

The background of the slide is a grayscale image of a circuit board. It features a complex network of black lines representing traces and several large black circular pads. A dark, semi-transparent horizontal band runs across the middle of the image, serving as a background for the text.

# Torque and Tension Project

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Mentor: Bernard Roberts

## Boeing

- Founded by William E. Boeing in 1914
- The 747 fleet has logged more than 42 billion nautical miles (77.8 billion kilometers), equivalent to 101,500 trips from the Earth to the moon and back
- On average, make 42 planes a month
- A 747-400 has six million parts, half of which are **fasteners**

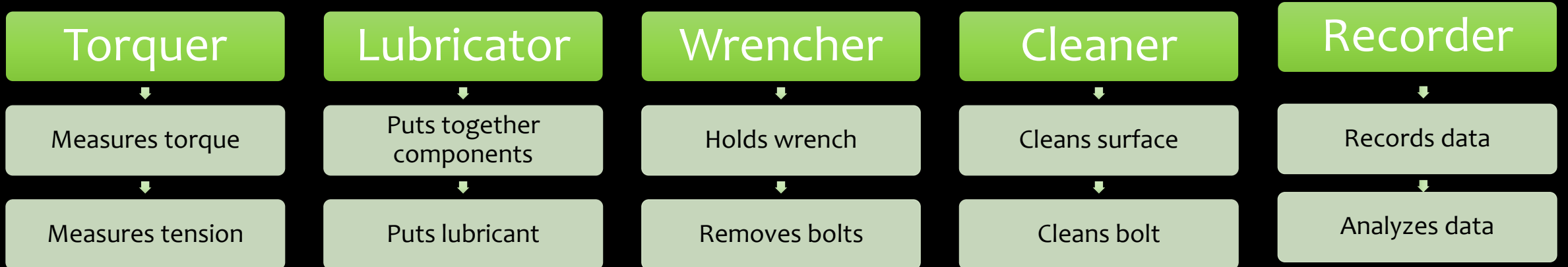


# Plan

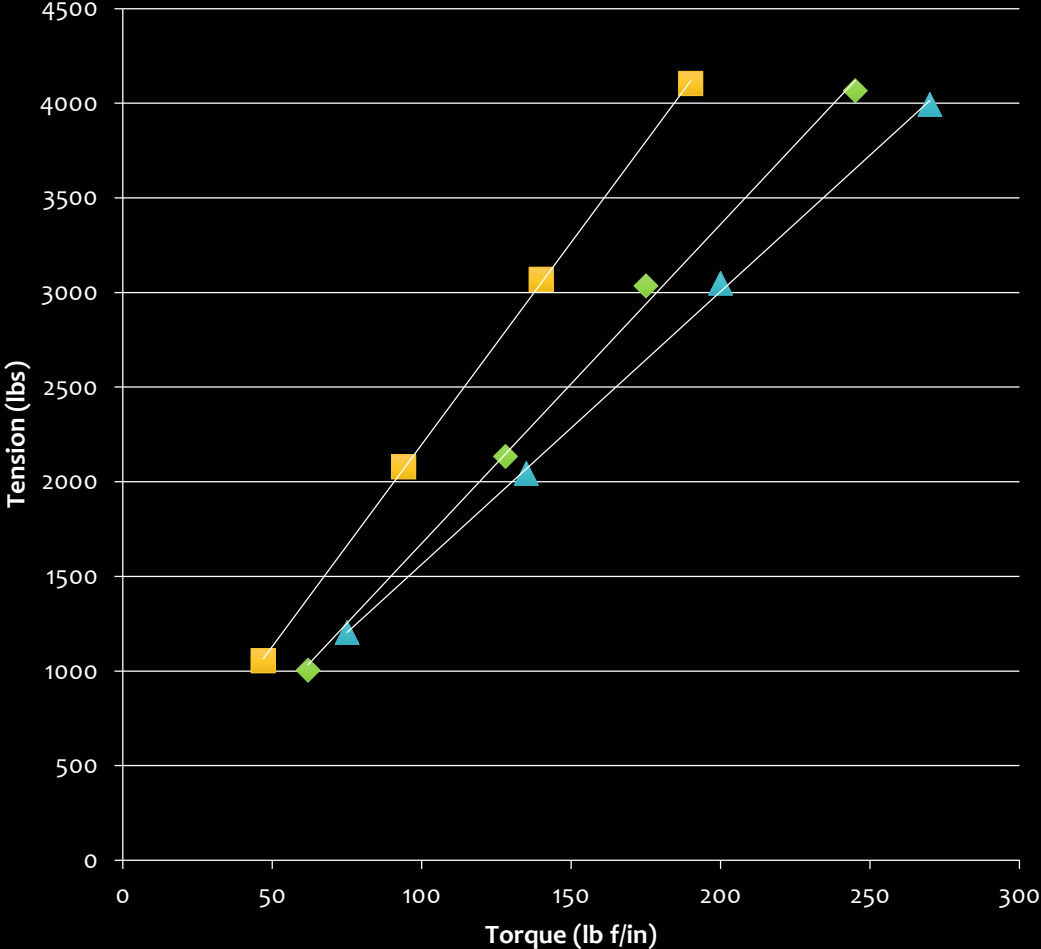
- Examine related specifications. Review materials (allow, lubrication, etc.) and test equipment
- Understand the role of lubricants used in aerospace bolt (removable) applications.
- Determine the torque/tension relationship of several lubricants.
- Compare experimental data with test machine data.



