)



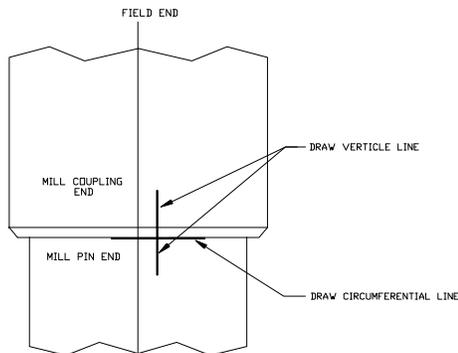
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- e) Clean thread protectors should be available prior to lying down or standing back. As each connection is broken out, protectors shall be installed on each pin.
- 4.6.2 Breaking Out
- a) Use power tongs with torque adjustment adequate for break-out without damaging pipe. When coming out of hole, the back-up tong should be placed on the coupling (below centerline) to assure that the pipe joint breaks out at the top of the coupling. Pipe wrenches or chain tongs shall not be used as back-ups.

NOTE: Prior to break-out, using an ink paint marker, draw a vertical line from the mill make-up side of the coupling onto the mill end tube body. Also draw a line circumferential on the tube body, either side of the vertical line even with the coupling face. If the mill make-up moves more than 1/4" circumferentially during break-out, use these marks to reestablish the mill make-up position.



- b) Break out the connection at a speed less than 10 rpm in a vertically aligned position.
- c) After breaking loose continue to rotate at 10 RPM or less until the connection drops down one thread. Remove the power tongs, place the stabbing guide on the coupling and slowly pick up the joint. The connection will be disengaged and ready for separation in 5 to 6 turns from the power tight position.

NOTE: Do not spin after the connection has “popped.” This can and will cause thread damage and/or galling. Approximately 5 ¾ turns should fully disengage the two connectors.

NOTE: On the Seal-Lock HC and GS connections, most galling occurs during the break-out operation due to misalignment between the broken-out pin and box connectors. Assure the pin and the box are fully aligned prior to attempting to separate the pin and box connectors.

- d) If excessive torque is noted, rotation should be stopped until cause is determined.
- e) Great care should be exercised to disengage all of the threads before lifting the casing out of the coupling. Do not jump out of the coupling. If this occurs, inspect the pin face and flank seal for damage.



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- 4.6.3 Standing Back
 - a) Tubulars should be set on a firm wooden platform when stood back in the derrick.
 - b) Protect threads from dirt or damage when the tubulars are out of the hole. Thread protectors should be installed on the pin members when standing back and may be required in the coupling when conditions warrant.
- 4.6.4 Re-Running
 - a) Clean connection members fully and inspect for damage.
 - b) Re-run as per 4.4 and 4.5.
- 4.6.5 Laying Down
 - a) Clean protectors shall be placed on the tubulars before they are laid down.
 - b) If tubulars are stored or re-used, remove the protectors after lying down, clean and inspect connections. Coat all exposed threads with water displacing oil (WD-40) followed by Kendex or other acceptable storage compound and install clean thread protectors.

5.0 RUNNING PROCEDURE FOR ACCESSORIES MADE UP USING THREAD LOCKING COMPOUND / LUBRICANT

- 5.1 Using steam, soap and hot water, or safety solvent, remove all thread storage or running compound from both pin and box connectors.
- 5.2 Ensure that the thread and sealing surfaces are clean, dry, and free of oil, grease, or residues.
- 5.3 On metal-to-metal seal connections, apply the Hunting recommended thread compound to the seal area on both elements (pin and box connectors).
- 5.4 Just prior to make up, the thread locking lubricant shall only be applied on the pin threads (not on the box), on the area that has not been covered by the approved thread compound.
- 5.5 When making up accessories like float equipment, hangers, thick wall accessories, and others, shoulder torques might be higher than normal due to relationship of the friction factors of the thread locking lubricant in comparison with the API Modified thread compounds and the wall thickness.
- 5.6 The make up torque of the accessories should be aimed to the maximum recommended torque. Therefore, if necessary, the published torque may be exceeded but in any case shall not exceed 80% of the published minimum yield torque.