



**HEICO-TEC<sup>®</sup>**  
EXPANSION BOLTS



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## WHY REPLACE FITTED BOLTS WITH EXPANSION BOLTS?

Coupling bolt connections of gears and shafts, as used in wind turbines, turbines of hydroelectric power plants, gas turbines or in drive technology in general, pose a major challenge for technicians and engineers already in the planning phase. Conventional fitted bolts are traditionally used in order to transmit the greatest possible transverse forces through positive locking. This contradicts the interpretation of the connection, which assumes a clearance-free form-fit.

To achieve a clearance-free form-fit, time-consuming and costly additional measures are often required, such as freezing in order to press-fit bolts. Even with careful preparation, it often turns out during assembly that the fitted bolts and bores do not match because the required manufacturing tolerances cannot be achieved. The bores then have to be laboriously reworked on-site. Despite all efforts to achieve a perfect form-fit, clearance reappears in the connection during pre-tensioning, as the fitted bolts contract radially due to transverse contraction. Typically, this is not apparent to the user and leads to micro-movements in the joint under high loads. Even minimal shifting causes the fitted bolts to tilt in the bore. As a result, the coupling flanges are subjected to extreme localized stresses, which can lead to plastic deformations. These increase the clearance in the connection which leads to greater movements in the joint and further increases the clearance - a vicious cycle.



In worst case, a complete failure of the connection occurs, which can cause significant damage to machines and equipment. Disassembly of the connection is complicated due to the tilting of the fitted bolts. If the fitted bolts are removed by force, the bores in the coupling flanges may be damaged, so that reworking is necessary. As a result, this leads to the problem that the original fitted bolts no longer match with the bore dimensions and have to be re-produced.

HEICO-TEC® Expansion Bolts are the perfect product solution for connecting large and rotating couplings - precise, reliable, and quickly assembled!

## FIELDS OF APPLICATION



SHIP PROPULSION



TURBINES



GENERATORS



DRIVE TECHNOLOGY

## ADVANTAGES

- Optimal alignment of components
- Adapts perfectly to the bores due to radial expansion
- No expensive and time-consuming re boring of holes or new fitted bolts
- Easy to handle – even for non-specialist users
- Quick assembly
- Reusable

HEICO-TEC® Expansion Bolts are available in three different basic designs for unthreaded bores, blind bores and through bores.

