



# ExtraEnergy.org

---

**TEST REPORT**

*July 2009*

**EXTRAENERGY E.V.** Koskauer Straße 100 07922 Tanna Germany

---

**TELEPHONE** +49 (0)36 646 270 94 **FAX** +49 (0)36 646 270 95 **EMAIL** [info@extraenergy.org](mailto:info@extraenergy.org)

## LEGAL NOTICES

<b>Publisher</b>	<i>ExtraEnergy e. V. · Koskauer Straße 100 · 07922 Tanna · <a href="http://www.extraenergy.org">www.extraenergy.org</a></i>
<b>Editorial head</b>	<i>Andreas Törpsch</i>
<b>Writers</b>	<i>Andreas Törpsch, Hannes Neupert, Susanne Brüsch und Frieder Herb</i>
<b>Translator</b>	<i>Christoffel Volschenk</i>
<b>Proofreaders</b>	<i>Heike Zschächner (German), Christoffel Volschenk (English)</i>
<b>Illustration</b>	<i>Norbert Haller and Moritz Grünke</i>
<b>Photography</b>	<i>Susanne Brüsch, Patrick Knappick, Hannes Neupert and Michael Heinrich</i>
<b>Design</b>	<i>Moritz Grünke · <a href="http://www.bueropluspunkt.de">www.bueropluspunkt.de</a></i>
<b>Font</b>	<i>Router and Karmina Sans</i>
<b>Print</b>	<i>Laserline Berlin</i>
<b>Print run</b>	<i>2000 copies</i>
<b>Order</b>	<i>per e-mail sent to <a href="mailto:info@extraenergy.org">info@extraenergy.org</a>, or per fax</i>

INTRODUCTION.....	4
TEST METHODS.....	5
ERGONOMIC AND LABORATORY TESTS.....	8
BATTERIES AND MOTOR CONCEPTS.....	9
AS VIVA · AS-B005.....	10
AVE · Tour.....	12
BIKETEC · Flyer L9 premium.....	14
DIAMANT · Zouma Elite E.....	16
GEPIDA · Reptila 1000.....	18
HEINZMANN · estelle Comfort.....	20
HELKAMA · E2300A.....	22
HELKAMA · E2800.....	24
KALKHOFF · Agattu Pedelec F.....	26
KETTLER · Layana Hybritec.....	28
RIESE UND MÜLLER · Jetstream hybrid.....	30
SPARTA · Ion GLS.....	32
SCHMIDT · Sylt.....	34
VITAL BIKE · City Pedelec.....	36
BIKETEC · Flyer c8 premium.....	38
FLYING-CRANES · Recovery Plus.....	40
GIANT · Twist Comfort cs.....	42
HELKAMA · TE2800.....	44
KALKHOFF · Agattu XXL Pedelec c.....	46
KOGA-MYATA · Tesla Tour.....	48
RABENEICK · Vitality Elite 8-Gang.....	50
BIONX · PL250 HT.....	52
LEVIATEC · E02.....	54
MATRA · Sports i-step racer.....	56
BIKETEC · Flyer S-Serie Street.....	58
DOLPHIN · express.....	60
RALEIGH · Dover 40.....	62
RIESE UND MÜLLER · Delite hybride 500 HS.....	64
ACKNOWLEDGMENTS.....	66
OVERVIEW IN TABLE FORMAT.....	67



## EXTRAENERGY TEST 2009

After testing electric bikes for 17 years, *ExtraEnergy* decided in the autumn of 2008 it was time to modernize the test procedure, strengthen the technical side of the test and conduct tests twice a year, instead of just once.

Why? Because sales of pedelecs are climbing, many new manufacturers are entering the market, the selection of products is growing wider and with it, the quality spectrum. Furthermore, Europe has a new set of standards for electric bikes and the number of frame breaks and battery fires reported by pedelec owners is rising.

Over the years the *ExtraEnergy* Tests have been conducted at different test tracks (1993-1998 in Lauchheim, 1999 in Modena, 2000-2008 in Kirchheim Teck and in Tanna), but earlier this year it was decided to conduct all future tests on the same, standardized test track in Tanna. All the values relevant to pedelecs were captured on this track in April and this is also where they will be captured in future, to make the results comparable over time.

