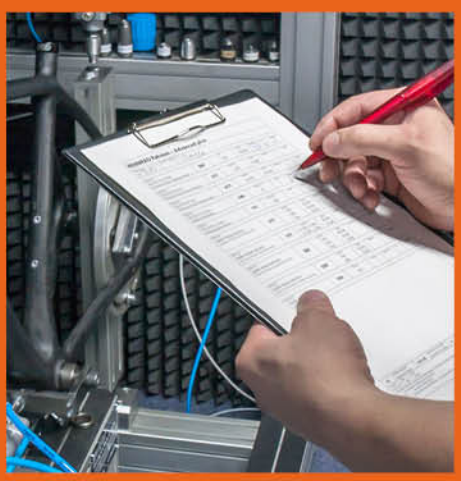
zedler-Institut

Technology and Passion for Bicycles

» SAFETY

TESTING SERVICES PORTFOLIO



DEAR CUSTOMER,

Thanks a lot for your interest in Zedler-Institut testing services.

With nearly 100 precise, innovative and reliable testing systems on the spot we provide you with tailor-made solutions for nearly any testing tasks in the state-of-the-art dynamic testing of bicycles, EPACs (electric-bicycles) and cargo bikes as well as their components. For about 30 years, we have been one of the leading suppliers of testing services and systems that you can find in the testing laboratories of the trend-setting bicycle manufacturers and magazines.

» The tests of our SAFETY series are aimed at testing bicycle frames, forks and components mainly for fatigue and impact as well as overload strength. They allow findings about the fatigue strength without time consuming assembly and long test rides in different terrains. «

Countless reports drawn up by our experts for courts and insurers throughout Europe, North America and the Middle East have created a unique wealth of knowledge about material failure in the case of bicycles and e-bikes. Based on this, and in close cooperation with universities, our engineers have created unique testing systems for evaluating operational safety over several years of development and, above all, proving.

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D-PL-22057-01-00

The bicycle testing systems developed by Zedler-Institut simulate typical riding situations, special incidents and foreseeable inappropriate use and misuse when mounted in a realistic way.

They also include the elements to be tested according to the respectively current standards. These are, however, completed when we learn from nearly countless experts reports that other, i.e. additional loads have to be introduced to avoid any damage in practice. It is close to reality that loads acting on the saddle and the head tube during riding out of the saddle and as a result of the influences of the road are reproduced for example in frameset tests just like braking forces acting on the front part of the frame and on the fork. Forces of disc brakes on the rear frame can be introduced and jump overload can be simulated; both types of loads are still ignored by some current standards.

In combination with the testing methods for the determination of stiffnesses, the geometry and the coating quality established by us in the industry for a good 25 years, the testing systems offer a wide range of possibilities to manufacturers and engineers. As early as prior to the series production, but also as quality control during the production, possible weaknesses can be remedied or variations in quality can be detected and repaired.

I am absolutely confident that our testing results will be a valuable support in the development of your products and wish you good luck and success.

I welcome your feedback. Feel free to send us your inquiries, improvement suggestions or criticism.

Graduate Engineer Dirk Zedler
Founder and Managing Director

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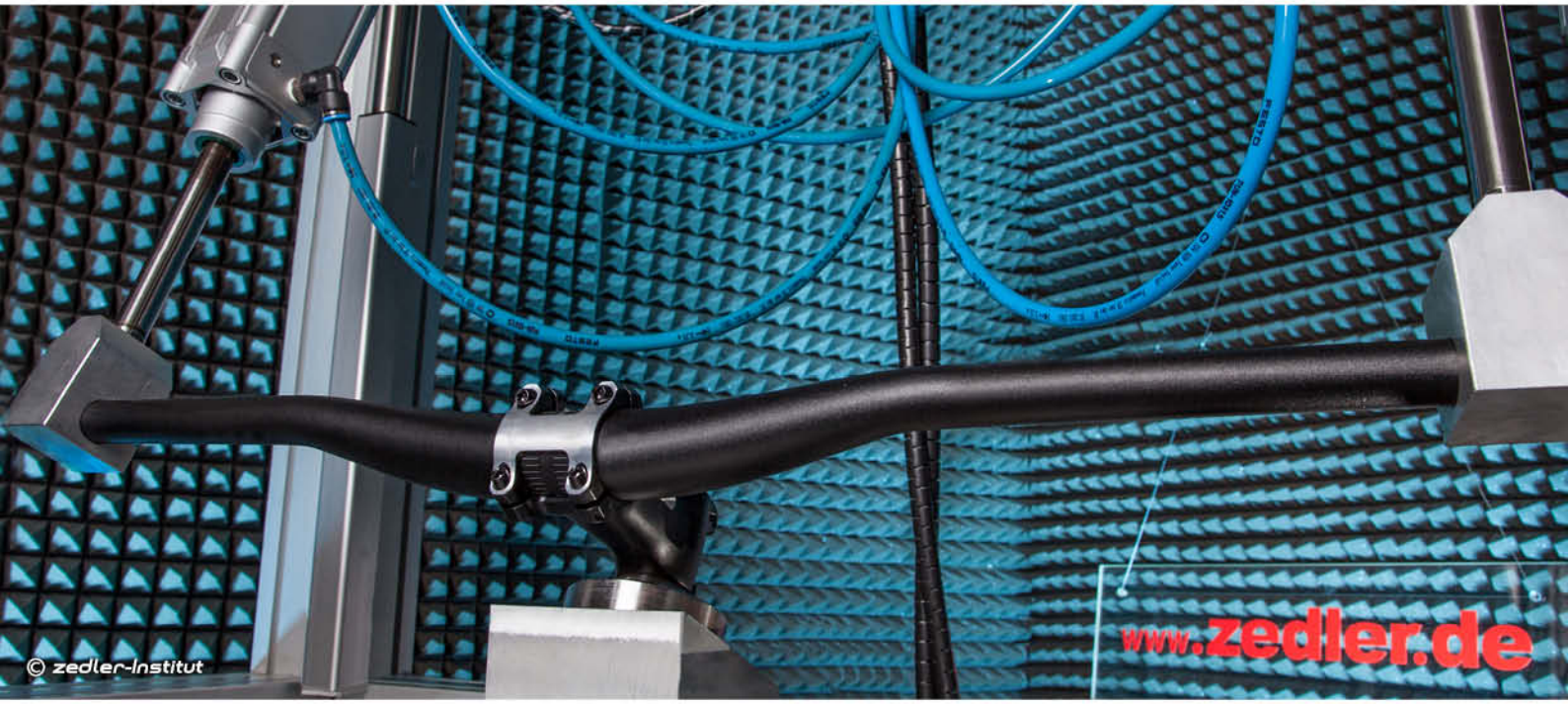
Technical details in the text and illustrations of the portfolio are subject to change.



