intellifast

Preload Measurement

Ensuring Fastener Safety

www.intellifast.de

SCAN ME

Content

Our goals: To be a reliable partner, a market and technology leader and the first address in ultrasonic load measurement

Where we come from

Intellifast was founded as ULTRACOAT in 1996 in Germany and therefore has over 25 years of experience. The technology derived from the NASA Pathfinder mission in the early 1990s and is unique to Intellifast. Since then, more than 300.000 bolts were equipped with Intellifast transducers.

What we stand for

Intellifast stands for preload measurements in bolted joints. Our customers are diverse and include industries such as aerospace, energy, machinery and automotive where the Intellifast systems are used in research & development as well as in production. Thanks to our in-house development & production, we can offer bespoke services and be your reliable partner.

What we offer

The Intellifast system enables your bolted joint to be easily measured with high accuracy and monitor its condition - anywhere, anytime. All made in Germany.

life-time-extension

maintenance free

biggest variety of transducers

independent from operator

in-house hardware- & software design

increasing safety

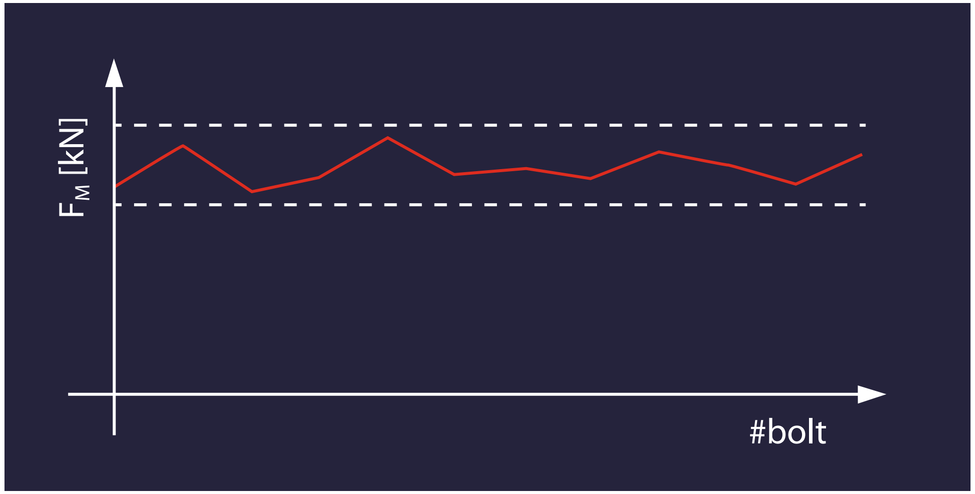
EN 9100 certified organization

USPs

Technology

What is the Intellifast technology?

- Direct determination of the residual assembly preload F_M by ultrasonic runtime measurement from M4 to M120
- Permanently mounted ultrasonic transducers enable more accurate, objectively reproducible measurements and documentatio
- Non-destructive measuring system requires no change of clamping length or cross-section of the bolt
- Measurement accuracy of ± 3 % to 5 % due to person-independent measurement (no influence by the operator)
- Measurement by self-developed measuring systems, software and accessories



Advantages of the Intellifast technology

Measurement at any time with the Intellifast System

- Ensuring the minimum assembly preload $F_{M\,min}$
- Prevention of excessive assembly preloads
- Independent of the tightening method
- Evaluation and display of the achieved assembly preloads, even in the bolted condition

Calibration of your application

Determination of mechanical and temperature parameters to characterize the behavior between time-of-flight and assembly preload F_M in joints

Documentation

Calibration report and export of measurements

Measurement procedure

Scan the Data Matrix Code on the intelli.bolt to upload the bolt file.
Next, attach the temperature probes to the bolt or a similar structure and the measurement probe to the intelli.bolt transducer.
The system will **measure** the preload directly and show the value on the display.
Press "save" to **document** the data in the database within the LoadLab software.
Repeat for the next bolt.

