

ZFG Light Weight Deflectometer

Dynamic plate load test according to TP BF-StB Part B 8.3
Calibrated according to TP BF-StB Part B 8.4
ASTM E2835



Road Construction and Civil Engineering

Many thousands of users worldwide appreciate the testing devices developed and completely produced by ZORN INSTRUMENTS as precise aids for quality assurance on road construction and civil engineering sites. Test laboratories, road construction authorities and construction companies all find suitable solutions for testing compacted soil materials in our product range.

With the ZFG light drop-weight devices, which have been tried and tested since the 1990s, the user continuously examines the load-bearing capacity of the grown subsoil, the complete road substructure as well as base layers without binding agent in the road surface.

The ZFG for carrying out the so-called "dynamic plate load test" sets standards in the field of compaction testing and assessment of the bearing capacity of unbound soils. The use of the different series of lightweight drop-weight devices is assured worldwide by recognised technical standards such as TP BF-StB, Part B 8.3 and international standards in Belgium, Switzerland, Spain, China, Russia and the USA.

Track Construction

The ZFG has also been recognised for over 25 years as a reliable field-testing device for load-bearing capacity testing in track substructure. It provides test engineers with binding data on compaction quality and for assessing load-bearing capacity. Guiding technical standards such as the Deutsche Bahn (DB) earthworks standard RIL836 require, among other things, the use of the lightweight drop-weight device. Tests with the ZFG are carried out both during new track construction and during maintenance measures.

The short test duration of a few minutes allows the device to be used even on construction sites with periodic train traffic. Load plate and loading device can be separated for transport and can be carried by one person even over longer distances. Use at test points that are difficult to access is therefore no concern. Test data can be sent from the construction site to the office via mobile app. This avoids delays in the preparation of the site documentation.

Gardening and Landscaping

Clients in gardening and landscaping are increasingly demanding binding proof of the compaction quality of the subbase of footpaths or driveways. The aim is to avoid subsequent subsidence of the surface layers (paving, concrete or asphalt) and thus expensive reworking. Testing with the ZFG is a simple and safe solution. The device is initially used for self-monitoring of the work by the company carrying out the construction. Test records of the E_{vd} measurement are reliable proof of their own quality of work. Municipal clients in particular also regularly use the light drop-weight device for external monitoring.



Soil Investigation

Combining the ZFG and ZLR

The ZFG light drop-weight unit is also suitable to a limited extent for preparatory assessment of the subsoil. This makes it easy to check the upper layers of large construction sites for weak points or unevenly compacted areas. Light pile driving probes are proven tools in this field of application. The ZLR 10 light ramming probe produced by ZORN is an easy-to-use testing device and fulfils all the requirements of DIN EN ISO 22476-2.

Broadband, Sewer and Pipeline Construction

It is no longer possible to imagine sewer and pipeline construction without the ZFG as a testing device. The compaction quality of both bedding layers and the backfilling of trenches can be tested with equal reliability. In contrast to penetration tests, there is no risk of damaging pipes or cables that have just been laid.

Reliably Test Bedding Layers with the ZORN Mini

In broadband expansion, clients such as Deutsche Telekom or Deutsche Glasfaser demand binding tests of the compaction quality. In addition to the established ZFG, the ZORN MINI light drop-weight unit, developed and manufactured entirely by ZORN, is an ideal solution for construction companies.

The ZORN MINI was specially designed for safe quality testing of bedding layers and backfill in so-called mini or micro trenches. These are significantly narrower and shallower compared to conventional cable trenches. With the ZORN MINI, the user tests trenches from 120 mm wide and compacted fill materials in layer thicknesses between 200 and 300 mm just as comfortably as standard trenches with the ZFG.

Sports Ground Construction

The subsoil of sports facilities should not be too heavily compacted. At the same time, it must be possible to load the entire surface evenly, especially on football pitches or riding arenas. Leading sports field construction companies in Germany, Switzerland and France use the following methods to test the subbase compaction with our light drop-weight device. With it, you can test the subbase of complete facilities with minimal personnel and within a few hours.

With the light drop weight device you can reliably find weak points but also areas that are too heavily compacted. The test itself does not damage any existing structures. Since a large number of test points have to be processed in a short time when examining the subbase of sports facilities, the use of the transport trolley for the ZFG is ideal here. With this useful accessory, users reduce the time and physical effort involved in transporting the ZFG between measuring points to a reasonable level when working on large areas.



Proof of Compaction Quality

A high-precision acceleration sensor works in the ZFG. This also allows fast and reliable testing of the load-bearing capacity of grown or weakly compacted soils. As each individual test takes only a few minutes, even larger areas can be completely "checked through", e.g. before the start of landscaping construction work.

