Fastener Systems

The maintenance-free bolting system

www.ihf-fasteners.com

SCAN ME

Content

The maintenance-free bolting system from IHF

IHF's product portfolio includes a variety of fasteners that are used in different industries. These include standard fasteners, the two round nuts RMS and RMZ for general machinery as well as IHF fasteners.

IHF fasteners are specially designed for tension loaded bolted joints in steel construction and for the tightening method of hydraulic friction- and torsion-free tightening (ITH Stretch Method). Both components together form the IHF Bolting System. A long-term study based on ultrasonic measurements proves that the assembly preload applied in this process are at a high preload level and lie within a narrow tolerance band. For this reason, the IHF Bolting System is defined as maintenance-free.

more than **2.100**
on- & offshore applications

confirmed maintenance-free
for over **4.200** days

more than **19.5** GW
nominal capacity

key figures

IHF Bolting System

The maintenance-free bolting system

IHF fasteners are specially optimized for tension loaded bolted joints in steel and mechanical engineering and designed for hydraulic friction- and torsion-free tightening "ITH Stretch Method". The combination of fastener and tightening method forms the IHF Bolting System.

The IHF Stretch Bolt, IHF Stud Bolt and IHF Round Nut have been specially designed for steel construction, such as those found on ring flanges of wind turbine tower segments. The IHF assemblies can directly replace the standard fasteners (e.g. HV assemblies).

A long-term study based on ultrasonic measurements proves this: The measured residual preload are within a narrow tolerance band and are so precise that the bolt connections do not need to undergo any further checks.

IHF fasteners have the European Technical Assessment (ETA) and the general building authority approval (abZ; allgemeine bauaufsichtliche Zulassung) issued by the DIBt (Deutsches Institut für Bautechnik).

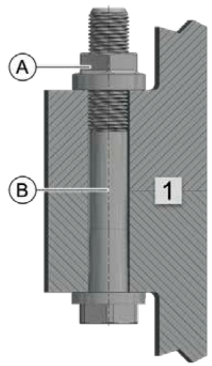
The IHF assemblies: only two main components

The innovative IHF Bolting System reduces the assembly to the two core elements: The IHF Stretch Bolt / IHF Stud Bolt and the IHF Round Nut. The washers are integrated into the bolt head and the nut. This reduces the number of interfaces. Likewise, a possible source of error due to incorrect installation of the washers is eliminated.

The abZ and ETA approvals were granted by the DIBt for IHF Bolting Systems in nominal sizes M20 to M100. The subject of the approval were the IHF Bolting Systems suitable for hydraulic friction- and torsion-free tightening for the production of high-strength preload structural steel connections in the following IHF-HV configurations:

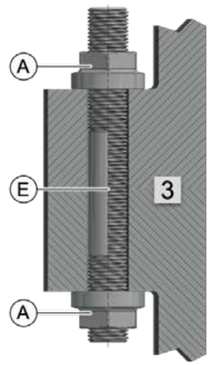
- IHF Bolt Set consisting of IHF Stretch Bolt with an IHF Round Nut
- IHF Stud Bolt Set consisting of IHF Stud Bolt and two IHF Round Nuts
- HF/ HV stud bolt set consisting of IHF Stud Bolt, one IHF Round Nut, one HV washer according to DIN EN 14399-6 and one HV nut according to DIN EN 14399-4

IHF Assembly



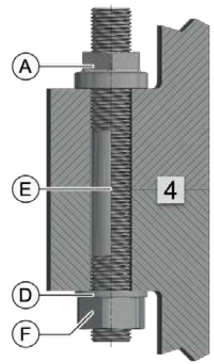
A IHF Round Nut 1 (acc. IHF-09.00100)
B IHF Stretch Bolt (acc. IHF-09.00100)

IHF Stud Bolt Assembly



A IHF Round Nut 1 (acc. IHF-09.00100)
E IHF Stud Bolt (acc. IHF-09.00100)

IHF / HV Stud Bolt Assembly



A IHF Round Nut 1 (acc. IHF-09.00100)
E IHF Stud Bolt (acc. IHF-09.00100)
D HV washer (acc. EN 14399-6 / DASt 021)
F HV nut (acc. EN 14399-4 / DASt 021)

Hydraulic friction- and torsion-free tightening
– ITH Stretch Method

ITH is the world market leader for bolt tensioning cylinders (hydraulic tensioning devices) based on the tightening method of hydraulic friction- and torsion-free tightening (ITH Stretch Method). As early as 1979, ITH company founder Hans Hohmann successfully introduced the ITH Stretch Method on gas and steam turbines. Since then, ITH Bolt Tensioning Cylinders (BTC) have been used in all branches of industry.