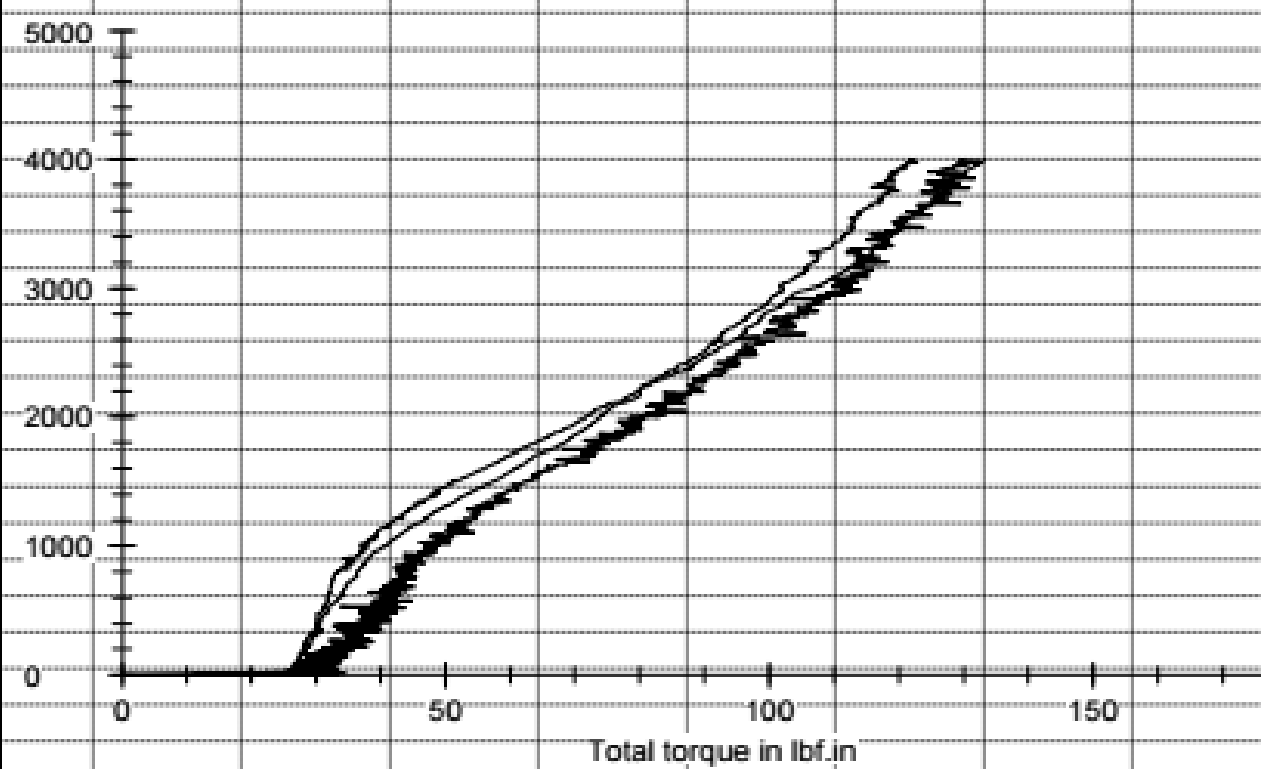
# Team Jobs



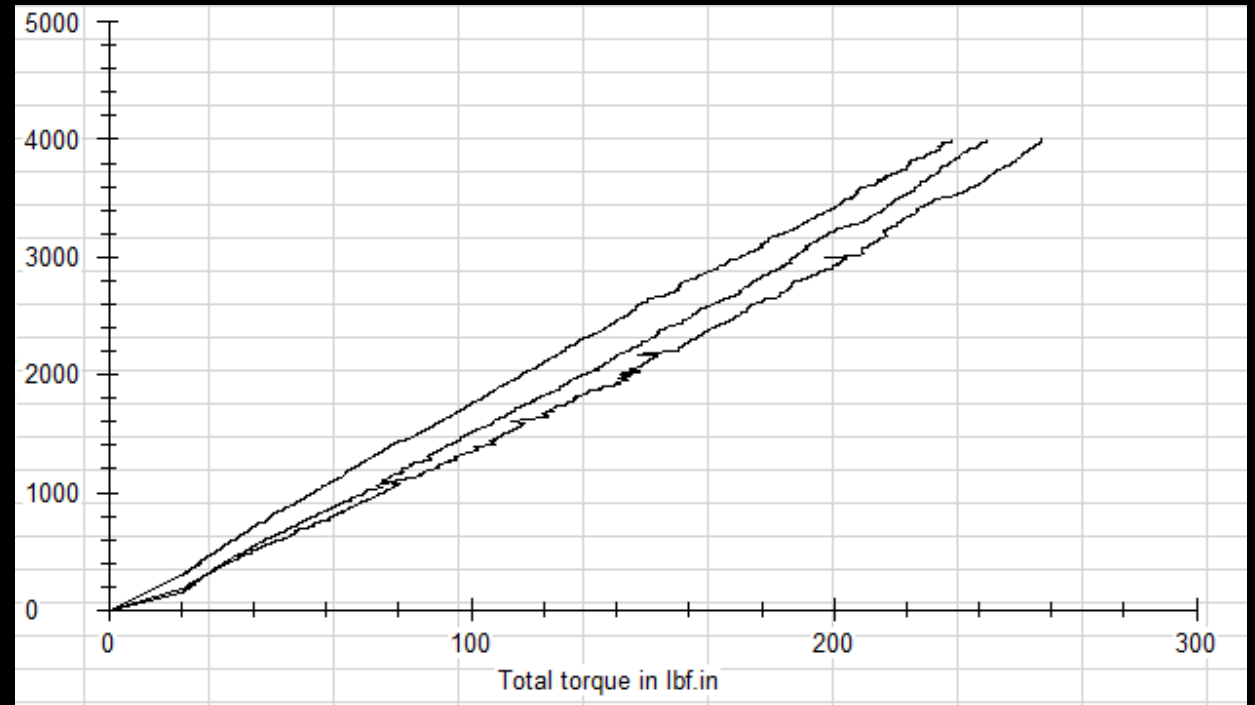