Trust, but Check

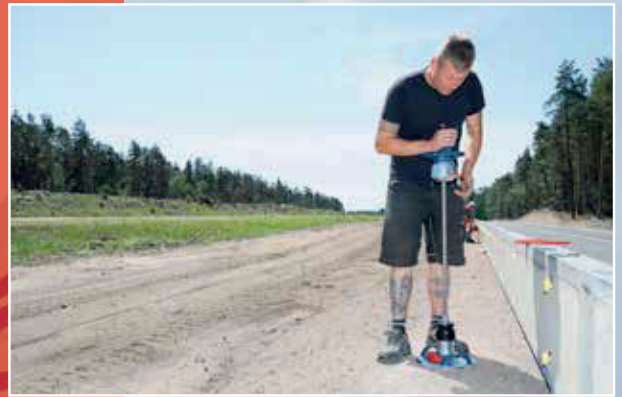
Test records can serve as effective evidence in legal disputes. The forgery-proof storage of GPS coordinates in the test data increases the validity of the evidence.

ZFG : In Facts

- The ZFG is based on complex, scientific principles
- Exact data delivery with easy handling
- Intuitive menu navigation in twelve languages
- Forwarding the measurement data via WiFi directly to the office
- Testing of gravel, sand, crushed stone or chippings as well as recycled building materials and material mixtures
- Easy operation in wind and weather (splash water protection)
- Use during ongoing construction site operations
- Reliable test results for quick decisions on construction progress (e.g. resumption or early termination of compaction, change of measures for soil improvement or material replacement).
- Ideally suited for in-house and external monitoring
- No additional equipment (e.g. impact tools or a heavy vehicle as counterweight) necessary

ZFG : Did You Know?

- Durable and yet modern: Digitally retrofitting ZFGs of all generations. The oldest unit that still comes back "home" to ZORN for annual calibration is number 18, which was sold in April 1992.
- Further developed with customers: triangular catching handle facilitates handling. The drop weight is easier to catch and does not roll back and forth unnecessarily during transport in the car.
- First-class products just in time: ZORN produces in its in-house manufacturing and assembly with highly qualified personnel.
- More accurate measurement results: Ball bearings in the weight of the ZFG make it possible (reduced friction force).
- Optimised measuring method: special acceleration sensor has lower scattering than common sensors.
- Stainless drop-weight device: the galvanic surface zinc coating makes the ZFGs extremely durable.



EXPERIENCE : the Precious Asset

- Since 1870: Product development, design and manufacturing from a single source at ZORN
- Since 1950: Specialisation in the field of dynamic test equipment
- From 1990: Germany-wide introduction of the ZORN ZFG Light Weight Deflectometer and recording of the dynamic plate load test in the "Technical Test Specifications for Soil and Rock in Road Construction".
- Since 2000: international standardisation of the Light Weight Deflectometer with ZORN
 - Austria: RVS 08.04.04 (March 2008)
 - Spain: UNE 103807-2:2008 (July 2008)
 - USA: ASTM E2835
 - Russia: N° 52068-12 (State Register approved measuring instruments)
 - Australia: Q726B Deflections - Portable Impulse Plate Load Test Device
 - Belgium: SB 250 versie 4.1, 4.16.2 (April 2019)
 - Switzerland: VSS 70 313 (July 2019)
- Since 2020: Quality inspection on construction sites with ZORN ZFG daily, thousands of times, worldwide
- Active exports to more than 100 countries
- At least 75,000 ZORN devices sold (13,000 ZFGs)

SERVICE CONCEPT : the Basic Idea

- Direct purchase as an end customer or via the specialist trade: ZORN test devices plus competent advice - always, personally, and free of charge.
- Passing on user knowledge: ZORN practical seminars with over 2,200 participants since 2008
- Digitalisation in construction becomes reality: ZORN Viewer App, ZORN D plus App, ZORN FG-WebApp
- ZORN support on all channels: telephone, email, web or even in person
- ZORN Support 24/7: many documents and information available online at any time