At the big *ExtraEnergy Spring Test 2009*, the challenge for material, test riders and the new testing technology was to thoroughly test 28 pedelecs in just 14 days. By the time the test was done, the test bikes had clocked a total of 12,746 kilometers. The insights gathered over this period and distance are summarized on the following pages.

The new *ExtraEnergy* Test consists of three parts:

- 1 → An ergonomic test with 100 test riders, conducted as part of the *Elektrorad Fair* in April 2009 in Lorsch;
- 2 → A „mass riding test“, conducted as part of the *Spezialrad Fair* in Germersheim in April; and
- 3 → The main test, conducted with complex measuring technology at the *ExtraEnergy* head office in Tanna, completed in the middle of May.

Two more tests are still in progress and will lay the foundation for the award of *cs* quality seals to electric bikes from next year (*cs* stands for *Certified Safety*):

- 1 → The endurance limits of the frames in the test are being determined by the firm *Velotech* in Schweinfurt;
- 2 → The electrical safety, electromagnetic radiation and radiation resistance of all bikes are being checked by the firm *SLG* in Hartmannsdorf close to Chemnitz.

The results of the second string of tests are expected at the end of the year.



## THE MEASURING TECHNOLOGY USED BY EXTRAENERGY

For the April 2009 Test *ExtraEnergy* invested 180,000 € in measuring technology which is unique in the world.

Up to 30 electric bikes can be tested at the same time with the new test equipment and the results are even more reliable and meaningful than in the past. The technology was developed in cooperation with the firms *STEC* near Mannheim and *Calantec* in Berlin. Most of the measuring equipment is attached directly on the bikes, without affecting the riding behaviour of the bikes at all. In this way, unbiased riding data, measured and recorded under actual conditions, were collected for the first time.

The heart of the measuring technology, the data box, is stowed in the handlebar bag (picture 1). All the values measured by all the sensors attached all over the bike flow into the data box. The energy consumption of the batteries, bike speed, pedal frequency and applied pedalling power are all measured, as well as, with GPS, the test route. In future wind resistance will also be measured and fed into the calculation.

To measure the withdrawal of energy (electricity + voltage) from the battery, a sensor is installed in the original battery of every test bike, either inside the battery casing, or on the outside of the plug. The sensor transmits electricity and voltage data per analogue signals to the data box.

Pedal frequency and speed of the test bike are measured with a magnet sensor attached to the bottom bracket and front fork respectively and transmitted to the data box with the help of a cable.

The pedalling power is measured with special measuring pedals (picture 2), with hall sensors (magnetic sensors in their top sections). In the flat casing of the measuring pedals, which lie parallel to the crank handle, the raw data are processed and transmitted wireless to the data box. With this data the performance actually rendered by the test rider is calculated, which, in turn, allows the assistance factor of the motor to be calculated. Compared to other performance measuring systems, the pedals used by *ExtraEnergy* have the advantage that they can easily be mounted and removed. The quick and easy exchange of power measuring pedals is a vital factor in the frictionless completion of big tests. For the exact determination of the tour data, a GPS receiver is connected to the data box, which makes it possible to document and reproduce the entire trip. In turn, this enables the meter-specific filtering of the measured values. In other words, the filtering of the values for different sections of the route.

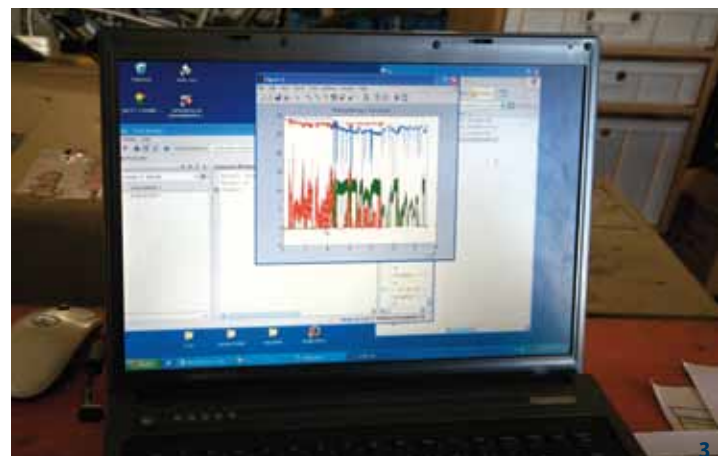
The data box records all data (altogether about 12 MB per test round) on both an internal memory and a USB stick. After the test ride, the USB stick is removed and the data saved on a PC. The data is later analyzed with the program Matlab (picture 3). →