TESTING YES – BUT HOW?

Discussions about the right way to test fatigue strength are still in full swing in the world of cycles. Real data are collected again and again by many universities and private companies. More and more sophisticated multi-axis test stands are presented. Nevertheless, the world of cycles is in this respect still standing at the beginning.

It would be ideal to run the measured data reduced by the non-damaging shares as so-called operating load fatigue tests (real time tests) in fast motion. At present, this kind of test that is closest to realistic cycling can only be performed with hydropulsers. This testing technology causes extraordinarily high costs that according to what experience has shown are not presentable in the cycle industry.

Fully-assembled bicycle tests are also an ideal case that, however, in our experience cannot be realized at present due to several factors. On the one hand fully-assembled bicycle tests require multiple force application points starting from the multiple contact points of the road loads via the luggage transported to the loads introduced by the rider into the bicycle.

This requires multi-axis test stands which not only increases the costs, but also leads either to a comprehensive setup or to the negligence of some load cases. Often many test axes lead to vibration problems which in the best case force the testers to reduce the testing speed considerably.

Furthermore, you as a bicycle manufacturer have numerous model configurations that would have to be tested individually one after the other.

As a result, groupset tests with final fully-assembled bike (functional) test are in our opinion the right way. In following this way, our customers have had the best experience, both in terms of fatigue strength and thus safety, and in terms of a vanishingly low complaint rate.

From the economic point of view this is also an advantage for you because the kit of freely tested components/groupsets allows various models without repeated test expenses.

Countless material failure and accident analyses made by our partner companies Ingenieur- und Sachverständigenbüros für Fahrradtechnik Zedler, Gesellschaft der Fahrradsachverständigen mbH and basic testings over many years as well as the experiences of Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH allow some key messages for clean testing under liability law aspects:

- More important than an individual test with a presumably high-tech test procedure according to state-of-the-art scientific findings is **to test regularly and in larger piece numbers**. To obtain a reliable evaluation you should, as a rule, test at least three test pieces per model.
- It is much more important to **mount a test piece realistically** and to properly apply the operating loads and forces than to feed in comprehensive real time tests.
- Metallic materials have another behaviour and show other damage mechanisms than fibre-compound materials. For this reason, it is the **test procedure and not the loads that must be adjusted to the materials** and optimized accordingly.
- There cannot be the one and only proper test for all bicycles. And neither is there the one and only rider. The **load profiles typically vary according to the type of bicycle** and of course also depend on the user habits of the cyclist. The analysis of countless cases of failure in practice clearly reveals the different types of failure for each bicycle type. That is to say damage to the frames of road bikes differ from damage to EPACs/electric bicycles in city and trekking bike designs. These aspects must be considered during the tests.
- In the event a component fails on the test stand, its **breakage pattern must be compared to those occurred in reality**. That's what we have already done for you with our internal benchmarking. We should be glad to show you that with our exhibits in our "Walk of Failure".
- Economically affordable testing follows the **platform idea or modular principle** and considers corresponding component assemblies.
- **Tests must be comprehensible and documentable**. Secret sciences are contraproductive and ineffective due to a lack of reproducibility.
- The **DIN EN ISO tests** should be performed (in adjusted form, see p. 6) in order to comply with the minimum standard accepted in nearly all countries.

THE MANDATORY CE MARKING AND ITS IMPLEMENTATION

The mandatory CE marking requires that EPACs, e-MTBs and e-cargo bikes are tested and evaluated according to the 2006/42/EC directive of the European Parliament and Council (Machinery Directive).

This also includes among other things a risk assessment that must be performed by the manufacturer prior to signing the declaration of conformity and attaching the CE mark. Although DIN EN 15194 is harmonised under the Machinery Directive, the DIN EN ISO standards are by no means sufficient in the testing area of the Machinery Directive, as there are serious gaps on the one hand and as the weight limit is much too tight for the users on the other hand.

Resulting from these findings and in consideration of the case law known to us, we recommend the intelligent use, combination and adjustment of existing DIN EN ISO standards as basis.