1. Laser-scanning

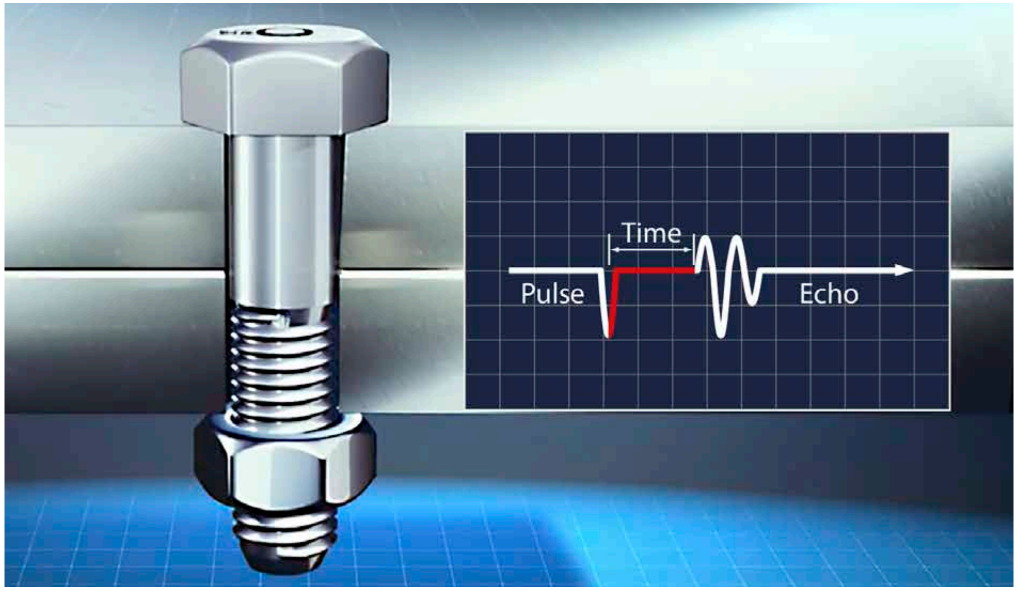
2. Measurement.

3. Documentation

Preload Measurement

What is preload and why is it important?

- The function of a bolt is to apply load in a bolted joint.
- This clamp force is technically known as preload and is measured in Newtons.
- Preload is what makes a bolted joint work and last.
- The correct preload ensures the system's safety and durability.
- Optimize bolted joint to reduce weight, cost and assembly time.



How is preload achieved?

- Either via torquing or tensioning the bolt.
- There are various technologies and methods under each principle method in practice.
- The challenges with both methods are the friction (torquing) and the relaxation which both vary with geometry, environment, materials, tools, components and many more.

How can preload be measured?

With Ultrasound

The measured variable "ultrasonic time-of-flight" increases with elongation and the stress in the material (acousto-elastic-effect).

Permanently-mounted transducers are applied to every single bolt and provide more accurate, objectively reproducible measurements and documentation. Two types are distinguished:

- Thin film plasma transducers are the most advanced transducer technology as they are certifiable, robust, environmentally durable and are suitable for large temperature ranges. Moreover, plasma transducers are the only technology to comply with DIN EN 4859.
- Glued on ceramics transducers are advantageous with regard to lead-time and are often used in R&D and process capability studies.

Hand held contact probes are low cost but suffer from higher measurement inaccuracy (reattachment error) leading to high tolerances and reduced repeatability.

With Strain Gauges or via Elongation

Strain gauges area used to measure the stress inside or outside of the bolt.

Strain gauges are accurate but expensive in preparation, lead-time and installation.

Strain gauges usually require mechanical preparation and therefore modification of the bolt.

The length of the bolt before and after tightening is measured while considering temperature, material and geometry.

Mechanical or optical tools are used with limited accuracy and repeatability.

Scope of Supply

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What we do?

Ultrasonic-based preload measurement in bolted joints using ultrasonic: Design – Development – Manufacturing – Assembly – Services – Customization, all according to DIN9100.

What we offer?

- One stop shop for ultrasonic transducers, hardware, software and services.
- Experienced and solution oriented: one modular system

Service

Spare parts

Since Intellifast is the designer and manufacturer of the system, we offer full repair, calibration and spare part service.

The temperature sensors and probes in particular can wear out with use. These parts can therefore be ordered as spare parts. The devices themselves are also repaired by Intellifast, and various accessories are available for the Intellifast systems.

