INDUSTRIAL PRODUCTS AND SERVICES

Re-torquing vs. spring assembly height to re-apply gland load

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CHESTERTON
Global Solutions, Local Service.

If a valve is leaking do you first re-torque?

First attempt: Re-torque to same values

Ensure adequate packing gland adjustment is left before attempting to adjust. If not, then repack or add additional rings of packing.

Basically retorque gland packing studs per the Packing Gland Assembly and Packing Consolidation sections using the same initial values. Use higher values with Engineering concurrence.

Maybe you are concerned about a valve and ask to verify what the torque is now??

Re-torque = shooting in the dark

- Anti Seize, Thread Pastes are made of oil, thickeners and lubricating solids. K nut factors are based on the “WET” or oily paste at installation only.
- One time use!
- Once exposed to heat cycles, oil is flashed off. “Dry” Anti-Seize properties K nut factor maybe up to 200-300% higher with wide variance
- Not CANNOT get the same gland load when re-applying original torque after any heat on the valve

“Dry” anti-Seize testing

- Using Skidmore device torque bolt to 100 ft-lbs, record LOAD and calculate K nut factor or coefficient of friction of “wet” thread paste.
- Remove bolts, re-lube and place in oven at 500C for 6 hours to “flash” off oil
- Put bolt back in Skidmore and apply 100ft-lbs, record Load and calculate K nut factor of “DRY” thread paste.

“Dry” anti-Seize testing

Anti-Seize	Torque	Cf wet	Cf dry	
Loctite Nickel	100	0.154	0.71	
Bostick Ni Nuclear	100	0.151	Seized	
Loctite N-7000	100	0.135	0.32	3 cycles, 4th seized
Chesterton 772	100	0.164	0.26	2 cycles, 3rd seized
Loctite Marine	100	0.12	Seized	
Loctite Heavy Duty	100	0.13	Seized	
Molykote P37	100	0.121	0.349	

- **Data average of 6 re-torquing cycles**
- Seized values attained 100 ft-lbs with NO Load transfer to stud. Threads galled during re-torquing
- N-7000, corase texture when dry, surface galling got worse with cycles
  dry coating on threads being scraped off under load.
- Chesterton 772, ultrafine particles, smooth film when dry, surface galling with repeat cycles. Coating present yet not sufficient film strength to resist load

What is your anti-seize “dry” coefficient of friction and how accurate is it?? Start asking....

“Prototype” Chesterton Anti-seize focused on re-torque

Anti-Seize	Torque	Cf wet	Cf dry
◆ 772 Modified(new)	100	0.154	0.28-0.31

passed 6 re-torques dry, no seizure, no galling. Threads burnished smooth and lubricant was intact.

Valve testing data

- Re-torque = 9 ftlbs
  - Consolidation: 9 ftlbs = 1.17” of compressed spring height
  - After Cycles: 9 ftlbs = 1.188” of compressed spring height
    - Dried Anti Seize
    - Bolt condition

Recap

- Re-torque not useful to gauge gland load
- Getting “as found” torque not useful in telling gland load
- If thread galling occurs, re-torque is impossible.

How accurate is Anti-seize "wet"