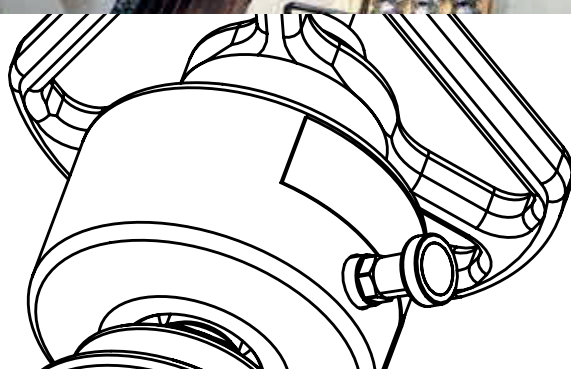
CALIBRATION : the Important Detail

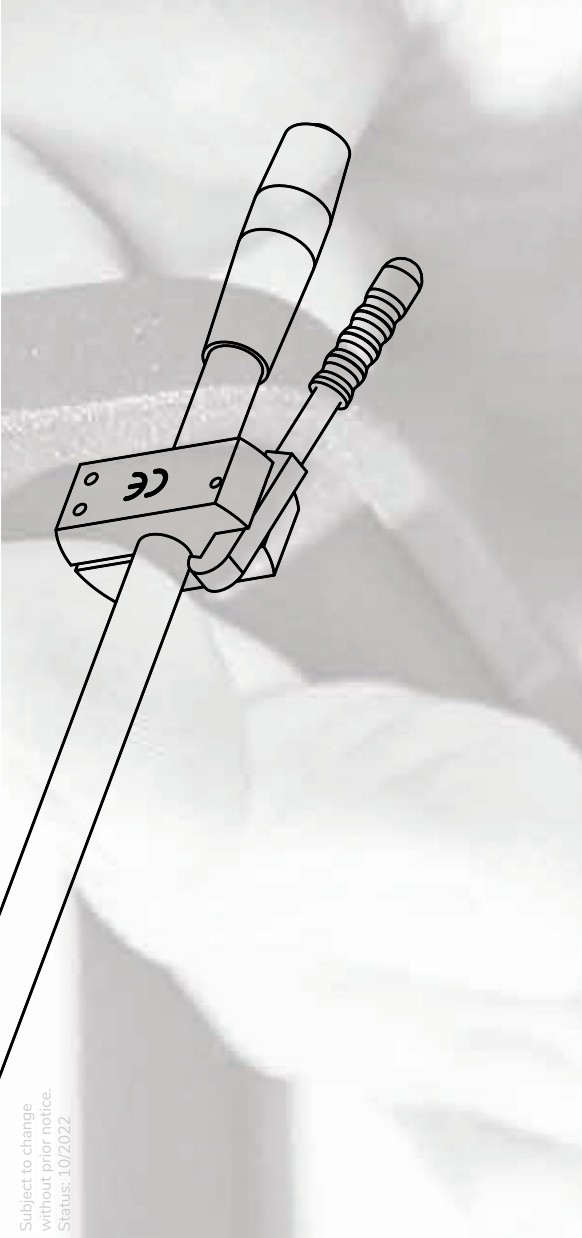
- No valid test without calibration: ZORN calibration stations for the Light Weight Deflectometer nationally and worldwide
- For short journey or delivery: BAST certified ZORN test benches in Germany: 2x Stendal, 1x Munich, 1x Hamburg
- For faster processing international: ZORN certified test benches in Austria, Australia, Belgium, Poland, Russia, Slovenia and USA
- The GERMANY reference: Calibration level for the Light Weight Deflectometer at the Federal Highway Research Institute (BAST): a ZORN product
- From a single source: calibration, maintenance, pick-up/-delivery service
- Double calibration reminder: in the device, by email



Annual Calibration:

According to German test specification TP BF-StB Part B 8.3, Light Weight Deflectometers have to be calibrated every year.





WORLD CONVENIENCE : the Special touch

- Hanseatic down-to-earth: Founded by master mechanic Wilhelm Schließer in 1870: over 150 years of "Made in Germany"
- Around the world with precision mechanics in the genes: from ZORN safes, sewing machines and bicycles to high-precision testing equipment.
- Family business anchored in the Altmark in the 5th generation: Bianca Zorn - Owner and Managing Director
- Ball, test needle and scale: the components of a Brinell hardness tester form the ZORN logo

PRECISION : the Precision Engineering Gene

- In addition to its own laboratory, material and road test equipment, ZORN regularly manufactures prototypes, small series and special workpieces for clients from the food processing, medical technology and automotive industries, among others.
- Clients benefit from the work of experienced ZORN designers and highly qualified employees on state-of-the-art turning and milling machines. Surface finishing and individual assembly round off the offer.

KNOWLEDGE : the Strong Passion

- Cooperation with universities, colleges and scientific institutions, participation in research associations: indispensable for ZORN
- User training and information events: ZORN Fuel for Improvement
- ZORN Training and internships: Not only for our own junior staff
- Bachelors, Masters and semester theses: YOUR project at ZORN



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