

	Running Procedure for Casing with GB Drilling with Casing Connections	October 29, 2007
		Rev. 9 (05/12/2010)

OVERVIEW

This field running procedure applies to makeup of **GB Drilling with Casing** Connections which include GB CD, GB WS, GB HB, GB CDE, GB WSE, and GB HBE Connections with GB Buttress, GB 4P, and GB 3P Threads. All of these connections are suitable for **Running** (standard casing applications), **Rotating** (to aid string advancement, **Drilling** (Drilling with Casing/Drilling with Liners) and **Driving**. This procedure is universal for all connections listed and applications above.

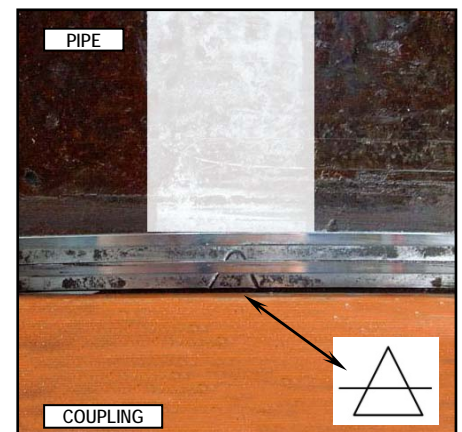
Numerous factors can impact the makeup torque of Buttress and Modified Buttress Threads, such as GB 4P and GB 3P Threads. Some of these factors include but are not limited to: vertical alignment, amount and distribution of thread compound, location and orientation of the snub line, distance between tongs and backups, temperature/weather, equipment type, calibration, personnel, gauges, etc. The nature of these types of connections makes it impossible to provide makeup torque values that will yield proper power tight makeup under all circumstances. This procedure has been designed to determine the torque required for proper power tight makeup of GB DWC Connections under the actual circumstances and with the actual equipment and set up conditions, weather, etc. that exist at the time of running. If properly executed, connections made up in strict accordance with this procedure will ensure that all connections are properly and consistently assembled and will provide the requisite downhole performance.

It is imperative that the following procedure be executed carefully at the beginning of the run (1st ten joints) to determine the torque that should be used for the rest of the string. Each Connection Data Sheet presents calculated yield torque values for the pipe body and connection. The Maximum Operating Torque values shown on the Connection Data Sheets represent the limiting torque **spike** that can be applied to the connection during rotating operations. The Maximum Operating Torque is **NOT** the Maximum Makeup Torque and is **NOT** a sustainable rotating torque. Operating at the Maximum Operating Torque for any length of time will likely damage the connection.

In general, the Maximum Makeup Torque at the beginning and throughout the run should be limited to 2X the Minimum Makeup Torque shown on the Connection Data Sheet. This rule of thumb is given as a practical limit for avoidance of thread galling and possible tube damage due to excessive jaw pressure that can occur with excessive makeup torque. Operators should make up connections until nose engagement with the minimum torque value shown plus enough additional delta torque for project-specific requirements. Contact GB Tubulars if more than 2X the minimum torque value is required for the intended service. See size- and weight-specific Connection Data Sheets for Physical and Dimensional Properties which include recommended torque values for GB **Drilling with Casing** Connections.

PROCEDURE

1. Remove box thread protectors only after casing is set in V-Door.
2. Always apply fresh thread compound to box threads. API Modified Hi-Pressure or Best-O-Life 2000 (or equivalents) are acceptable thread compounds. See Comment No. 1 for discussion on proper amount of thread compound.
3. Remove pin protectors only after joint is raised in the derrick. Visually inspect pin threads for sufficient thread compound; add compound as necessary.
4. Stab the pin carefully into the coupling of the joint hanging in the rotary table. Makeup each connection until pin nose engagement for GB CD, GB WS and GB HB Connections and to shoulder engagement for GB CDE, GB WSE, and GB HBE Connections. The Minimum Makeup Torque is (a) that shown on the Connection Data Sheet **or** (b) the torque required for pin nose or shoulder engagement + 10%. Carefully watch the gauge for the shoulder torque and try to shut down the tongs before reaching 2X the Minimum Makeup Torque shown on the Connection Data Sheet. Record the shoulder torque observed for the first 10 joints (excluding threadlocked and accessory joints).
5. After the first 10 make-ups, use a "running" torque equal to the maximum shoulder torque (recorded in Step 4) + 10%. for the remainder of the string. If available, a dump valve should be used to stop makeup when the established