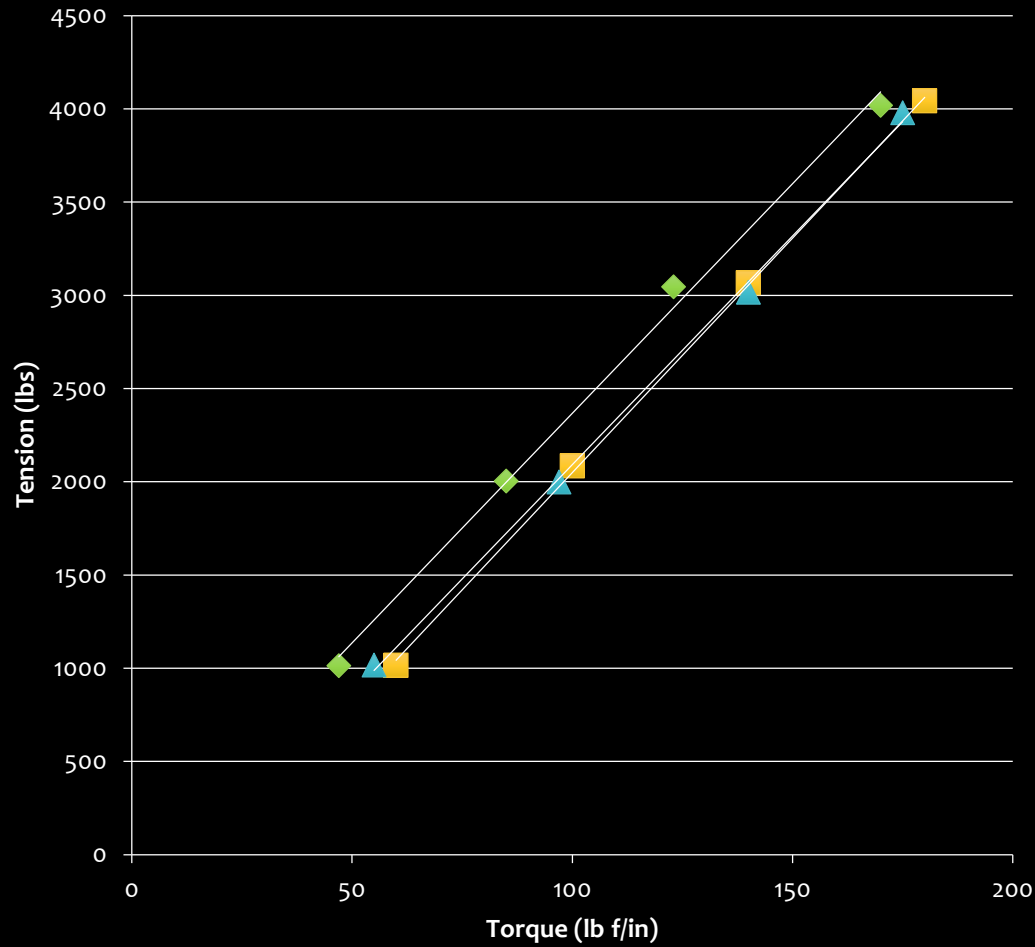
# Steel bolt, silver plated steel nut, no lubricant