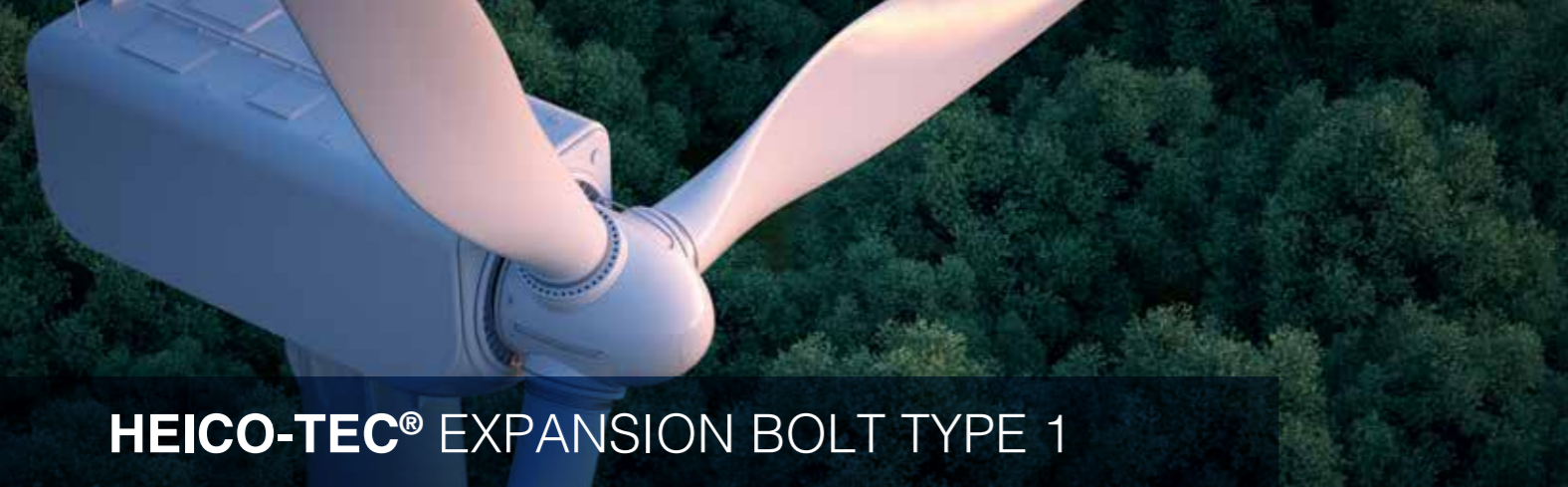
			
<b>Drilling</b>	Blind bore drilling	Blind bore drilling with thread	Through bore drilling
<b>Axial space requirement</b>	Flush sunk in the flange	Protruding over flange	Protruding over flange or flush retractable with countersink
<b>Transmission of lateral force from torque</b>	✓	✓	✓
<b>Transmission of longitudinal force (tensile force)</b>	X	✓	✓
<b>Operation from</b>	1 side	1 side	2 sides
<b>Tightening method for pressure bolts</b>	Torque-angle	Torque	Torque
<b>Tool</b>	Powered screw tool (e.g. cordless screwdriver)	Torque wrench	Torque wrench
<b>Adjustment of stroke for radial pre-tensioning using</b>	Angle measurement	Feeler gauge	Feeler gauge

## PRODUCT VIDEO



Find out more about the different types and how HEICO-TEC® Expansion Bolts work in our explanatory video. Please visit our website [www.heico-group.com](http://www.heico-group.com) or scan the QR code to be redirected directly to the product video of the HEICO-TEC® Expansion Bolts.





## HEICO-TEC® EXPANSION BOLT TYPE 1

### EXPANSION BOLTS FOR THREADLESS BORES

- Mechanical expansion bolts made of high-strength steel enables precise, displacement-controlled, radial preloading
- Designed to user specific requirements
- Expansion controlled by one central pressure bolt
- Compact design
- Operation from one side



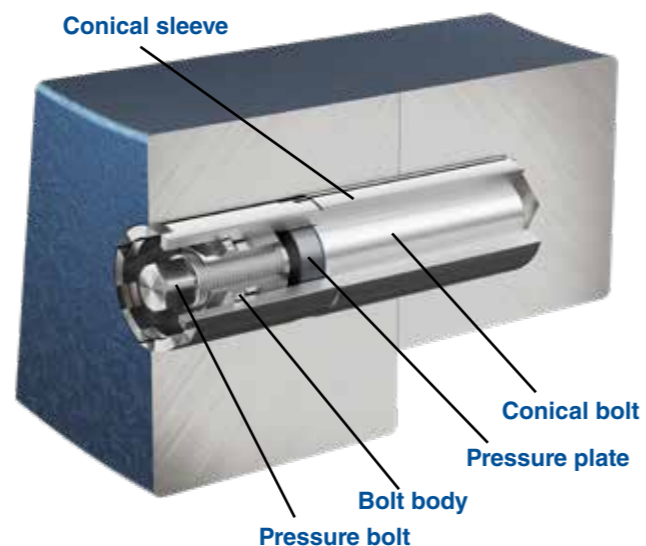
The threadless expansion bolt was specifically designed for use in threadless bores. Pre-tensioning is achieved through one central pressure bolt. This brand new and market-unique method allows expansion bolts to be mounted more quickly and easily than ever before.