Beyond that, we urgently recommend that you have the missing load types tested. And in case of a higher permissible overall weight than the normative 100 or 120 kilograms we recommend the Advanced, Advanced Plus or even the Advanced Plus XXL tests of Zedler-Institut.

Our fatigue testing systems allow single-step and multi-step tests or block programs. In particular in the case of the fatigue tests, we bring in our testing experience and the comparison with reality.

We should be glad to specify together with you in personal contact the respective test scope for your models and the test costs. Get in touch with us.

BOOK THE WORKSHOP NOW!

Make your team ready for the requirements of the conformity procedure. For more than 10 years, we have been conducting training courses to show you how to attach the CE mark with an easy conscience.
https://zedler-schulung.de/en/retailers-manufacturers/

TEN GOOD REASONS FOR TESTING AT ZEDLER-INSTITUT

- Precise testing systems with regulated and not only controlled test actuators. Storage of the test cycles in the system monitoring.
- Testing systems and relevant tools are regularly calibrated traceably.
- Large number of testing systems with totally around 100 testing systems, i.e. there are several testing systems of each type.
- The machines are built in-house, therefore no makeshift solutions when mounting test pieces on the testing systems.
- Five engineers, i.e. bachelor, master and graduate engineers, are exclusively in charge of the operative testing business.
- The operation of our laboratories is climate neutral.
- Many scientific studies for the validation of the Basic, Advanced, Advanced Plus and Advanced Plus XXL test criteria have been successfully carried out with German universities.
- Based on more than 15,000 experts reports on bicycle accidents on three continents.
- More than 50 proceedings of market surveillance authorities and recalls in seven European countries were accompanied with the manufacturers being "freed" as a result.
- Our test laboratory is accredited, i.e. it's being audited externally. The special thing with that is that not only the normative tests are included in the scope, but also all tests of our SAFETY and PERFORMANCE categories. Thus, our own testing procedures have also successfully passed this enormous hurdle.

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TESTED IN GERMANY

CLIMATE-NEUTRAL TESTING

48 Hour Promise until test start

YOUR ADVANTAGES AT A GLANCE

- Development accompanying tests with high reproducibility within short time
- The option for continuous product quality due to sample checks
- Basic legal security due to DIN EN ISO compliant tests
- Increased legal security or the legitimation to attach the CE mark due to the tests that go beyond the minimum requirements of the DIN EN ISO standards
- Free trade in Europe with passed and recorded DIN EN ISO compliant tests and CE marking
- Reduction of complaint rate and therefore saved costs for staff, storage and spare material
- As a result many satisfied customers due to bicycles with reduced complaint rate owing to high product quality

TOGETHER WITH YOUR TEST REPORT YOU OBTAIN

- Test and measurement results from technically mature, reliable and calibrated Zedler testing systems made in Germany

YOUR OPTIONS IN THE LAB OF ZEDLER-INSTITUT

- Tests according to the valid, type-specific DIN EN standards can be performed as well as tests compliant to higher requirements or company-own standards, as is common use e.g. in the automotive sector.
- In principle, you can order every test individually. The tests can also be performed according to your company-own standard.
- We have developed for you a number of test suggestions for framesets that are according to our experience suitable to test the fatigue strength of bicycle frames and forks or to meet the requirements of the standards and the CE marking. With the increasing demands in the packages you can classify your bicycles in the respective category according to the user profile. Please contact our team of bicycle test engineers.

TESTING SERVICES – PERFORMANCE AND QUALITY

We offer further testing services in our state-of-the-art laboratory:

- Measurement results of the PERFORMANCE testing systems subsume riding characteristics of bicycles and their components into figures.
- The tests of our PERFORMANCE series are to test bicycle frames, forks and components mainly for their stiffness and geometry. They allow precise findings about the riding behaviour without time consuming assembly and long test rides in different terrains.
- The global measurements that were established together with us have produced terminologies whose international comparability is based on the originals of our testing systems.
- These are the terms with which brands and order manufacturers communicate globally:
  - Head tube stiffness
  - STW (stiffness to weight factor)
  - BB stiffness
  - Comfort frame
  - Fork stiffness
- To determine reasonable torque values and mounting specifications for assemblies instead of relying upon the instructions of the screw manufacturers, is a very important step towards the minimization of failures in operation. Further examinations and measurements comprise the entire field of "precision and snug fit on the bicycle" as well as coating tests and functional checks.

PERFORMANCE TESTING SYSTEMS – SELLING

We not only offer testing services in our company own test laboratory in Ludwigsburg, but also sell the PERFORMANCE testing systems.

- You find more information on our PERFORMANCE test stands in our PERFORMANCE testing systems portfolio at:
  https://www.zedler-institut.de/en/buying-testing-systems/

THE SAFETY TEST PACKAGES

DIN EN ISO PACKAGE

Includes all tests prescribed for the according bicycle, EPAC/e-bike and cargo bike category in the respective DIN EN ISO standards. These tests are necessary with regard to the free trade in Europe and provide safety in terms of documents.

However, in the DIN EN ISO standards some load cases are not assumed realistically. In addition, the EN standard does not consider material-specific properties.

» **In short:** Our field experience shows that the DIN EN or ISO testing methods are absolutely important, but often insufficient.

BASIC PACKAGE

Most cost-effective option for a Basic test. The complete number of tests according to the DIN EN ISO standards are performed and completed by the testing methods necessary for the respective bicycle category or frame materials. In the case of mountain, trekking and electric bikes (EPAC) this is e.g. the disc brake load acting on the frame. In addition, the tests are performed by applying partly more load alternations, as the EN ISO load alternations seem to be without viable system.