$$K = 24.77$$

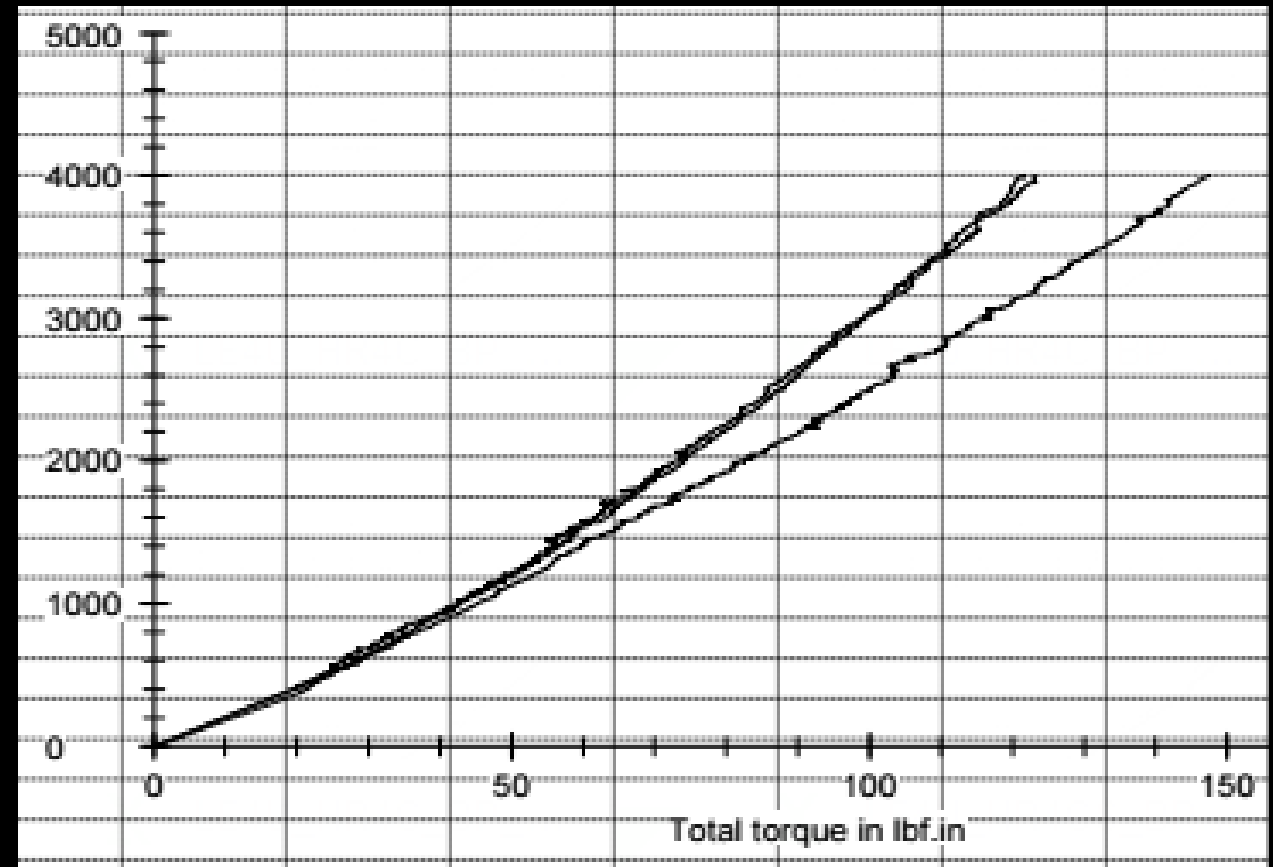
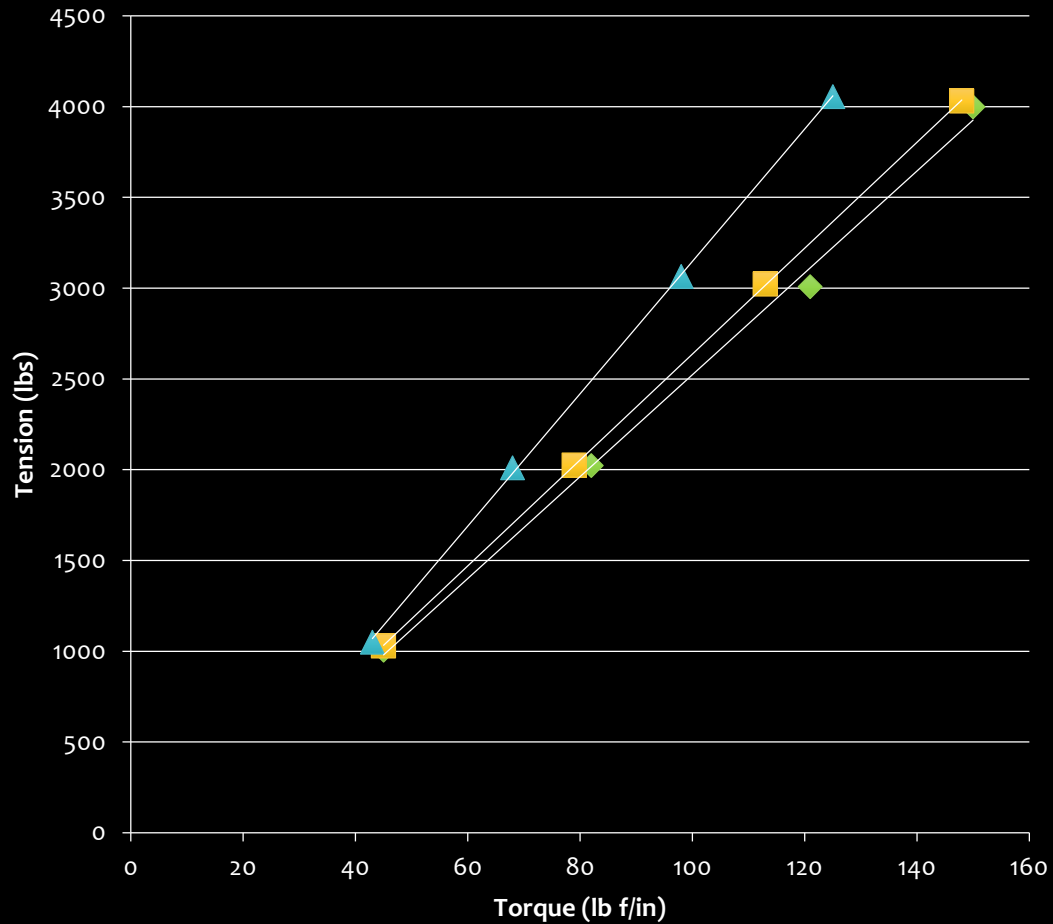