1



2



3

## THE TEST TRACK

The test route is sub-divided in a number of sections (picture 4). These differ in the demands they make on rider and bike, to test the performance of the test bikes under different conditions:

### 1 Tour section

The first part of the test route runs over hills with moderate inclines and on different surfaces (country roads, gravel roads, forest paths), representing a typical tour route. To simulate conditions as realistically as possible, riders complete this section at a pace they find comfortable.

### 2 Flat section

On this section of the route, the support and riding behaviour of the test bikes are tested on the flats and approaches to the flats.

### 3 First hill section

The first hill section is about one kilometer long, with a moderate incline of on average 5%. On this section especially the range and assistance factor are measured.

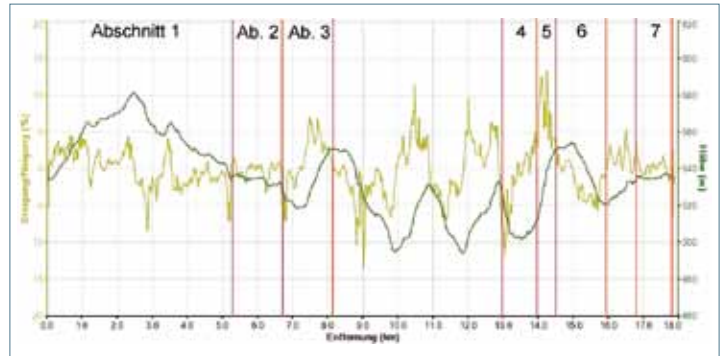
(In April more hilly sections followed. The data collected on these inclines proved to be almost identical to the data collected on the first incline. In future, this part of the test route will, therefore, fall away.)

### 4 City section

The city section emulates the riding experience in the city, which is characterized by stops and starts. In total there are eight stops on the section, to specifically test the behaviour of the test bikes when starting out again. The data of this section will be included in the evaluation from October 2009. The results of the April test for this section will serve as a basis for comparison in future tests.

### 5 Second hill section: from a stationary position

The second hill section is shorter than the first, but its incline, is much steeper at an average 12%. In addition, the rider has to stop at the beginning of this section, to determine how the test bike starts out against an incline.



### 6 Downhill: recovery section

The recovery section gives the opportunity to measure the feedback of energy when braking. Here the motor operates like a generator. On the downhill section the performance of the test bikes with this recovery function are tested.

Values captured during the April Test will serve as a basis for calculating how efficient pedelecs feedback energy in future tests.

### 7 Riding without a motor

On the last section of the test route, the riding behaviour of the test bike with no motor support is determined to serve as a base for comparison. A conventional bicycle (without motor) is used on this section.

## THE CALCULATED DATA

The data calculated for a particular test bike, are the median values of all the test rides completed with the bike. Every bike is ridden once by every one of six test riders. →



1 Range

Naturally, the range is seen as an important value for a pedelec. However, the demands made upon every vehicle should be kept in mind when looking at this value. A foldable bike, which is, for instance, used in tandem with public transport, should be easy to carry and also be light. Under normal circumstances, the foldable bike doesn't need a very long range. On the other hand, range is an important factor for tour bikes, because if a motor cuts out in the middle of a tour, riding enjoyment is something of the past. Terrain also has a significant influence on range. Therefore, range statistics are published for the sections tour, flat, city and hill. Due to different terrain profiles and demands, the different sections also have noticeably different ranges.

The range given in this test is a computer value and can be seen as the minimum value achievable at the maximum support level.

Range is a ratio of the battery capacity to the consumption, as measured on a particular route section. To get a realistic value, the battery capacity is multiplied by an uncertainty factor of 0,8.