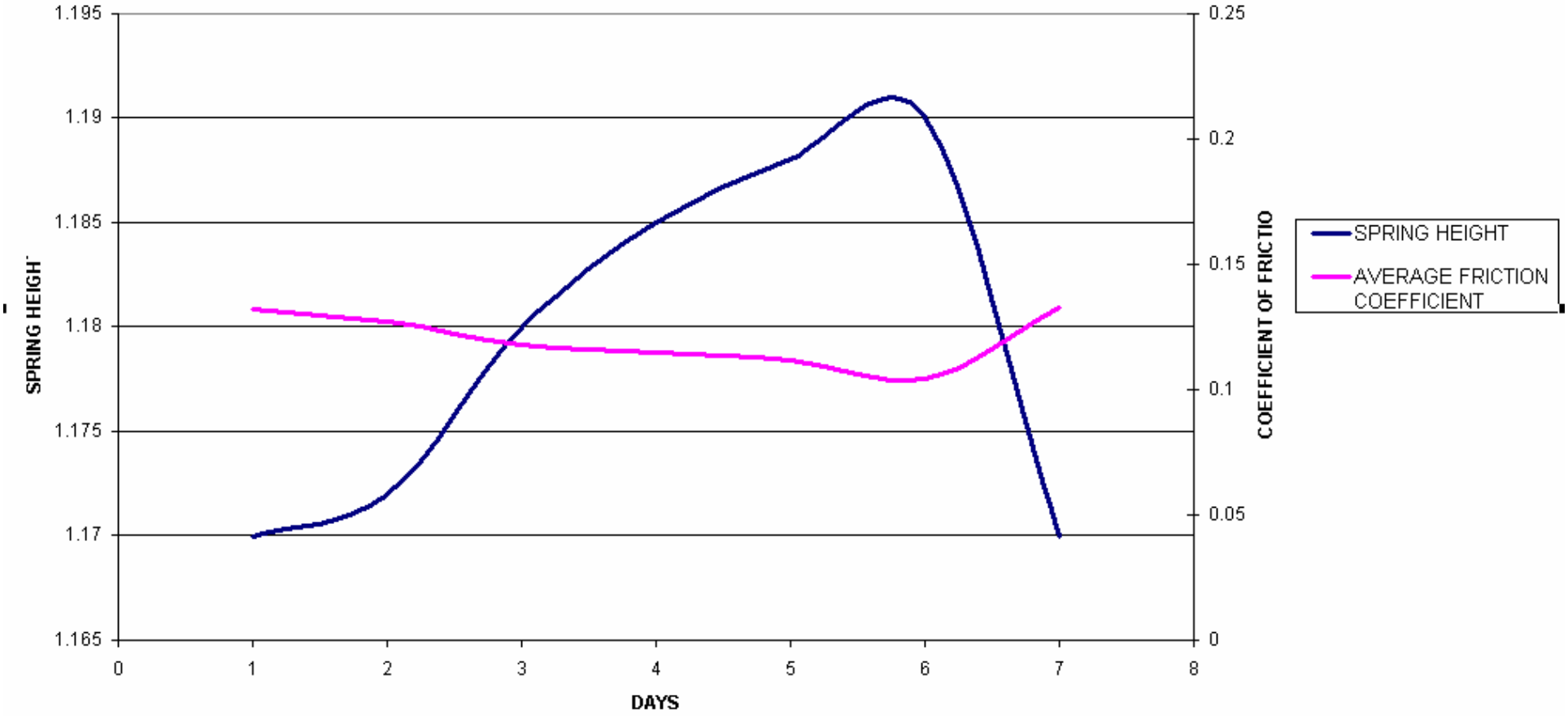
Table 3-1*			
Reported Nut Factors for Various Materials and Lubricants			
Metal/Lubricant	Minimum Nut Factor	Mean Nut Factor	Maximum Nut Factor
As Received Alloy or Mild Steel Fasteners	0.158	0.2	0.267
As Received Stainless Steel Fasteners	---	0.3	---
Cadmium Plate (Dry)	0.106	0.2	0.328
Copper Based Anti-Seize	0.08	0.132	0.23
Cadmium Plate (Waxed)	0.17	0.187	0.198
Fel-Pro C54	0.08	0.132	0.23
Fel-Pro C-670	0.08	0.095	0.15
Fel-Pro N 5000 (Paste)	0.13	0.15	0.27
Machine Oil	0.10	0.21	0.225
Moly Paste or Grease	0.10	0.13	0.18
Never-Seize (Paste)	0.11	0.17	0.21
Neolube	0.14	0.18	0.20

Live loading as a “load gauge”