» **In short:** Tests according to the DIN EN ISO standards are performed. Tests that are missing in the standards are added, the load cycles partly adapted.
This means that the weights on which the standards are based can be approved with an easy conscience.

ADVANCED PACKAGE

In an additional round on all testing systems the test pieces which have already undergone the DIN EN ISO and Basic tests are tested with partly increased loads at simultaneously lower load cycles.

With this package the DIN EN ISO standards are fulfilled on the one hand and completed with reasonable tests with adjusted loads that are necessary for sufficient fatigue strength on the other hand. This is in our opinion the minimum level for an EPAC or e-MTB and for sports or intensively used bicycles, e.g. with an overall weight of more than 100 kg.

» **In short:** Tests according to the DIN EN ISO standards and the Basic tests are performed; the tests in addition to the standard Advanced are mixed in form of a realistic block program. With Advanced a higher overall weight, which is of course specific to the category, can be approved.

ADVANCED PLUS PACKAGE

A test piece undergoes 12 to 22 individual tests before on its way to achieve the Advanced Plus standard. After DIN EN ISO, Basic und Advanced the test pieces are tested again with partly increased loads at simultaneously lower load cycles.

» **In short:** Tests according to the DIN EN ISO standards and the Basic tests are performed; the tests in addition to the standard Advanced and Advanced Plus are mixed in form of a realistic block program. For most use cases, i.e. load scenarios, Advanced Plus is sufficient. For EPACs in city/trekking design experience has shown that there is no problem in approving e.g. a permissible overall weight of 150 kg.

ADVANCED PLUS XXL PACKAGE

XXL – the name says it all: A further round of load types with once again increased loads and at the same time lower load cycles, satisfies even heavier weights. For EPACs/e-bikes it has been no problem over the past years to approve a weight of up to 180 kg with the to date successfully tested models in the market or in the field.

» **In short:** Tests according to the DIN EN ISO standards and the Basic tests are performed; the tests in addition to the standard Advanced and Advanced Plus XXL are mixed in form of a realistic block program. The tests have been fully completed and we are not aware of any failure of frames, forks and components in the respective bicycle and e-bike categories.

YOUR ADVANTAGES – IMPORTANT TO KNOW

Frames undergo mixed tests in form of a block program over several rounds with all load types and increasing forces.

This is currently one of the most time consuming and realistic tests for components, frames and framesets.

» The failure of a component during mixed tests in blocks indicates to the manufacturer where the component will fail, if the worst comes to the worst.

TEST SEALS FOR SUCCESSFUL SAFETY TESTS

Upon your request we are glad to make successfully passed tests transparent and thus evident for your customer as a confidence-building measure which can also be used for marketing purposes.

The new test seals are available in many categories which are classified according to the requirements of our SAFETY tests:

- For a successfully passed EN ISO and EN ISO Basic test you obtain the seal in **grey**.
- **Bronze** is presented by us for complying with the stricter Advanced requirements.
- **Silver** is presented by us for Advanced Plus tests.
- **Gold** is presented for products which have successfully passed the Advanced Plus XXL test requirements.

Please let us know, when three components of one type have successfully passed our tests and you want the respective test seal for your products. We should be pleased to create these test seals* individually for you – including your brand and model name. Just mark with a cross in the respective field of the application form.

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* Due to your accreditation as test laboratory in accordance with DIN EN ISO 17025 it must be also ensured that the "marketing" is clean. As one test is no test in the theory of fatigue strength, we are not allowed to present a test seal for passing an individual test.

FAQ – FREQUENTLY ASKED QUESTIONS

ACCREDITATION

Test methods, testing systems, procedures, training of employees and quality assurance are audited in the course of the accreditation procedure. You can therefore rely upon the fact that there is nothing going wrong with the tests in our laboratories.

In our house, the scope not only includes the common standards. A special thing is that nearly all of our company-own procedures and in-house-built testing systems are audited externally. Information on the scope of our laboratories is provided on the website of Deutsche Akkreditierungsstelle: https://www.dakks.de/de/akkreditierte-stelle.html?id=D-PL-22057-01-00

ISO

ISO standards are internationally agreed minimum standards of the "International Organization for Standardization" with their headquarters in Geneve (Switzerland). It is an independent, non-governemental organization with currently 168 members. The ISO 4210 for bicycles which is a slightly revised version of previous EN standards has been in force since the beginning of 2015. Further standards are the ISO 8098 for kids' bicycles, the ISO 11243 for luggage carriers, etc.

According to their specific types the 4210 standard includes the categories mountain bike, road bike, city/trekking bike and young adult bikes. These standards have been ratified by numerous countries, including 27 EU member countries, and converted into the national standards.

Note: In France, the EN and thus the ISO standards have been adopted into law, i.e. goods can only be imported or sold on the French market after they have passed the testings to standard.

Comment: The bicycle standards are established by interested parties on an international level and define no more than a minimum standard for the products. It is common sense that ISO standards were developed for the most simple bicycles, e.g. bicycles bought in a DIY store or hypermarket. Bicycles for higher demands, for sports use should of course fulfil the ISO, but should be tested beyond.

The ISO 4210 has loopholes that are elegantly exploited by some suppliers. It is for example allowed by the standard to perform each test with a new component. This is downright absurd, as the load types overlap and only this way reach their actual damage potential occurring on the road or in the terrain.

