Principles of Joint Integrity

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HYTORC
The World's Most Trusted Industrial Bolting Systems

Mission

To optimize safety, quality and schedule in industrial bolting through innovative solutions, and an unyielding commitment to world class customer service.

- 50 years of bolting solutions across multiple industries globally
- Focused on providing value to the end user in both standard and unique applications
- Making everyday bolting safer
- Dedicated Representation in 100+ countries worldwide
- Global Bolting specialists (PEG) dedicated to work with you.

Productivity Enhancement Group P.E.G.

Safety Moment

USS Iwo Jima

- Correct Size
- Correct torque
- Passed leak test

Failed in Service with 10 fatalities !!

Productivity Enhancement Group
P.E.G.

Pressure containment, Bolted joint

Gasket **Flange** **Fastener**

To obtain a leak free joint we must remain within the limitations of all components while taking into account operational and test conditions

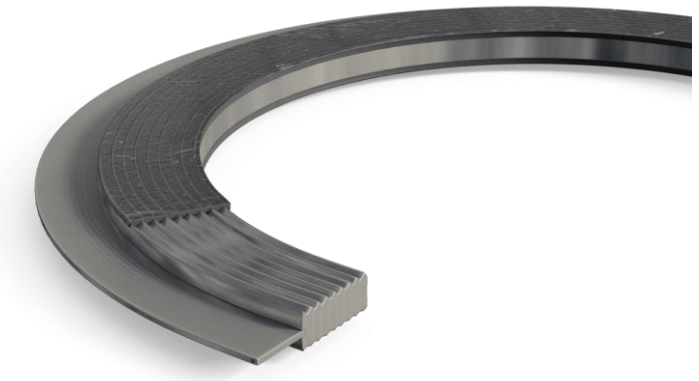
Productivity Enhancement Group P.E.G.

Gasket

Spiral Wound Gasket

Non Asbestos Fibre (NAF)

RTJ



Kammprofile

Gasket Boundaries

- Material compatibility (Physical and chemical properties)
- Minimum seating stress during Assembly stage
- Maximum allowable Gasket Stress
- Gasket stress during operation and test stage

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Flange

Welded neck flange

Slip on flange

Lap joint flange

Screwed flange

Blind flanges

Spectacle blind flange

Flange Boundaries

- Material Compatibility (Physical and chemical properties
- Maximum allowable flange stress
- Flange stress during assembly or applied depending on tightening method
- Flange stress during operation (Pressure and Temperature)

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Fastener (Bolt, Stud or Nut)

Fastener Boundaries

- Material Compatibility (Physical and chemical properties)
- Maximum allowable bolt/stud stress at assembly
- Fastener stress during operation (Pressure and Temperature)

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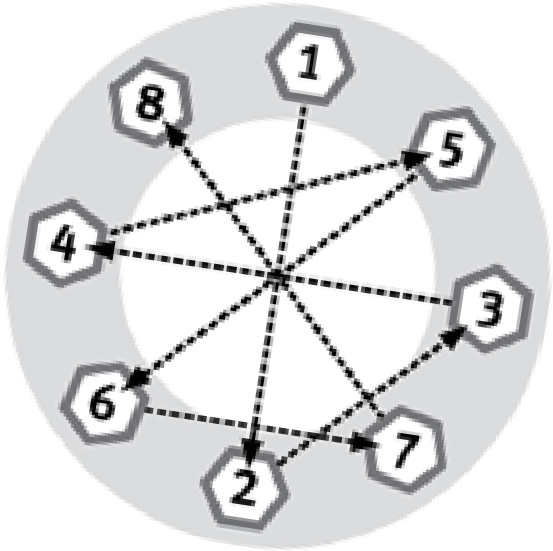
Assembly and Tightening Process Torque



- 30% of required Torque
- 60% of required torque
- 100% of required torque

- Check pass in clockwise pattern at 100% torque value until no further nut movement

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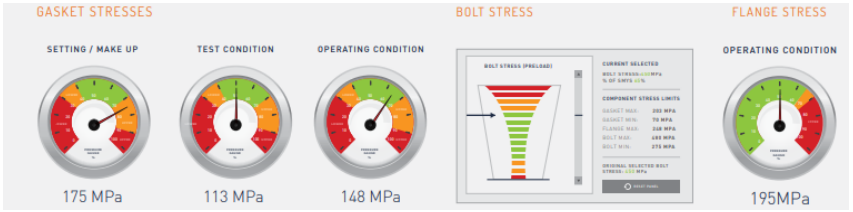
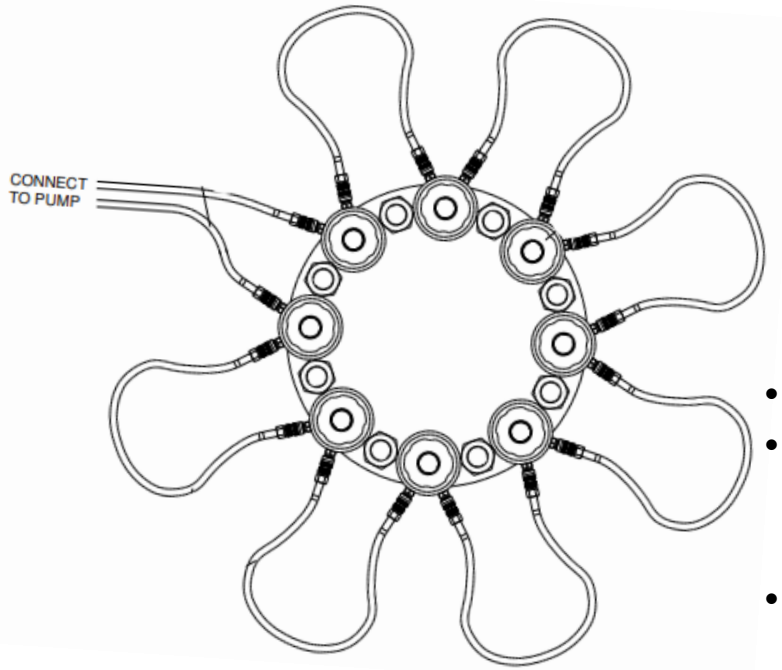
Torque = K*D*F



Assembly and Tightening Process Tension

50% Cover Tension



TLLF – TOOL LOAD LOSS FACTOR

FLLF – FLANGE LOAD LOSS FACTOR

APPLIED LOAD = ASSEMBLY LOAD + TLLF + FLLF

- Apply tensioners to every other bolt (Odd numbers)
- Apply **pressure 1** which includes Applied load turn down nut with tommy bar and release, repeat twice assuring no nut movement can be achieved
- Move tensioners to remaining 50% of the bolts (even numbers)and apply **Pressure 2**, turn down nut with tommy bar and release, repeat twice assuring no nut movement can be achieved

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Questions ?

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