# Steel bolt, molybdenum disulfide steel, no lubricant



$$K = 17.55$$

# Steel bolt, silver plated steel nut, aeroshell grease (lubricant)



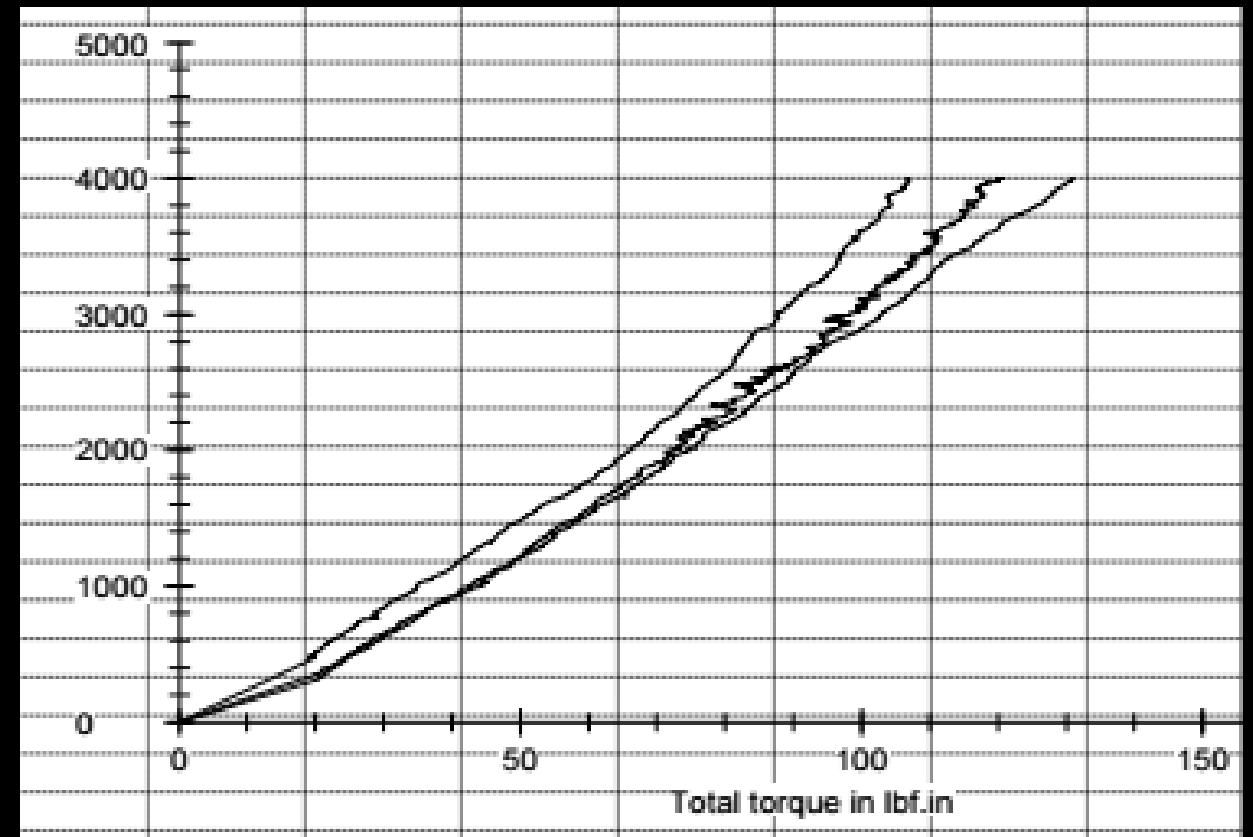
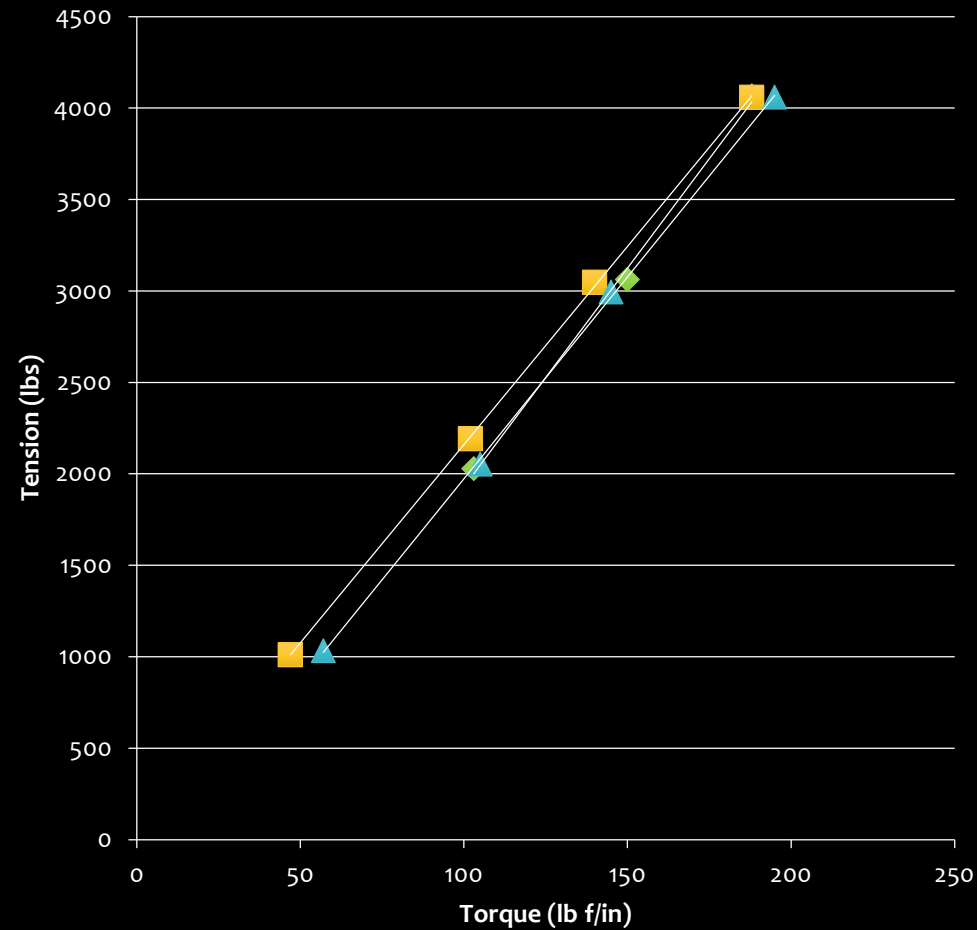
$$K = 31.23$$