We do not think, but we know from our experts reports department that ISO tests passed like this lead to damage, severe accidents and even to recalls. In addition, the set of standards is not complete, the requirements of the different bicycle types are not congruent and in some areas do not make sense.

Please note: The tests according to ISO standards do not provide sufficient safety for your products.

FAQ – FREQUENTLY ASKED QUESTIONS

EN

EN standards are minimum requirements developed by the "European Committee for Standardization" (CEN). Just like the ISO standards they are mandatorily transferred into the respective national standards by the currently 34 states of the EU and those of EFTA.

The EPAC (e-bike) standard EN 15194 is of special importance. It is harmonised under the Machinery Directive and therefore law. For e-MTBs the EN 17406 standard applies in addition.

DIN

Traditionally, the committee of the German Institute for Standardization in Berlin is very busy. The DIN 79100 standard from the 1980s and 1990s was the ancestor of the current ISO and EN standards for bicycles and later of the mechanical part of the EPAC (EN 15194).

Currently, the DIN 79010 is the only standard that applies to cargo bikes. In the medium run, it will be transferred into an EN standard with slight modifications.

AFNOR, BS, AUSTRIAN STANDARD ÖNORM, UNI, ETC.

AFNOR, BS and similar standards are the national standards of European countries, just like the DIN standards in Germany. Since the harmonization the national standards are converted EN or ISO standards developed by the European Committee for Standardization (CEN) or the international ISO. The correct designations are therefore for example AFNOR EN ISO 4210 or BS EN ISO, DIN EN ISO etc.

DINPLUS

DINplus is a commercial seal of quality based on extracts from the EN and ISO standards as basis and imposing higher requirements for these tests by increasing the percentage.

To become certified by DIN CERTCO GmbH according to DINplus, the component must be tested by an accordingly accredited laboratory and pass the tests.

Like the European EN standards, the DINplus rules are neither complete and therefore do not provide sufficient safety.

CE MARK

With the CE mark, the manufacturer or importer signals to the authorities that the product meets the minimum requirements of all directives and standards applicable in Europe. Furthermore, a risk assessment according to DIN EN ISO 12100: 2010 and an EMC test have to be passed successfully.

The CE mark is mandatory for EPAC s/e-bikes, e-MTBs etc., but not for bicycles.

The self-certification is possible; the EPAC must however comply with the requirements of the Machinery Directive. Apart from the tests a risk assessment must be carried out. The analysis conclusively shows that the DIN EN 15194 standard passed is not sufficient. Supplementary tests must therefore be carried out. For this reason we recommend at least the Advanced tests for EPACs.

In case of any further inquiries regarding the CE marking, feel free to contact us at conformity@zedler.de

BOOK THE WORKSHOP NOW!

Make your team ready for the requirements of the conformity procedure.
For more than 10 years, we have been conducting training courses to show you how to attach the CE mark with an easy conscience.
https://zedler-schulung.de/en/retailers-manufacturers/

FAQ – FREQUENTLY ASKED QUESTIONS

STANDARDS OF INSTITUTES, MANUFACTURERS AND COMPANIES

Various universities, companies and test institutes have created their own standards, which makes sense, as the DIN EN ISO standards are neither sufficient nor complete. In the case of "self-built" standards checking the tests against the real incidence of damage is of major importance that is often neglected. Unfortunately, even today it has not been possible to unite the multitude of nuclei of progressive bicycle tests and to set up a strong standard above the standard.

For your products, we have validated our test types and cycles in particular, in addition to decades of intensive inspection of failure cases in operation and real data collection for the solid data foundation. This serious balance was achieved by testing components that fail in operation and those that are considered indestructible in operation to date.

Our own test criteria are almost without exception externally audited and have been accredited by DAkkS (Deutsche Akkreditierungsstelle GmbH).

SINGLE-STEP TESTS, MULTI-STEP TESTS AND TEST BLOCKS

Single-step tests are tests during which a load level is driven repeatedly. Most tests are performed in form of a sine wave or trapezium-shaped. The load can be applied dynamically, i.e. it oscillates between two levels without zero crossing. Cyclical tests are tests during which the test forces vary from a positive value to a negative value and vice versa.

During **multi-step tests** (Advanced, Advanced Plus, Advanced Plus XXL) several load levels are driven. This is typically realised by applying first an inferior load level a determined number of alternations of load, e.g. 50,000 load cycles with a force of 1,200 N. Then, in the next stages, the loads are increased and the number of load cycles reduced, e.g. 20,000 load cycles with 1,500 N and 10,000 load cycles with 1,700 N.

During **test blocks** several load levels are tested. The special feature is that these are comprised in individual, small blocks and checked. These small blocks are assembled in a test procedure and repeated until a certain number of total load alternations have been completed. This is how we test all components in principle, the most detailed being the highly sensitive handlebars.

OPERATING LOAD FATIGUE TESTS (REAL TIME TESTS)

This testing method starts with the precise knowledge of the loads occurring during cycling. These must be determined during real data measurement rides. Reduced by the non-damaging shares, these are subsequently applied into the test piece. At present, there are no paired off measurements which are generally recognized. The tests require usually the usage of hydropulsers.

This testing method that is actually the most reasonable one is at the same time the most time and cost consuming one. It is not common use in the cycle industry.

Our block programs Advanced, Advanced Plus and Advanced Plus XXL are closest to this kind of testing.