The threadless expansion bolt typically consists of three main components: the longitudinally slotted conical sleeve, the conical bolt, and the tensioning element, which includes the bolt body, pressure bolt, and T-shaped pressure plate. To connect two coupling flanges, the threadless expansion bolt is inserted as a pre-assembled unit into the bore. Due to the slotted design of the conical sleeve, it has enough flexibility to be inserted effortlessly, even if the bores are slightly misaligned. By tightening the pressure bolt, the conical bolt is driven into the slotted conical sleeve, causing the sleeve to expand and create radial pre-tension.

The radial pre-tension is applied in a controlled manner, with the rotation angle of the pressure bolt measured by a powered tool. This ensures that the generated radial pre-tension is independent of friction conditions.

The powered tool allows the threadless expansion bolt to be preloaded in less than one minute, making it faster than any other expansion bolt. The coupling flanges are precisely aligned by the expansion bolt, allowing them to transmit transverse forces generated by the coupling torque without destructive micro-movements.

To disassemble the threadless expansion bolt, the pressure bolt is first loosened and removed along with the bolt body and pressure plate from the conical sleeve. Despite the removal of the tensioning element, the radial pre-tension remains, and the conical sleeve stays expanded. The pressure plate exposes a threaded bore, which can be used to pull the conical bolt out of the sleeve. Thanks to the slots, the conical sleeve contracts and can be easily removed from the bore with minimal effort.



## HEICO-TEC® EXPANSION BOLT TYPE 2

### EXPANSION BOLTS FOR BLIND BORES

- Mechanical expansion bolts made of high-strength steel enables precise, displacement-controlled, radial and axial preloading
- Pre-tensioning using the proven HEICO-TEC® Tension Nut
- Designed to user specific requirements
- Operation from one side
- Selectable dimensions

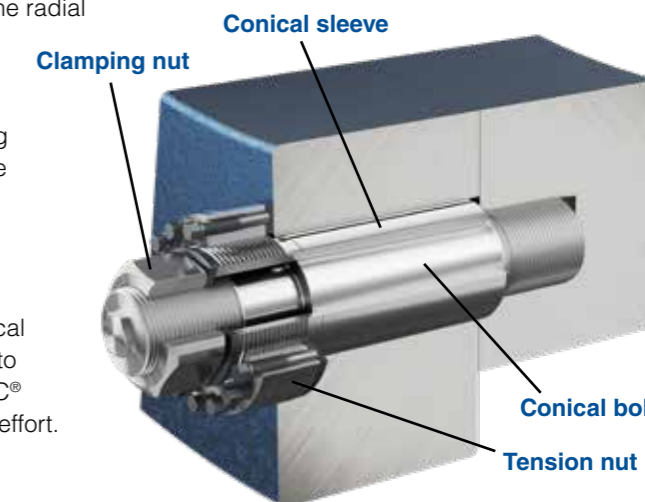


The blind bore expansion bolt is suitable for applications in threaded blind bores. This blind bore expansion bolt is pre-tensioned using the proven HEICO-TEC® Tension Nut.

The blind bore expansion bolt consists of four components: the longitudinally slotted conical sleeve, the conical bolt, a HEICO-TEC® Tension Nut and a clamping nut. Due to its size and weight, blind bore expansion bolts are not installed as one unit, but in individual parts. First, the tension nut is connected to the conical sleeve. Depending on the design of the blind bore expansion bolt, this can be done with or without a thread by means of a collar at the end of the conical sleeve. The conical sleeve including the tension nut is then pushed into the bore until the tensioning element rests on the coupling flange. Due to the slotted design of the conical sleeve, it has enough flexibility to be inserted effortlessly, even if the bores are slightly misaligned. The conical bolt is threaded on both ends. The conical bolt is inserted into the conical sleeve with the tapered side facing downward. Next, the clamping nut is fastened to the end of the conical bolt. The expansion of the conical sleeve is adjusted using a feeler gauge. A defined gap is set between the conical sleeve and the clamping nut, corresponding to the required distance to achieve the desired radial pre-tension.