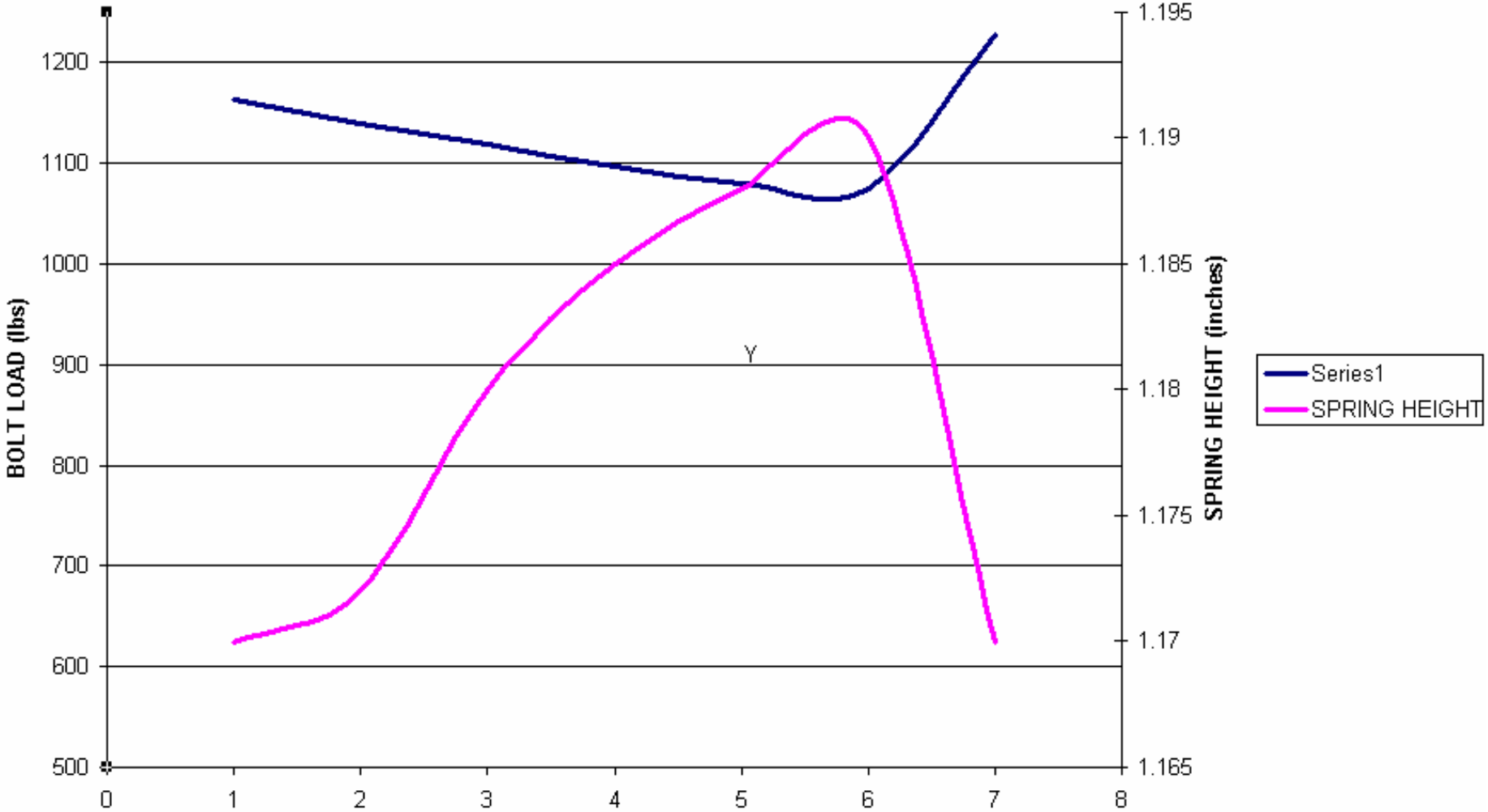
Chesterton Valve Springs

- Creates stored energy with Belleville springs to postpone gland load loss
- Springs sets designed for specific valve data
  - System pressure
  - Dimensions (packing and bolt size)
- Chesterton live loading designed over 30 years
- What to live load
  - Thermal Cycling
  - Vibration
  - Critical Dynamic Applications
  - Anywhere you want to measure gland load!!!