FAQ – FREQUENTLY ASKED QUESTIONS

UNIAXIAL, BIAXIAL AND MULTI-AXIS

Each load direction typically requires one testing axis. Uniaxial tests are typically the tests of a seat post reproducing the road loads with a cylinder pressing downward.

Biaxial tests reproduce e.g. pedal forces or riding out of the saddle, with one cylinder respectively per pedal replacement body simulating the rider's forces.

Multi-axis tests try to realize many load cases with one clamping of the test piece. The problem with such test stands is that the higher number of actors in many fields of the bicycle generate masses that may not exist in reality. This often entails oscillations that may lead to false test results.

That is why we have opted for a very large machine park where around 100 high-precision testing systems precisely reproduce the real load types.

FATIGUE ENDURABLE VERSUS FATIGUE RESISTANT

The term "fatigue endurable" (German: dauerfest) is often used in combination with products. **Fatigue endurable** assumes that a product is infinitely, i.e. solid (durable) to infinity. There is simply nearly no such product where this would be the case. A fatigue endurable plane would never get off the ground, a driving shaft of a small car would have to weigh more than 75 kg instead of 10 kg to fulfil this requirement.

In the field of aeroplanes and vehicles the constructions must be **fatigue resistant**. That means that a component provides the necessary safety against failures for a determined period of use under given conditions of use and the anticipated loads. Therefore, factors, such as the permissible overall weight, the future approval for an intended use and the target service life, must be taken into account, as well.

INTENDED USE, REASONABLY FORSEEABLE MISUSE, IMPROPER USE

Everybody understands that riding a road bike in a bikepark is improper use. The road bike is actually not built for such a use and bound to fail. There is no remedy available to prevent such action. However, after successful testing according to the Advanced standard or beyond, it is easy for the manufacturer to defend himself against unjustified liability claims in such a case.

Riding on tarred roads or hard-surface roads and trails must be regarded as intended use of such a bicycle. Training as well as racing use comply with the intended use from a certain quality level on. This use must of course be covered by testing, i.e. with tests beyond the standard.

Accidentally bumping up a kerb or traffic island or riding through a water drain channel covered with grids while sitting in the saddle is not intended use, but they are foreseeable (mis)use. Therefore, the resistance to damage resulting from such events must be checked in tests and covered.

The EN 17406 standard offers good help to categorize the bicycle types. In the standard bicycle categories are roughly classified and assigned to respective riding manoeuvres.

Of course, the same applies here: every manufacturer can improve or refine the differentiation in their variety of models. Our experienced technical documentation department will be happy to support you.

INTERESTING DETAILS

TEST PROCEDURE

All tests of the SAFETY series are destructive tests. The products cannot be rebuilt or reused after the test.

Of course, all test pieces are returned.

For your release from liability, we recommend that you keep the test samples and the protocols for at least 11 years.

48 Hour Promise until test start

DURATION OF THE TESTING SERVICES

In general, SAFETY tests can be performed within three to ten working days. In case of larger orders, please place your testing order in good time.

We would like to avoid delays due to long waiting times for test results. It is also our declared aim not to provide any excuse that slow order processing meant that testing could not be performed. Profound knowledge in a short time for good bicycle products is what drives us. Therefore, you have our promise that incoming test pieces, at least the first of a larger series, will run on the first testing system no later than 48 hours after receipt. Typically, it is mounted and the test starts the very day of arrival.

For orders where you want to make the delivery personally and discuss the test procedure on site, we reserve ourselves the right of charging an extra charge of 50 %.

Please get in touch with us in individual cases!

WHAT HAPPENS TO THE TEST PIECE

In principle, all test pieces are returned to the customer. The customer is obliged to store or file the respective test piece after it has been returned by Zedler Institut GmbH for a period of time of eleven years at least in view or preserving evidence. All disadvantages that arise from the infringement of the obligation to store shall be at the expense of the Customer.

PRICING

The prices mentioned for the individual testings and SAFETY packages are inclusive of expendable items, however exclusive of VAT, in case of collection by the customer.

If delivered within Germany, we permit ourselves to charge dispatch costs at € 20.00 per DHL-size package.

For large bicycle boxes within Germany we charge € 40.00.

For deliveries abroad please get in touch with us.

Further counselling going beyond the standard tests, e.g. at a product optimization, are charged at an hourly rate of € 125.00 for an engineer and € 250.00 for the managing director.

We permit ourselves to charge customers we have no current business relation with an advance payment.

VOLUME DISCOUNTS

Please note our sales-related quantity discount for the PERFORMANCE, SAFETY and QUALITY testing services:

As soon as the tests ordered by you per calendar year exceed the below-mentioned amount for all three testing service fields, a bonus payment on the total amount achieved shall be granted retrospectively. That means the price for the next test order in the subsequent year will be reduced by this discount.

From a test volume of

- € 5,000.00 net we allow a 5 % discount
- € 10,000.00 net we allow a 10 % discount
- € 15,000.00 net we allow a 15 % discount
- € 20,000.00 net we allow a 20 % discount
- € 25,000.00 net we allow a 25 % discount
- € 30,000.00 net we allow a 30 % discount
- € 50,000.00 net we allow a 35 % discount
- test volumes beyond as agreed upon.

All testing orders are settled according to the enclosed General Terms and Order Conditions of Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH.