Then, the pressure bolts of the HEICO-TEC® Tension Nut are tightened. As a result, the slotted conical sleeve is pulled upward and expanded by the internal conical bolt. The expansion continues until the conical sleeve touches the clamping nut, at which point the radial expansion stops. Further tightening of the pressure bolts generates additional axial force, which clamps the coupling flanges together. This process allows tensile loads or bending moments to be transmitted, while also creating additional frictional contact in the joint, thus increasing the transmittable coupling torque.

To disassemble the blind bore expansion bolt, first loosen the pressure bolts. Then tighten the clamping nut and release the conical sleeve from the conical bolt. The conical bolt, along with the clamping nut, is untightened. Thanks to the slots, the conical sleeve contracts and the HEICO-TEC® Tension Nut is easily removed from the bore with minimal effort.



# HEICO-TEC® EXPANSION BOLT TYPE 3



# HEICO-TEC® EXPANSION BOLT

## EXPANSION BOLTS FOR THROUGH BORES

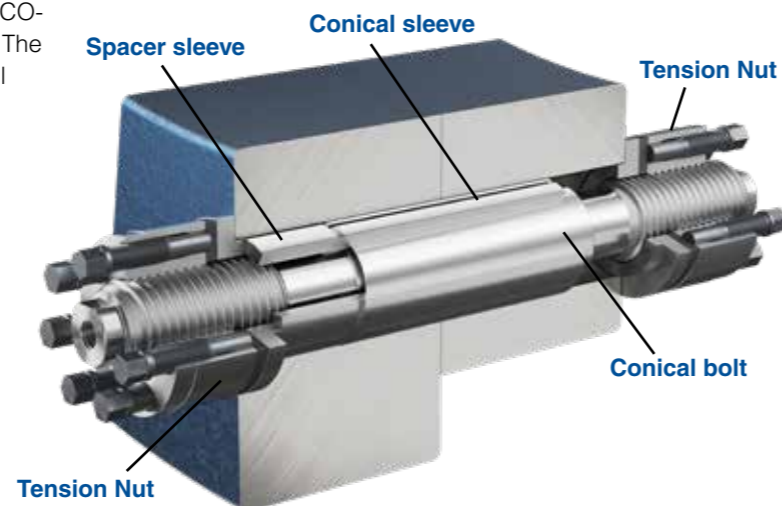
- Mechanical expansion bolts made of high-strength steel enables precise, displacement-controlled radial and axial preloading
- Pre-tensioning using proven HEICO-TEC® Tension Nuts
- Designed to user specific requirements
- Operation from two sides
- Selectable dimensions



For through-bores in highly dynamic applications, the through-hole expansion bolt is the ideal fastening element. The through-bore expansion bolt is designed with two HEICO-TEC® Tension Nuts, so it can be pre-tensioned radially and axially.

Like all expansion bolts, the through-bore expansion bolt features a conical bolt and a slotted conical sleeve. Additionally, it includes two HEICO-TEC® Tension Nuts, each attached at one end of the conical bolt. A spacer sleeve positions the conical sleeve centrally to the joint. The conical sleeve is pre-assembled onto the conical bolt and both are inserted as one unit into the bores. Due to the slotted design of the conical sleeve, it has enough flexibility to be inserted effortlessly, even if the bores are slightly misaligned. The spacer sleeve is then placed into the bore. By tightening the first HEICO-TEC® Tension Nut on the operating side, the through-bore expansion bolt is centered. Then the second HEICO-TEC® Tension Nut can be tightened on from the backside. The expansion of the conical sleeve is adjusted using a feeler gauge. A defined gap is set between the second HEICO-TEC® Tension Nut and the coupling flange, corresponding to the required distance to achieve the desired radial pre-tension. On the operating side, the pressure bolts of the first mounted HEICO-TEC® Tension Nut are fastened. This pulls the conical bolt into the conical sleeve, causing it to expand and thus apply radial pre-tension to the connection. To also apply axial pre-tension to the connection, the pressure bolts of the second HEICO-TEC® Tension Nut on the backside are then fastened.