Measuring Service

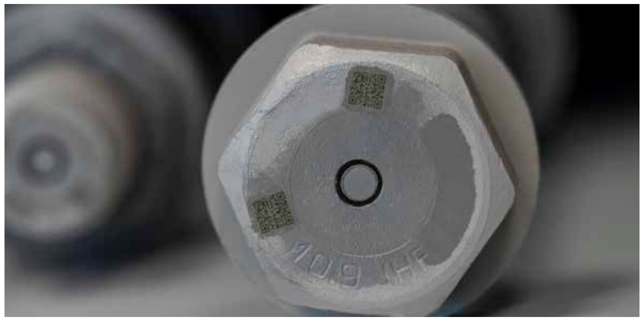
Intellifast offers to carry out the measurements for the customer, which offers the following advantages:

- No acquisition costs
- No resource commitment at the customer's site
- Only provision of the bolts
- On-site measurement and creation of a report

Transducers

Intellifast offers the widest range of transducers for different industries and applications, temperature ranges, bolt diameters and lengths:

- intelli.bolt plasma (permanently mounted)
- intelli.bolt ceramics (permanently mounted)
- intelli.bolt metal (permanently mounted)
- handheld (transducer in probe and attachment to bolt via coupling gel)



Products

Measuring devices

LoadProbe 410

The LoadProbe 410 offers up to 10 hours of battery life. Its WiFi connectivity enables seamless data transfer to external processing units like PCs or tablets.

Please note that an external PC/tablet is required for operation, making it ideal for users who prefer to connect to their own devices for analysis and control.

LoadProbe 416 & 420

These devices are offering 5 hours of battery life. With an integrated Microsoft Windows system and a touchscreen display, it offers a user-friendly experience.

Additionally, an optional load-controlled tightening feature makes theses devices ideal for industries where precise tightening is essential. The main difference between the two devices is their robustness. In addition, the LP416 is IP protected.

LoadProbe 450 & 460

These devices are designed for Multi-Channel measurements, whereas the LP450 is for 8-channel sequential measurements (configurable from min. 10sec) and the LP460 is for parallel measurements (up to 1kHz per channel) in dynamic environments.

Each channel can be equipped with a separate temperature probe and a load probe. The software provided is either a monitoring software or a high dynamic "offline module" in the Load Lab Software.

E-Torc II

- Direct measurement, display and documentation of torque, angle and preload
- Available for 10-150Nm, 30-300Nm or 100-800Nm measurement ranges
- Torque/Angle/Load-based tightening diagram graphically displayed in the software


Temperature sensor Pt100

Available as:

- Standard magnetic temperature sensor
- Bluetooth magnetic temperature sensor for wireless transmission of the measured values

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Online Monitoring

Advantages

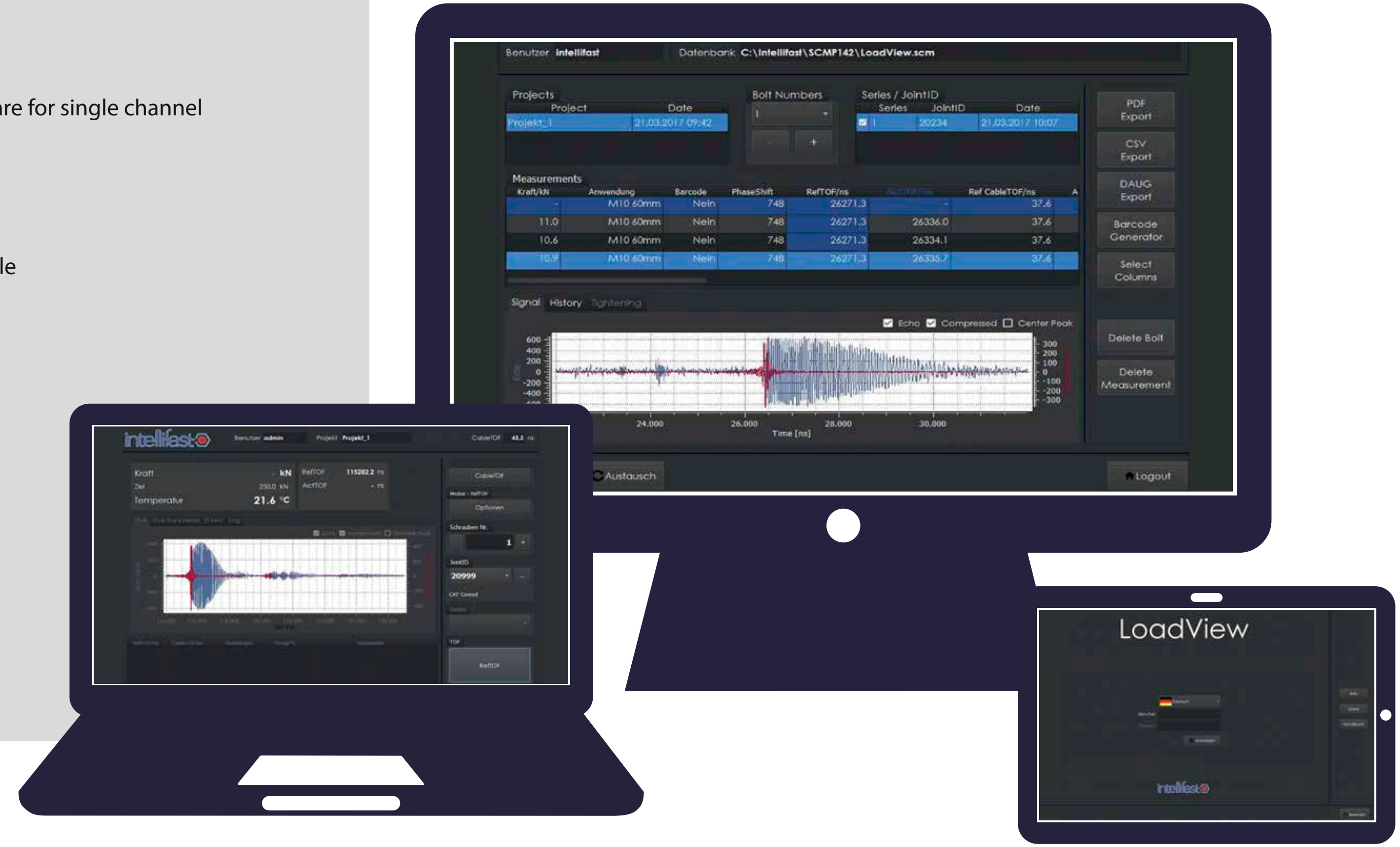
The Online Monitoring System provides a continuous measurement (monitoring) of the bolted connections. In the LoadLab Software the measurement rate can be tuned. The bolt data then will be published through an FTP Server. These systems are already successfully installed and operational in more than 20 Offshore Wind Turbines as well as in onshore machinery bolt monitoring assemblies.

