Engineering Bulletin	WORKSTRINGS INTERNATIONAL	**Document #:** BLTN-005
Adjusted Max MUT by Thread Compound Friction Factor		**Revision:** D
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		Release Date: Oct 24, 2018

Background

Operators sometimes request an increase in maximum recommended make-up torque because they are expecting one of the following.

- The surface torque to exceed 80% of Max Recommended MUT.
- The downhole conditions to exceed 80% -100% of max recommended MUT and experience downhole make-up.

Every thread compound has a friction factor ranging from 1.0 to a maximum 1.25. The industry accepts increasing Max MUT by the thread compound friction factor with proper doping procedures.

WSI should **understand** the operations driving the request, drilling, landing, or completions; and what pipe and thread compound they are using. Is the increase in MUT justified?

-Drilling operations will experience the highest torque conditions.
-Casing landing operations do not generally experience high torque conditions.
-Completion or Workover operations will need to rotate the pipe from TD inside casing.

Details

WSI should generally recommend Max Recommended MUT as listed on the performance sheet in the majority of cases. WSI should handle these requests for increasing the MUT beyond the Max MUT with the following procedures and recommendations.

-Ensure the use of a good copper based thread compound with a friction factor of 1.10 or greater.

-WSI recommends using 1.10 as the multiplier even if the friction factor is higher, MUT x 1.10. This is to address if proper doping procedures are not followed the connection will only be over torqued by no more than 10%.

-The 1.15 friction factor multiplier is acceptable and used frequently for higher torque environments, especially with reactive torque, such as horizontal, extended reach, or deeper wells using smaller OD pipe on bottom. Again, good doping practices are key in these instances.

-Good doping procedures are required for good care and handling of the connection, especially to increase the MUT beyond max MUT. These procedures include doping 360° around the threads and all sealing shoulders.

-Engage the threads slowly then spin up the connection.

The MUT on 6 5/8" .813" FH (8.5" x 3.5" TJ) landing string can be adjusted with attention to make-up and doping practices. The 71,000 ft-lbs Max Rec MUT was determined by FEA on this connection and API bevel diameter. It is at the upper limits to yield the primary shoulder with API bevel diameters. Using the higher friction factor thread compound multiplier will not increase the stresses in the connection and it will maintain the max MUT connection tensile capacity.

Increasing MUT without taking into account the correct thread compound friction factor or increasing MUT beyond the thread compound's friction factor adjustment lowers the tensile value of the connection. This is a consideration in the design and the decision to increase the MUT. Smaller connections are often connection weak so this should be considered. The boxes are often thinner so damage to the connection is easier with higher MUT values. So it is very important to implement the adjusted MUT properly with the emphasis on make-up and doping practices so the connection tensile capacity is not reduced.

The recommend MUT for the MW20 connection, 2,700 to 3,000 ft-lb are based on testing and FEA using a friction factor of 1.15. The MUT for MW20 cannot be increased or decreased from the recommended value. A thread compound with at friction factor of 1.15 must be used with the MW20.

Engineering should be engaged for these requests to review the conditions. Higher friction factors can be used as multipliers if all of these conditions are understood and the operator has ensured good make-up practices.

References: *Grant Prideco Product Bulletin PR-16.4-2009 Jun09-EXT Rev. 4 – 05 December 2016*

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