This process allows tensile loads or cyclic bending moments to be transmitted while also creating additional frictional contact in the joint, thereby increasing the transmittable coupling torque. To disassemble the through-bore expansion bolt, the HEICO-TEC® Tension Nut on the operating side is first loosened. The second HEICO-TEC® Tension Nut is then tightened to pull the conical bolt out of the conical sleeve. Thanks to the slots, the conical sleeve contracts, and the through-bore expansion bolt is easily removed from the bore with minimal effort.



## DESIGN TAILORED TO YOUR REQUIREMENTS

HEICO-TEC® Expansion Bolts are customized to your specific application and precisely tailored to your requirements. Whether you prefer the compact series of HEICO-TEC® Tension Nuts due to limiting constraints, or you wish to optimize the product lifespan of the bolt by using an elastically resilient HEICO-TEC® Reaction Nut, or want to protect your connections against self-loosening, the variety of options is nearly unlimited.

We are also please to assist you with all questions related to corrosion protection, ensuring that your expansion bolts remain durable and reliable despite adverse environmental and weather influences. In this way, you ensure that your components stay safe and ready for long-term use.

In cooperation with you, we will design the perfect solution for your application!



Expansion bolt for blind bores with HEICO-TEC® Reaction Nut



Expansion bolt for trough bores with anti-loosening device

## CERTIFICATION

Optionally, the expansion bolts are also available with 3.2 certification according to EN 10204. We cooperate with many well-known testing institutes like:

- ABS [American Bureau of Shipping]
- DNV [Det Norske Veritas]
- LRS [Lloyd's Register of Shipping]
- BV [Bureau Veritas]
- TÜV [Technical Inspection Association]

## ASSEMBLY

Each HEICO-TEC® Expansion Bolt is designed and manufactured according to your individual requirements. To ensure easy and accurate assembly of your expansion bolts, we will provide you with an installation guide tailored to your exact application. For any questions about your specific application or if you need technical support, please contact our HEICO sales team. Our professional sales engineers and certified fastener engineers are always eager to assist you.

## INQUIRY FORM



To make your inquiry for our HEICO-TEC® Expansion Bolts as convenient and simple as possible, you can find an inquiry form on our website [www.heico-group.com](http://www.heico-group.com), where you can provide us with all relevant information and data about your application. Enter all important specifications and send the completed inquiry form to [sales@heico-group.com](mailto:sales@heico-group.com). Our HEICO sales team will contact you as soon as possible and provide you with an attractive offer.

Use the QR code to be redirected directly to the inquiry form.

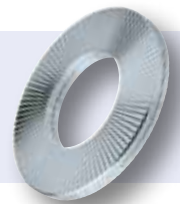




## HEICO-LOCK® Wedge Locking Systems

In addition to the HEICO-TEC® Tensioning Systems the HEICO-LOCK® Wedge Locking Systems offer a reliable solution to prevent self-loosening in demanding bolted connections - especially ones with dynamic loads!

Further information on the HEICO-LOCK® products can be found at [www.heico-lock.com](http://www.heico-lock.com)



## HEICO-TEC® Tensioning Systems

In addition to the HEICO-LOCK® Wedge Locking Systems, the HEICO-TEC® Tensioning Systems complement the portfolio of the HEICO Group. With these products, large bolted joints can be easily pretensioned by hand. A unique feature of the HEICO-TEC® Tensioning Systems is the distribution of the pretensioning force of a large main thread to many smaller pressure bolts. These are tightened one after the other, for example with a standard torque wrench, until the required pretensioning force is generated.

For further information about the HEICO-TEC® Tensioning Systems, visit [www.heico-tec.com](http://www.heico-tec.com)