In hydraulic friction- and torsion-free tightening, a force-controlled process, the assembly preload is generated by axial elongation of the bolt by means of the ITH BTC.

The method is particularly suitable for pretensioning bolts larger than M16, but can also be used for smaller nominal diameters. As the assembly preload is only applied to the bolt connection by tensile loading, no torsional and bending stresses, no thread torques and no head and nut friction torques occur.

Long-term study confirms maintenance-free operation

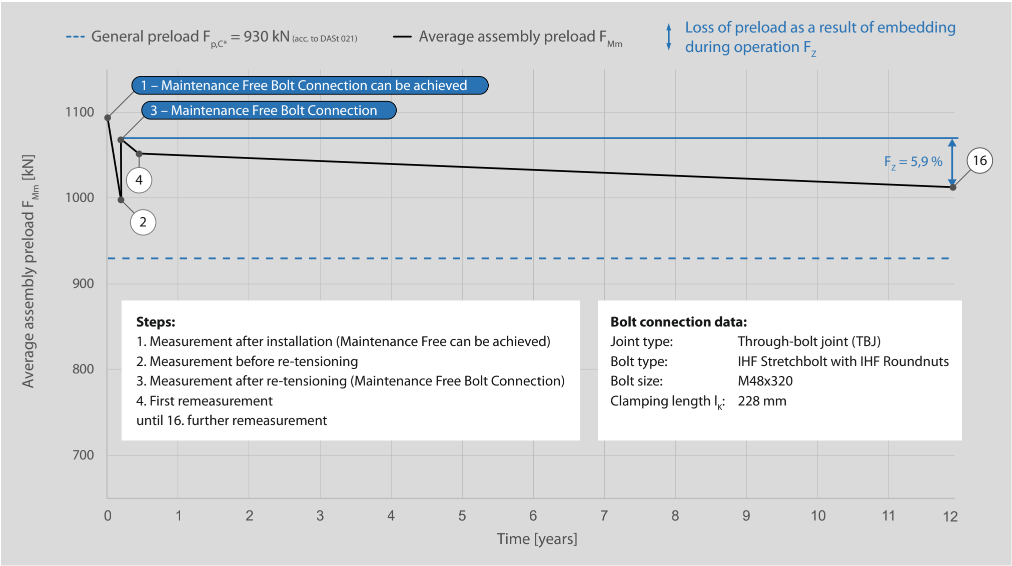
A large number of ultrasonic measurements on wind turbines over 12 years prove: IHF fasteners are maintenance-free.

A long-term study based on ultrasonic measurements proves this: The measured residual preload is within a narrow tolerance band and is so precise that the bolt connections are installed according to a specified bolting process and do not need to undergo any further checks. In addition, cloud-based ultrasonic measurement techniques are used to provide proof of this. For this reason, the bolt connection is defined as maintenance-free.

The precise measurement results are a result of: the precise manufacturing of IHF fasteners and their stress-optimized design as well as the very high system accuracy of the tightening method "hydraulic friction- and torsion-free tightening" with bolt tensioning cylinders.

A comparably high precision of the assembly preload cannot be achieved when using conventional HV connections, which are pretensioned according to the friction-loaded torque -controlled tightening method. In particular, this applies to bolted connections larger than M30. This optimization potential was efficiently exploited in the design of the IHF fasteners.

This means that IHF fasteners require far fewer inspection intervals than conventional HV bolt connections, which can save considerable maintenance costs on bolt connections (especially in offshore applications).



Advantages & Quality

Advantages

- ✓ Cost reduction due to faster installation and elimination of maintenance work
- ✓ High system availability due to maintenance-free operation
- ✓ Less effort due to no need for maintenance work
- ✓ Re usability of IHF fasteners
- ✓ Bolting system up to M120
- ✓ Load-optimized design
- ✓ Replacement of standard bolts and nuts
- ✓ No washers required under the nut and bolt head
- ✓ European Technical Assessment (ETA) and general building authority approval (abZ) by the German Institute for Building Technology (DIBt)

Proven Quality:

DIN ISO 9001 - CERTIFIED -

DIN ISO 14001 - CERTIFIED -

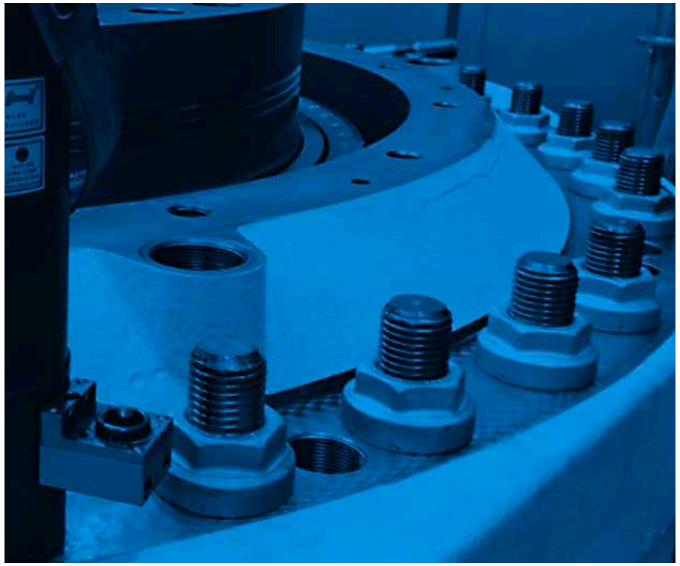
DNV·GL - CERTIFIED -

TÜV - CERTIFIED -

ETA - APPROVED -

DIBt - APPROVED -

Industries



Wind power & foundations

IHF fasteners are used for wind turbines, tower flange connections, blade bearing bolts. Also for onshore and offshore foundations MP-TP (Monopile to Transition Piece).

IHF supplies numerous, diversely designed fasteners for wind turbines. IHF has developed the IHF Stretch Bolt, IHF Stud Bolt and IHF Round Nut especially for the tension loaded bolted connections of wind turbine tower segments.

General steel construction

The advantages of designing with IHF fasteners can also be applied to numerous applications in general steel construction. Due to the precise fabrication and accurate application of the assembly preload by the ITH Stretch Method, bolt connections can be designed more efficiently by using IHF fasteners. Likewise, the re usability of IHF fasteners is given.

The increased efficiency level allows the following advantages to be realized, depending on the design requirements: A smaller bolt dimension while maintaining the same flange thickness (which saves material costs) or alternatively the use of fewer bolts while maintaining the same preload and the reduction of flange dimensions while maintaining the same bolt dimension.

IHF assemblies can replace conventional HV connections. Common bolt dimensions of the assemblies are M20 to M100.

General machinery

Bolted fasteners are used in numerous general machinery industries.

IHF supplies numerous fasteners between M16 and M120, such as for large-diameter bearings or gear manufacturing.

Products

-IHF- Fastener Systems

Products

IHF supplies bolts, nuts, washers and other fasteners for general steel construction, wind turbines and all industrial applications from M16 to W510.

Delivery range

- ✓ IHF fasteners
- ✓ ITH Round Nut RMS/RMZ
- ✓ Standard fasteners
- ✓ Special fasteners and drawing parts

More product & technical information
Simply scan the QR code with your smartphone and find more information and dimensions for our fasteners.

SCAN ME

IHF Stretch Bolt

IHF Stud Bolt

IHF Round Nut

IHF fasteners

The IHF assemblies are available in various thread sizes from M16 to M120 and are specially optimised for tension-loaded bolt connections in steel and mechanical engineering and designed for use with hydraulic friction- and torsion-free tightening (ITH stretch method). The standard fasteners (e.g. HV assemblies) are directly replaced by the IHF assemblies.

Designs:
- IHF Stretch Bolt
- IHF Stud Bolt
- IHF Round Nut

Products ITH Round Nut RMS/RMZ

ITH RMS hexagonal

ITH RMZ two-flat

Stud bolts

ITH Round Nut RMS/RMZ

ITH Round Nuts certified by independent societies are preferably designed for the use of hydraulic friction- and torsion-free tightening (ITH Stretch Method). This involves the direct replacement of standard hexagon nuts with ITH Round Nuts.

The design of the ITH Round Nut is possible as:
- ITH RMS - ITH Round Nut hexagon version
- ITH RMZ - ITH Round Nut two-flat version

Customized designs are also possible. Both versions are also available as a compact version with smaller dimensions (ITH RMS / RMZ slim-line).

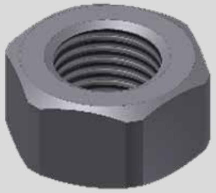
The ITH Round Nuts are available as standard in thread sizes from M16 to M160, other thread sizes are available on request. The material is selected according to the corresponding application (including temperature dependence and corrosion protection). In principle, the materials used are of higher quality than those specified in the corresponding standards (e.g. DIN EN ISO 898, ASTM A193).

Hexagon head bolts

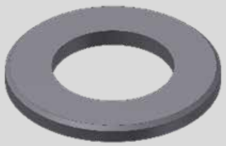
Hexagon socket bolts

Stud bolts

Reduced shaft bolts



Hexagon nut



Washers

Standard fasteners

The IHF range includes a variety of bolts, nuts and washers that comply with the respective standards.

The thread sizes range from M16 up to the maximum nominal size of the standard. Customized versions are also possible in accordance with the relevant standards.