tensionpro
THE BOLT TENSIONER EXPERTS

DATASHEET DS-401

TECHNICAL: Load Transfer Factor

A hydraulic bolt tensioner provides a very accurate hydraulic load onto the bolt. This load is directly proportional to the applied hydraulic pressure.
When the correct load is achieved , the nut is wound down, and the pressure is released, the hydraulic load is transferred into a mechanical load - the bolt residual load, or pre-load.
When the load is transferred compensation needs to be made for:

- Bending in the nut/stud threads
- Embedment of the nut into the flange surface
- Radial dilation of the nut under load

These factors are calculable and are summed up as the term LOAD TRANSFER FACTOR (LTF). The LTF is applied to the target bolt pre-load to give the required tensioner hydraulic load and working

LOAD TRANSFER FACTOR (LTF)

A general case, easy to use, formula for the LTF is:

LTF = 1.01 +D/G

CALCULATING REQUIRED TENSIONER LOAD

F = R x LTF

CALCULATING REQUIRED OPERATING PRESSURE

P = F / HPA

Always check that the applied pressure and load is allowable for the actual bolt and material. Always limit to less than 95% bolt stress.

If in doubt contact the TensionPro team for

TERMS:

LTF = Load Transfer Factor

D = Bolt Nominal Diameter

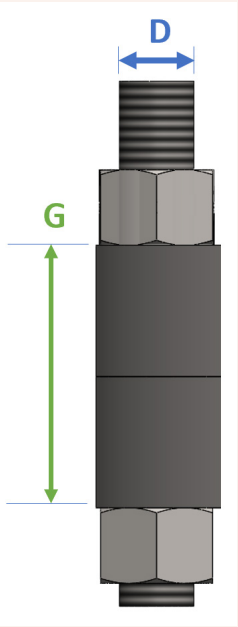
G = Grip Length

R = Residual Bolt Load

F = Applied Tensioner Load

HPA = Tool Pressure Area

P = Tool Pressure



WORKED EXAMPLE

A M30 bolt, with a grip length of 250mm, requiring a 300 kN pre-load. Tightened with a HTS20 Tensioner, with pressure area of 2955 mm^2

D=30 mm
G= 250 mm
R = 300 kN
HPA = 2955 mm^2

LTF = 1.01 +30/250 = 1.11

F = 1.11 x 300 = 333 kN

P = 333 x 1000 / 2955 = 112.7 MPa

(x 10 to convert MPa to bar)

P = 1127 bar

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