- ✓ Custom built setup
- ✓ IP67 housings
- ✓ Cap-in-cap system to protect probe and transducers
- ✓ Service module (SCM) with touch display
- ✓ Multi-channel configurations

LoadView

Advantages

- ✓ LoadLab Software Suite including LoadView Software for single channel measurements
- ✓ 100 % developed in-house
  - ✓ Direct customer support
  - ✓ Customized solutions and integration possible
- ✓ User friendly menu navigation
- ✓ Windows-based software
- ✓ From simple measurement to documentation and detailed analysis



Fields of Activity

Energy Sector

Safety, maintenance and documentation are essential in the energy business.

Intellifast is a trusted partner with its solutions for long-term monitoring of bolt loads leading to controlled assembly and acceptance procedures.

Aerospace

The Intellifast technology is used in aerospace applications for various reasons such as increasing of preventive maintenance intervals, weight reduction by reducing excessive margins of safety, monitoring of critical assemblies with high temperature variations, exact tightening to optimize tension and increase safety.

Research & Development

The Intellifast technology is widely used in Research & Development, particularly where Process Feasibility Analysis and Machine Feasibility Analysis are required. The flexibility with regard to the variety of transducers and probes as well as in terms of quality and support make the Intellifast technology a highly appreciated and reliable measuring system.

Machinery

Machine and equipment manufacturers as well as steel building industry rely on the Intellifast technology in its 100% quality insurance on critical assemblies and in production. The Intellifast technology is not only used for Process Feasibility Analysis and Machine Feasibility Analysis but also for example for the optimization of tensions.

Fastener Industry

The bolting and fastener industry use the Intellifast technology to validate and verify fastener systems and solutions as well as to integrate the technology into their product portfolio and support customers with enhanced safety and control.

About Intellifast

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How we keep up the quality

DIN EN 9100:2018
Certified since 2006 - annual audits

PPAP process acc. QS 9000
Production Part Approval Process
(automotive industry standard)

100 % testing of transducers
Each transducer is verified before shipment

DIN EN ISO 9001:2015
Certified - subordinated to EN 9100

Germanischer Lloyd Wind
Product certificate for plasma transducer in wind energy

TÜV Nord certificate (Oktagon)
Product certificates, e.g. according to specification "Standard Fastener Aerospace" (2006)

DIN EN 4859:2017
Aerospace series – Sensor based clamp load determination / high tensile bolts – Technical specification (2017)

Contact

Let's talk about the challenge and find a solution together.

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