# Steel bolt, silver plated steel nut, Cor-Ban 027L (lubricant)



$$K = 22.55$$



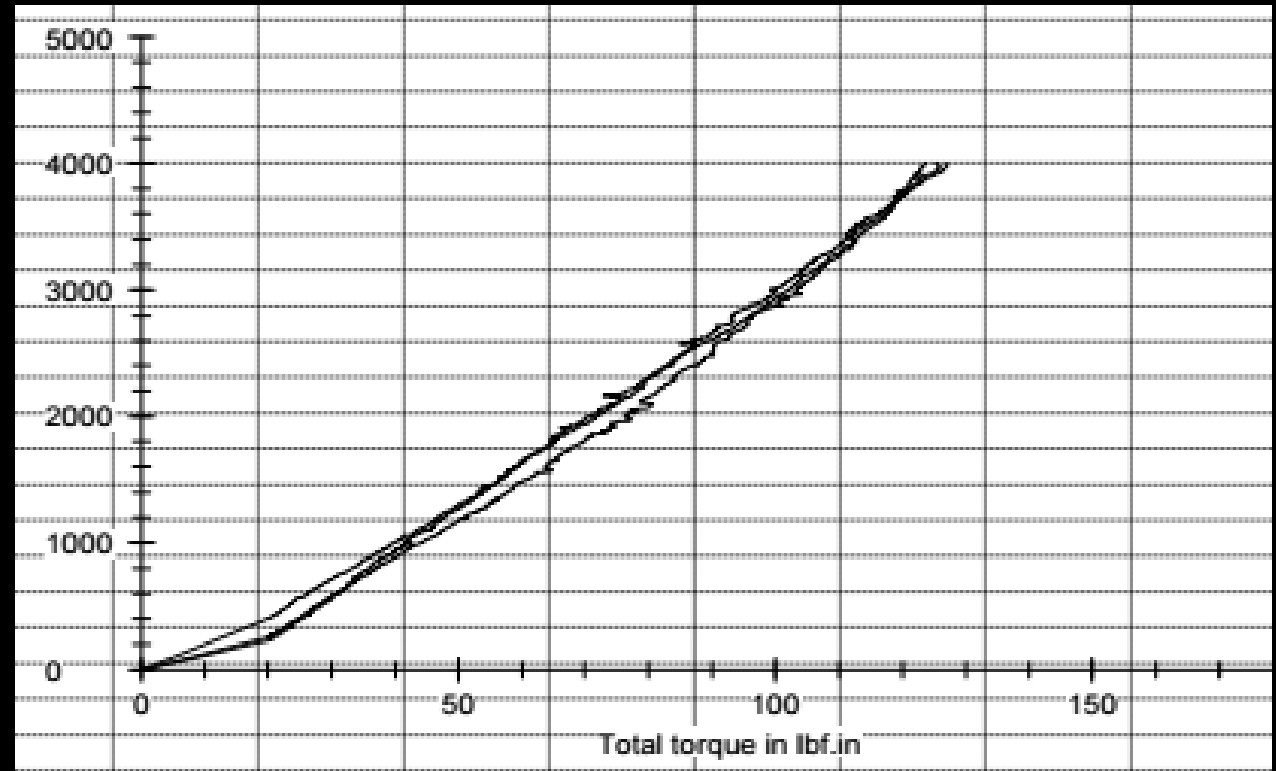
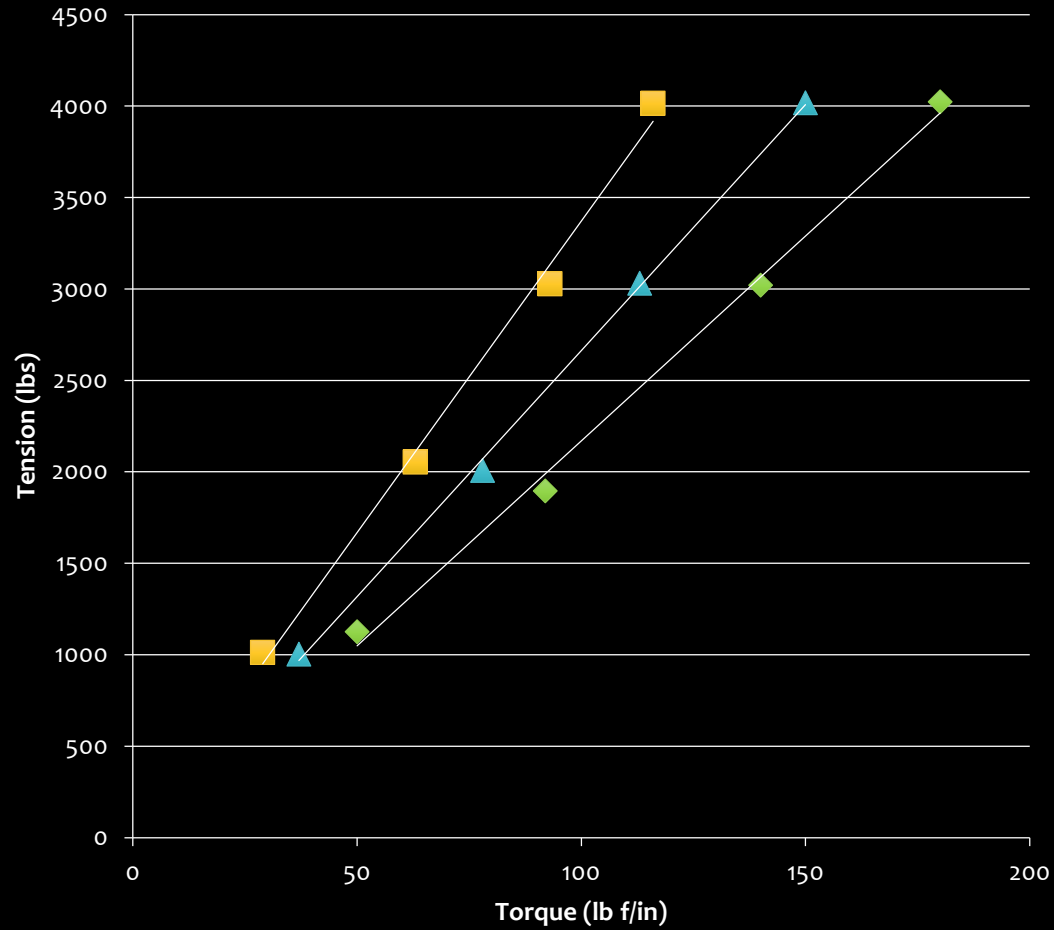
Net Contents: 5 fl oz / 148cc  
 Shelf Life: 2 Years From DOS  
 Product Code: 000002  
 Storage: Between 40° to 100° F  
 Specification: BMS 3-36A  
 9447580 DPM 6498; CML-05  
 133 LGAP 5010  
 Part 8030-01-531-7357