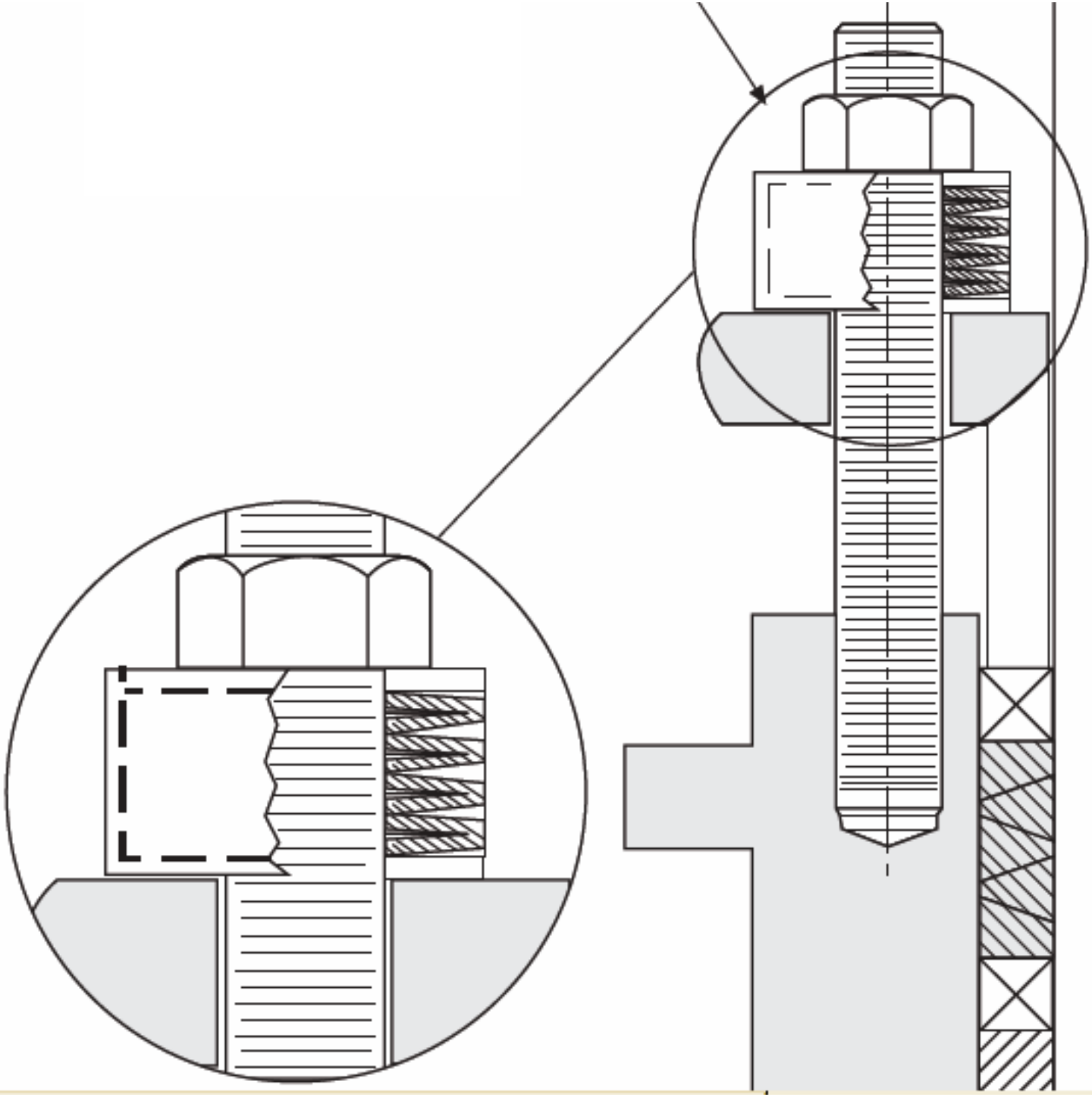
5800 2500 CYCLES AT 1550 PSIG AND 600 F
COEFFICIENT OF FRICTION RELATIVE TO SPRING HEIGHT



5800 LIVE LOADED OVER 2,500 CYCLES AT 1550 PSIG and 600 F SPRING HEIGHT RELATIVE TO BOLT LOAD



Outer Guide Technology



Outer Guides

- Easier to re-energize then inner guide assembly
- Do not need scale to measure height; can use flat washer / outer guide as visual
- Springs stay together “in-line” / easier installation then inner guide

Questions....

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