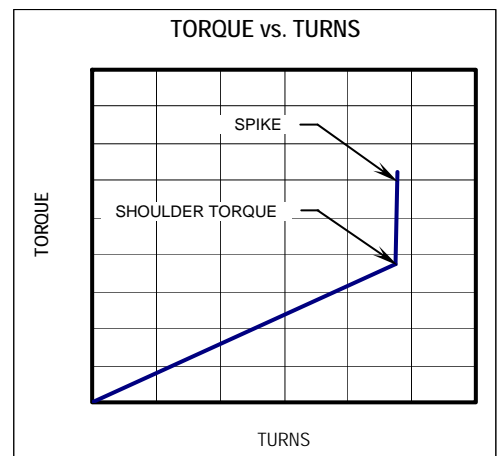
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Running Torque value is reached.

- All connections should achieve pin nose or shoulder engagement with power tight makeup to the “running” torque established in accordance with this procedure. Carefully watch for the spike on the torque gauge during each make-up to verify pin nose or shoulder engagement. As **secondary** verification, randomly check the make-up position relative to the API Triangle Stamp during the run. Proper power tight makeup is achieved when the coupling covers half of the API Triangle Stamp on the pin (see accompanying photo).

COMMENTS

- GB Drilling with Casing** Connections are thread compound friendly. Sufficient thread compound has been applied when all threads are covered with no gaps or bare spots leaving the threadform discernable beneath the compound. Be generous with the thread compound; but avoid over-doping to the point where excessive amounts are squeezed out during assembly.
- If threads are cleaned on racks, new dope should be applied in a light, even coat to both pin and box. See Comment No. 1 above for description of sufficient thread compound.
- All connections should achieve pin nose or shoulder engagement before reaching the “running” torque value determined by this procedure. Any connection that does not achieve pin nose or shoulder engagement at the minimum torque value should be visually inspected for position relative to the API Triangle Stamp.
 - If the coupling is shy of the API Triangle Stamp base, the connection should be broken out, cleaned and inspected visually for thread damage, re-doped, and made-up again (or laid down if threads are damaged). Connections that have not achieved nose or shoulder engagement **should never** be backed up a couple of turns and remade. They should be completely broken out, cleaned and inspected as described above.
 - If the coupling covers the API Triangle base but does not cover half of the Triangle, add additional torque to achieve pin nose or shoulder engagement. It is common to see high torque (possibly exceeding the recommended maximum torque) to initiate additional makeup. This is acceptable as long as the torque drops off once movement starts and then spikes with pin nose or shoulder engagement. If acceptable makeup doesn't occur with one additional torque application, the connection should be broken out (as described in 3a above).
- It is recommended to have a few spare, loose couplings available in the event box threads become damaged on the rig. This allows changing out a coupling without having to lay a joint down.
- Torque vs. turn plots provide another indication of a good make-up; but **should not be substituted for direct visual observation of the connection during field assembly.** When available, torque vs. turn plots should finish with a clearly defined spike as shown in the above graphic. The general character of torque vs. turn plots for good make-ups will become evident after the first 10 connection assemblies. Any make-up that results in a plot that is “out-of-character”¹ when compared with the majority of plots from previous good make-ups, should be checked carefully.
- A double wrap of the pick-up sling should be used when raising casing into the derrick when single joint, side-door, or slip elevators are not being used.
- Higher torque may be required to achieve pin nose or shoulder engagement when thread locking compounds are applied. Due to many variables including temperature, time, etc. torque ranges with thread locking compounds cannot be anticipated. In these cases, carefully monitor makeup to be sure pin nose engagement or shouldering occurs.



¹ An “out-of-character” plot may initiate with a high torque, show significantly steeper slope from the start of make-up, wide torque undulations as make-up progresses, no clearly defined spike, etc.