TSF

www.tsftsh.com

patent pending

TH

Tension Holder

guaranteed **preload systems**

Minimum guaranteed preload

75% of bolt yield stress

Less than 5% dispersion

if fastened as specified by the manufacturer

TH Tension Holder.
guaranteed preload systems.

patent pending

TSF has designed, developed and patented the TH nut system with the following objectives:

- Provide joints with high requirements in preload;
- Provide joints with both requirements of preload and untightening;
- Provide joints with low demand in preload and high requirement in untightening;
- Control of stress applied to the joints of soft components maintaining high preloads on bolt, stud or similar.

These objectives are achieved through pilot nut and washer interrelated with a variable contact angle for its different applications.

The TH nut preload system is specially designed to fit in standard and commercial tensioners.
No special tools or pulling systems required.

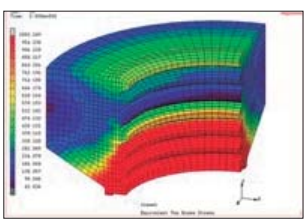
Specific system for pulled unions to **guarantee 75% preload with less than 5% dispersion**

Innovation

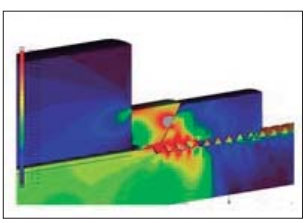
- Depending on the joint characteristics, we define the location of the contact zone for optimizing the pressure and the cone strength distribution.
- Interesting for different industrial sectors as: Automotive, Wind Power, Nuclear, Aerospace, Marine, Industry etc...
- Certified by Lloyd ' s Register.
- Manufactured in different materials and coatings according to each required performance.

Advantages

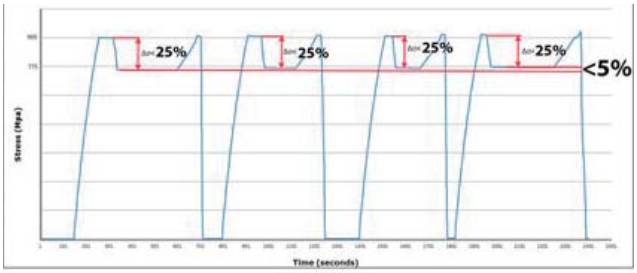
- Reduced number of fastening elements with respect to torque control (25-35% less)
- It can be designed as standard sized parts or according to different designs adapted to any specific application from M-12 up to M-150.
- It is suitable for assembly with standard pullers equipment.
- Low Dispersion.
- High stability of the preload.
- Low load distribution factor for the fastening element. Lower fatigue range.
- Insensitivity to bending moments
- Simultaneous assembly of fastening elements. Elimination of elastic interaction of close elements.
- Benefits of elongation, without the disadvantages of friction.
- Multiple reuse of the element. Ease preload reset by assembly process repetition.
- Self-locking result.
- Same assembly protocol for all metric sizes.
- Depending on each union characteristic a different assembly protocol will be followed.
- Every specific union would be object of its own engineering analysis according to each customer application.
- Maintenance costs are drastically reduced.



Stress in TH nut at stud preload.

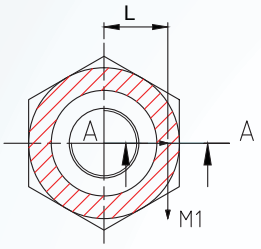


General view of the equivalent Von Mises stresses in load



Mechanical behavior of TH system.

Higher untightening resistance increasing the moment

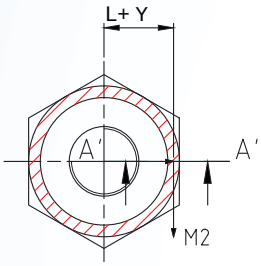


1 - Standard nut flat base:

$$M1 = F1 \times L$$

F1: Preload

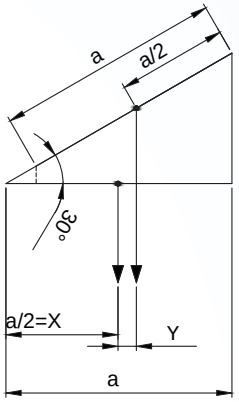
M2 > M1



2 - TH nut conical base:

$$M2 = F1 \times (L+Y)$$

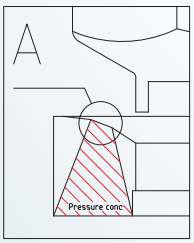
F1: Preload



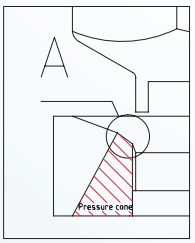
SECTION: A-A; A'-A'

Comparison of standard nut - th with the same preload

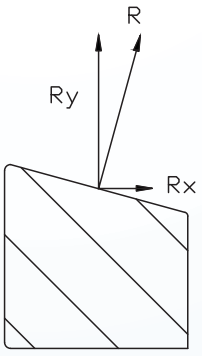
Higher untightening resistance because higher preload values achieved