**Cor-Pan 27L**  
 CORROSION INHIBITING COMPOUND

STAMP ID: BA 431 USAG  
 Name: 8-38 COR - PAN 27L CORROSION  
 MC 68 - 0000 - 6938  
 TRACER 281A/0:4  
 CONTROL  
 TEST BEFORE  
 INDEX  
 26 AUG 11  
 INDEX  
 INDEX  
 SIZE 5 OZ TUBE  
 STORE 100 F OR BL CO  
 DATE/LOT 12078 / 1256  
 VSDS 94443

LOT#: 1237A / 1256  
 DATE: 08/2011

# Steel bolt, silver plated steel nut, pure nickel special (lubricant)



$$K = 27.79$$



**Bostik®**  
**NEVER-SEEZ®**  
Anti-Seize & Lubricating Compound

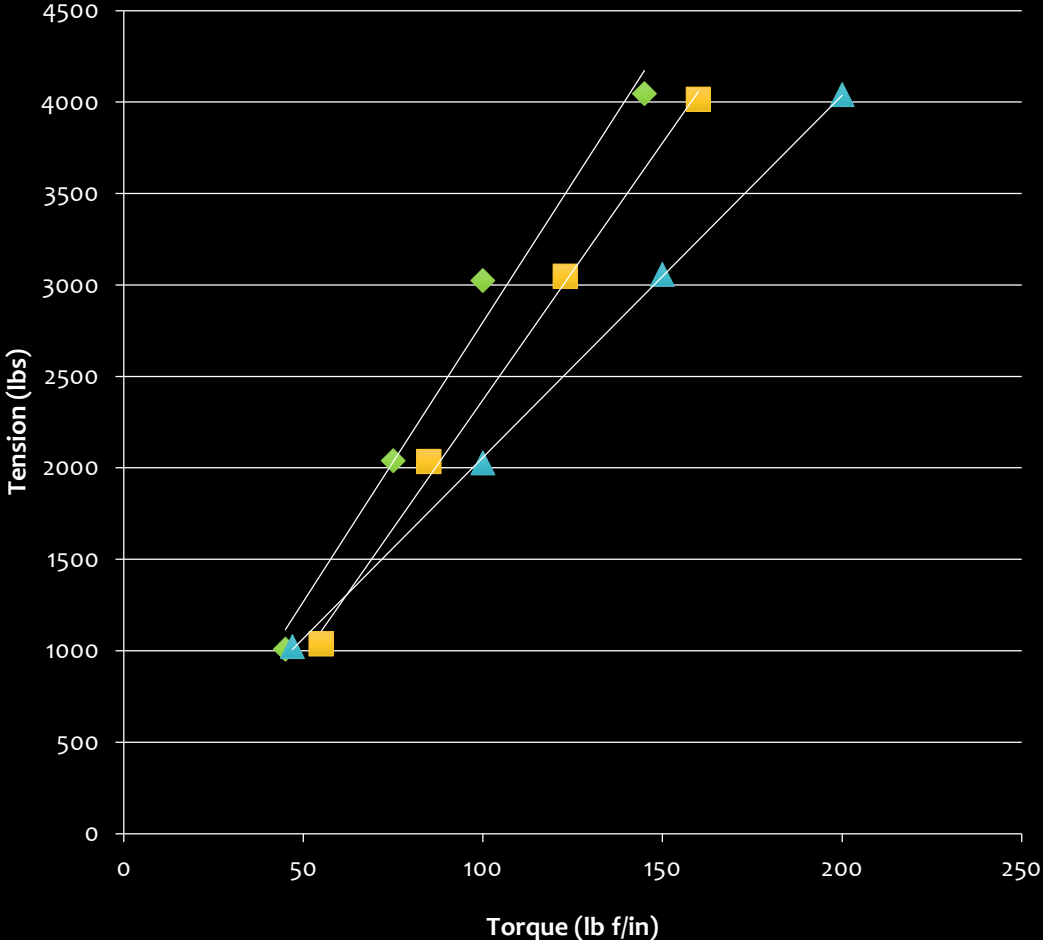
**Pure Nickel Special**

- \* protects parts up to 2400°F
- \* Assures absolute parts protection against corrosion, seizure, galling, rust
- \* Contains no copper
- \* Excellent resistance to corrosive environments