All prices are valid as of 06/2020

OUR TEAM

We look forward to your request:

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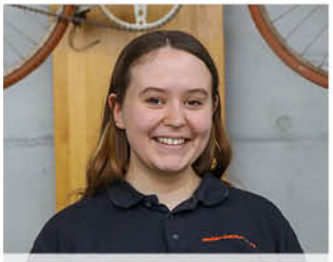
Administration Testing



PAULINA GABLER
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Administration Testing

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Master of Science
Testing | Head of Quality Assurance

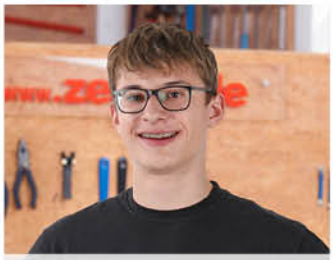
JULIUS WEIMANN
Graduate engineer (FH)
Testing | EDP and Calibration

LORENZO SCHMELZER
Master of Science
Testing

DAVID HEIL
Bicycle mechanic
Assistant to Testing Technology

JULIAN GROSSKOPF
Working student
Quality assurance

RAINER AISENPREIS
Assistant to Testing Technology | Building Services



FYNN HEIT
Apprentice Two-Wheeler Mechatronic Bicycle Technology

ARNE MACHER
Apprentice Two-Wheeler Mechatronic Bicycle Technology

Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH
General Terms and Conditions for Delivery and Payment of Test Stands and Accessories
for all transactions entered into with companies, legal entities under public law and state-operated special funds

1. General

1. The following terms and conditions are an integral part of the contract for all deliveries and services of Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH.
2. Variations at the expense of Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH are effective only in so far as they have been expressly accepted by Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH in writing. Accordingly, any conflicting terms and conditions of the Contracting Party are hereby expressly excluded. This also applies in the event that they incorporate any provisions exceeding the scope of these General Terms and Conditions for Delivery and Payment.
3. Should the Contracting Party object to these General Terms and Conditions, they shall immediately notify Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH accordingly in writing. In this case, Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH has the right to withdraw from the contract within ten days of having received such advice without this entitling the other party to derive any claims whatsoever from such action.
4. These Terms and Conditions also apply in so far as they have not been included expressly by reference in the contract. Furthermore, the Customer also accepts the validity of these General Terms and Conditions for future orders.

2. Conclusion of Contract, Prices

1. All offers are made without obligation. Price lists, circular letters, brochures and the like are non-binding and deemed to serve only as information for interested parties about the services offered including the Terms and Conditions of Delivery and Payment.
2. Subsequently, the all-important factor shall be only and exclusively the order confirmation of Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH. In the event the order confirmation does not include a fixed price, the goods shall be charged at the list price that is valid the day of dispatch.
3. Increases in the cost of materials and in labour costs taking effect between the time of the order confirmation and delivery may be passed on to the Customer.
4. All prices are exclusive of the currently prevailing rate of value-added tax.
5. Representatives shall be only entitled to conclude delivery contracts and sub-agreements, including variations of these General Terms and Conditions for Delivery and Payment, under reserve of confirmation by Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH.

3. Delivery

1. All deliveries are made ex works and at the expense of the Customer. Upon dispatch ex works, the risk passes to the Customer, even in the event that Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH has undertaken any additional obligations, such as FOB costs, carriage, installation or assembly.
2. Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH is not obliged to take out an insurance for the transport of the goods.
   In the event the Customer desires an insurance, Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH will take out a transport insurance at the expense of the Customer; in this case Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH shall be entitled to take out an insurance for all types of transport. The option for a mode and place of dispatch shall remain with Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH.
3. Packaging costs shall be paid by the Customer.
4. The charging shall be based on the quantity actually delivered.
5. A possibly agreed delivery date shall start with the receipt of the first down payment to the account of Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH. As long as the Customer does not duly fulfil his contractual obligations, Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH shall not be obliged to observe it. This applies also in the event the Customer does not fulfil essential contractual obligations resulting from further concluded business dealings. Delays that are not due to the fault of Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH shall extend the delivery period accordingly. Delivery delays of more than three months shall entitle both Parties to withdraw from the contract, as long as it has not yet been executed.
6. Partial deliveries are permissible.
7. In the event the goods are not accepted by the Customer within a reasonable time in spite of being requested, Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH shall have the right to refuse fulfilment by way of written explanation and to sell the goods elsewhere. If necessary, the Customer shall be obliged to pay flat-rate damages at the amount of 20 % of the outstanding order value. He shall have the right to provide evidence of a lower loss. The negation of all damage by solely invoking the alternative usage shall be excluded (presumption of profitability).

4. Mounting

Machine mounting is not part of the delivery contract. Mounting can be taken over by separate agreement; it shall be remunerated separately by the Customer. The nature and duration of the completion of mounting shall have no legal and/or actual effect on the delivery contract of the of goods.

5. Payments

1. Unless otherwise expressly agreed, invoices shall be due for payment immediately upon receipt without the deduction of cash discount.
2. As far as payment through letter of credit, bill of exchange or cheque, is accepted by Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH these payment methods shall be only accepted as an undertaking to pay. Any charges occurring for bills of exchange or cheques shall be borne by the Customer; the latter is not entitled to deduction of cash discount.
3. In the event a bill of the payer is protested or a letter of credit or cheque is not honoured on schedule, the Customer shall be obliged to provide securities for all open bills of exchange and other still outstanding payments. Furthermore, Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH shall be entitled to withdraw from all not yet completed orders, as long as the Customer has not provided the counterperformance.
4. Payments to employees or representatives shall only release the Customer from his obligations to Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH, if they have presented a specific power of attorney in written form specifying the order.
5. In the event Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH has several outstanding claims arising from different businesses, payments of the Customer shall be always credited to the oldest claim of the still outstanding claims. This also applies in the event the Customer assigns the payment to another use.