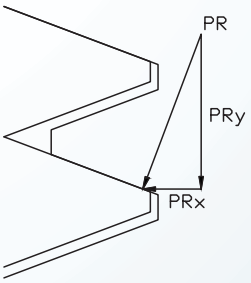
Pressure Cone



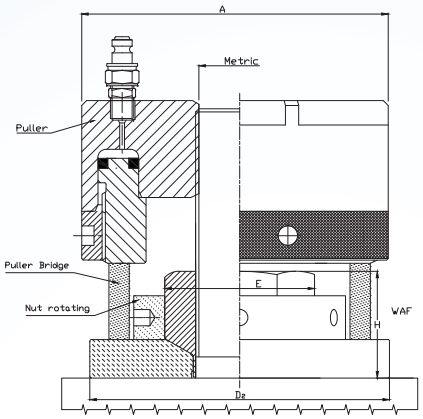
Pressure Cone



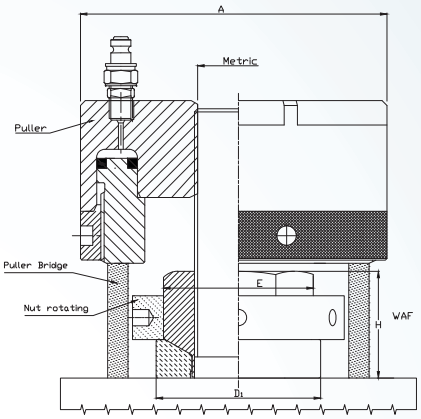
Decomposition of preload reaction in normal and axial stresses at TH washer.



Decomposition of preload in normal and axial stresses at stud thread.



TH Standard assembly over its own washer



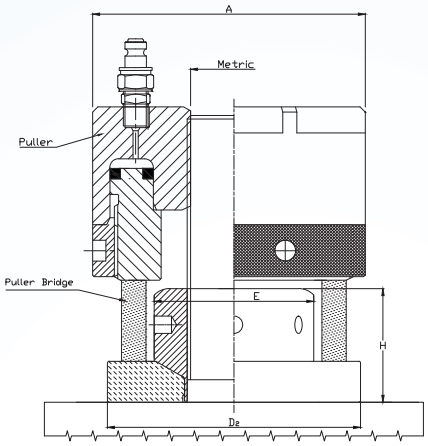
TH Standard assembly over flange

TH - Standar

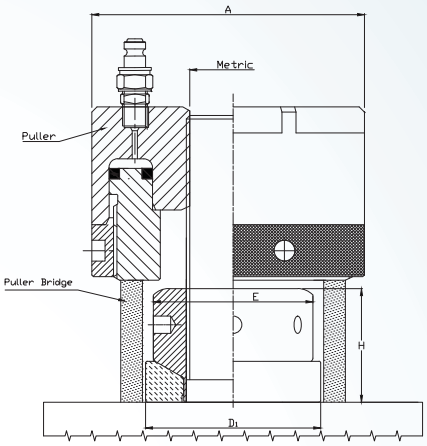
TH	Nut body			Puller		
	E (mm)	D_1 (mm)	H (mm)	Preload (kN)	TH Preload minimun (kN)	A (mm)
M16x2	24	27	19,0	180	135	73
M20x2,5	30	34	21,5	230	173	73
M22x2,5	32	36	24,5	285	214	102
M24x3	36	41	27,0	332	249	102
M27x3	41	46	31,0	431	324	102
M30x3,5	46	51	35,5	527	396	132
M33x3,5	50	55	38,5	652	489	132
M36x4	55	60	43,0	768	576	132
M39x4	60	66	46,0	917	688	163
M42x4,5	65	72	50,5	1053	790	163
M45x4,5	70	78	53,5	1232	924	163
M48x5	75	84	55,0	1382	1036	163
M52x5	80	90	62,0	1654	1241	192
M56x5,5	85	97	65,5	1908	1431	192
M60x5,5	90	101	70,5	2218	1664	231
M64x6	95	105	73,0	2519	1889	231
M68x6	100	110	78	2876	2157	231

**D2: It will depends of the size puller bridge.

The dimensions shown on the tables may be modified, as every specific union would be object of its own engineering analysis.



TH Round assembly over its own washer



TH Round assembly over flange

TH - Round

TH	Nut body				Puller		
	E (mm)	WAF	D_1 (mm)	H (mm)	Preload (kN)	TH Preload minimun (kN)	A (mm)
M16x2	26,75	24	30	19,0	180	135	73
M20x2,5	32,95	30	37	21,5	230	173	73
M22x2,5	35,03	32	39	24,5	285	214	102
M24x3	39,55	36	44	27,0	332	249	102
M27x3	45,2	41	50	31,0	431	324	102
M30x3,5	50,85	46	56	35,5	527	396	132
M33x3,5	55,37	50	60	38,5	652	489	132
M36x4	60,79	55	66	43,0	768	576	132
M39x4	66,4	60	72	46,0	917	688	163
M42x4,5	71,3	65	78	50,5	1053	790	163
M45x4,5	76,95	70	85	53,5	1232	924	163
M48x5	82,6	75	92	55,0	1382	1036	163
M52x5	88,25	80	98	62,0	1654	1241	192
M56x5,5	93,56	85	105	65,5	1908	1431	192
M60x5,5	99,21	90	110	70,5	2218	1664	231
M64x6	104,86	95	115	73,0	2519	1889	231
M68x6	110,51	100	120	78,0	2876	2157	231

**D2: It will depends of the size puller bridge.

The dimensions shown on the tables may be modified, as every specific union would be object of its own engineering analysis.

TSF

global fastening solutions

TH

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