- \* Meets MIL-SPEC-A907E

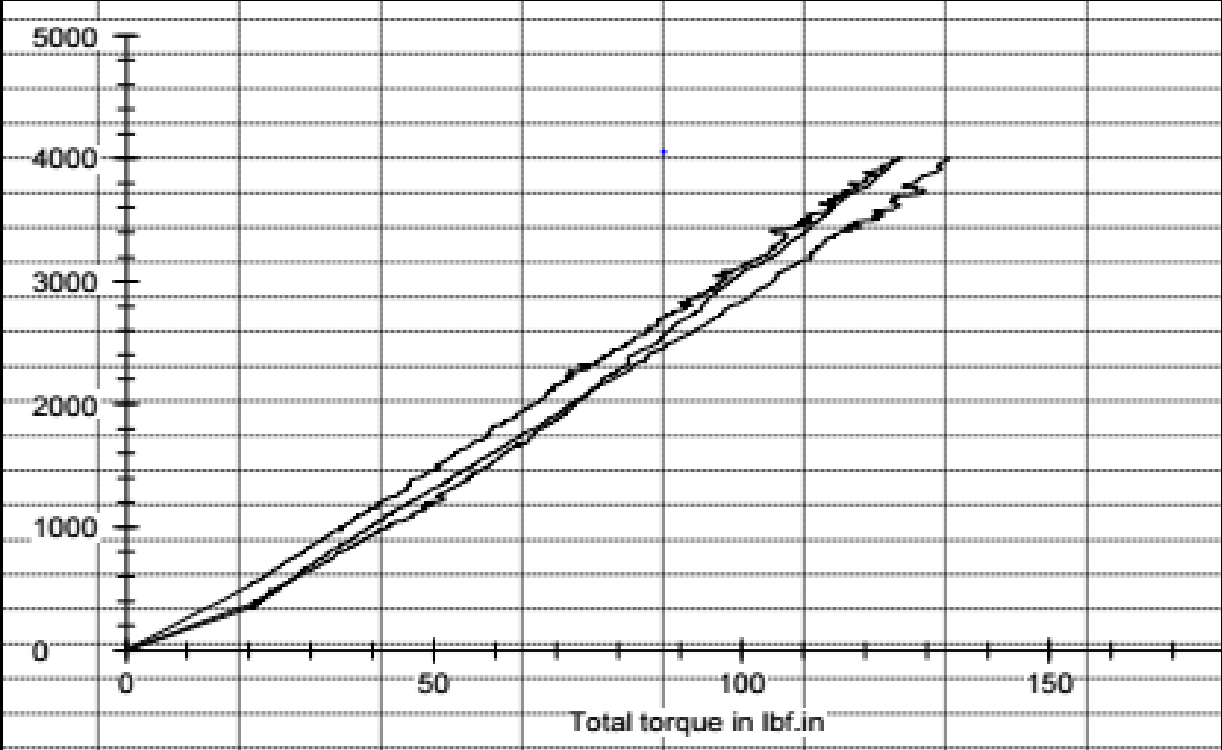
**WARNING! HARMFUL IF INHALED. CAUSES SKIN IRRITATION.** Read warning on back before using

NET WT 8 OZ (227.2g)

# Steel bolt, silver plated steel nut, braycote grease (lubricant)



$$K = 26.16$$





**BRAYCOTE® 600 EF**





# Data Analysis

K Value			
		Ours:	Machine
molybdenum disulfide		24.77	30.93
silver plating		17.55	16.37
aerospace grease		31.23	30.54
cor-ban		22.55	33.46
never seez		27.79	31.84
baycote		26.16	31.09

30% Max Tension Torque			
		Ours:	Machine
molybdenum disulfide		97.86	78.37
silver plating		138.12	148.8
aerospace grease		77.62	79.37
cor-ban		107.73	72.44
never seez		87.26	76.13
baycote		92.66	77.97