6. Reservation of Title

Deliveries of Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH are carried out exclusively under reservation of proprietary rights to the extent permitted by law in the country of destination. In this connection the following clauses apply:

1. The goods shall remain property of Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH until full payment of all, including future claims of Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH resulting from contracts with the Customer, irrespective of legal basis, in particular of current account balance claims and until encashment of bills of exchange and cheques subject to the release regulated in the following.
2. In the event the Customer is in default of payment, Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH shall be entitled, even without fixing a period of time for execution, to rescind the contract, to collect the goods subject to reservation of title and to enter for this purpose the place where the goods are kept; furthermore, Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH is entitled, even without withdrawal from the contract, to exploit the goods subject to reservation of title at their best discretion, in particular to sell them to third parties by private contract.
3. In case of a reworking or processing of the goods subject to reservation of title creating new goods, an acquisition of property by the Customer according to section 950 BGB (German Civil Code) shall be excluded. A reworking and processing of the goods subject to reservation of title shall be carried out for Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH, if necessary, by the Customer.
4. The Customer may only resell the goods subject to reservation of title within his proper business operations. The Customer shall be only entitled to resell the goods subject to reservation of title on condition that the claims resulting from the resale pass over to Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH, as stipulated in the following. The Buyer is not entitled to any other dispositions regarding the goods subject to reservation of title. He is, in particular, not allowed to pledge the goods subject to reservation of title or to transfer them for the purpose of securing a debt.
5. The claims of the Customer resulting from the resale of the goods subject to reservation of title are herewith already assigned to Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH.
6. The Customer shall be entitled to collect the assigned book account until revocation at any time. The Customer shall not be entitled to assign these claims. Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH will not exercise the right of revocation, as long as the Customer shall duly fulfil his obligations to pay. By request of Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH the Customer shall be obliged to inform his customers about the assignment to Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH and to submit Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH the details and documents necessary to collect the claim.
7. The entitlement of the Customer to resell the goods subject to reservation of title and to collect assigned book accounts shall expire in any case with the cessation of payment of the Customer.
8. The Customer shall be obliged to inform Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH about any third party intervention that impairs the rights of Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH based on the reservation of proprietary rights.
9. Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH commit themselves to release securities to which they are entitled according to the above-mentioned provisions by request of the Customer insofar as their value exceeds the securing claims by more than 20 %. The option regarding the securities to be released shall be reserved to Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH.

7. Warranty and Limitation of Liability

1. Warranty and liability of Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH shall be settled by the respective contract. On no account, however, the liability of Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH shall extend beyond the provisions stipulated in the following provisions:
2. Complaints regarding goods delivered should be notified by the Customer in writing immediately or at the latest within 3 working days upon receipt of the goods.
3. Goods that are demonstrably defective at the moment of transfer of risks shall be remedied, repaired or replaced free of charge (supplementary performance) at the option of Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH. The Customer shall, however, be entitled to reduction of or withdrawal from the contract, in the event the supplementary performance fails. The supplementary performance shall be deemed failed if two replacement deliveries were also defective or if the remedy or repair were carried out twice without success. In the event the Customer opts for a withdrawal from the contract, he shall not be entitled to claim damages. In the event the Customer opts for damages, the goods will remain with the Customer, if this is reasonable. Damages are restricted to the difference between the purchase price and the value of the defective goods.
4. The ordered goods shall be delivered in the usual design and quality of the Supplier. Insignificant deviations and modifications, in particular technical improvements, do not represent a defect. The goods shall remain subject to such deviations and modifications which must be accepted by the Customer.
5. All rights of the Customer regarding defects shall become statute-barred one year at the latest after delivery of the goods.
6. The use of unsuitable raw, auxiliary and operating materials as well as unsuitable accessories and spare parts shall lead to an exclusion of the warranty for all resulting defects, damage and consequential losses. Raw, auxiliary and operating materials as well as accessories and spare parts are deemed unsuitable in particular if they do not comply with the respective provisions in the operating instructions made available by Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH for the machine supplied.
7. Apart from that, Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH shall not be liable for slightly negligent breach of secondary contractual obligations. In the event of intentional or grossly negligent breach of contractual duty by simple vicarious agents. Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH's liability to pay compensation shall be limited to the respective order value. The same applies to damage that is not foreseeable by Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH and to damage for which the Customer is responsible. This shall not affect the liability for culpable injury to life, body or health of staff members of the Contracting Party.
8. Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH shall not be liable for unforeseeable events of force majeure, such as war, riot, strike, lockout, official measures and restrictions on the performance of pre-suppliers as a result thereof. They extend, however, the delivery time adequately and entitle Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH to withdraw from the contract in the event of sustained duration.

8. General Provisions

1. Conclusion, contents, interpretation and amendment of the contract are subject to German law excluding the provisions of the United Nations Convention on the International Sale of Goods CSIG (UN sales law) of August 11, 1980.
2. The place of performance for deliveries and payments is the registered office of Zedler – Institut für Fahrradtechnik und -Sicherheit GmbH.
3. The legal venue is Ludwigsburg (Germany). This legal venue also applies to legal actions on bills of exchange and cheque claims.

Zedler – Institut für Fahrradtechnik
und -Sicherheit GmbH

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Technology and Passion for Bicycles