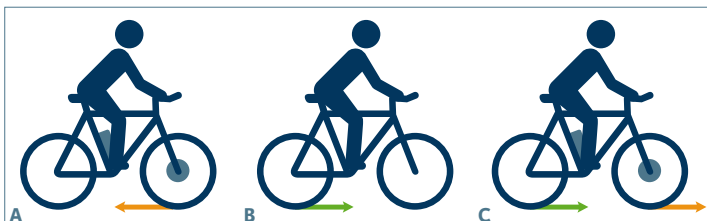
$$\text{Range [km]} = (\text{battery capacity [Wh]} \times 0,8) \div \text{consumption [Whkm]}$$

2 Assistance factor

The ratio of muscle power to electrical power gives the assistance factor. An assistance factor of one means the e-motor contributed exactly the same power (as measured on the bike) as the rider of the bike. Another example: if the rider contributes 100 W and the e-motor supports the rider with another 150 W, the assistance factor equals 1,5.

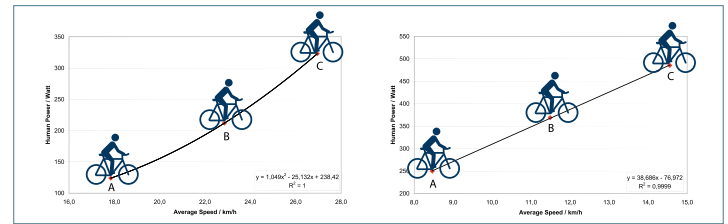
The starting point for the assistance factor is the measured values for pedal power, pedal frequency and average speed on a standard bike (without motor), for the particular test route section:

- A → Assistance factor negative** Riding without motor would have been easier
- B → Assistance factor 0** The motor of the pedelec compensates only its own additional weight
- C → Assistance factor 1** The performance of the rider is doubled



The ratio of pedal performance and average speed equals a square function on, for instance, a flat section. In contrast, on a hilly section the ratio is more linear, since the air drag is so low that it can be ignored.

As the next step, the values measured for the pedelec on the different test track sections are compared with the measured values of the bike without motor, and the difference between the values expressed as the assistance factor.

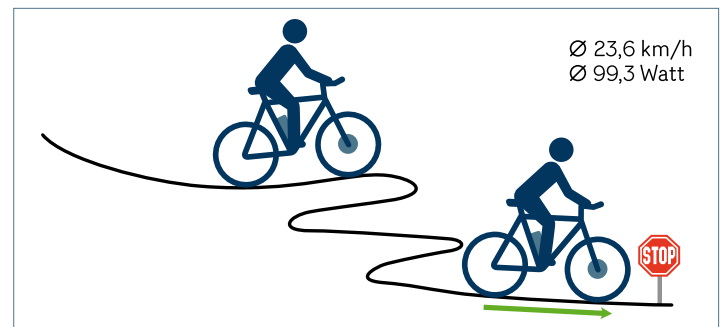


LEFT Ratio of pedal performance to average speed on hill  
RIGHT Ratio of pedal performance to average speed on flat terrain

For example, here is the formula for the assistance factor on flat terrain:

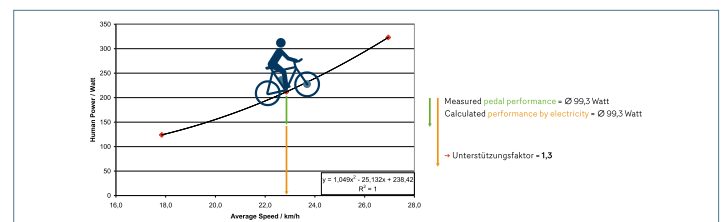
$$ue(v\_ped, mL\_ped) = 1 \div [mL\_ped \div (1,049 \times v\_ped^2 - 25,132 \times v\_ped + 238,42)] - 1$$

- ue** Assistance factor on the flat
- v<sub>ped</sub>** Speed of the pedelec/e-bike in kilometer per hour
- mL<sub>ped</sub>** Muscle performance of pedelec/e-bike rider in watt



3 Average speed

The average speed is the average speed ridden with a specific bike on a defined section of the test track. To help you assess the value better, here is what the comparison bike (without motor) achieved in the test: it was a *Kalkhoff Agattu tour* bike and it completed the test track with an average speed of 20 km/h. On the hill section, the average speed of the bike without motor dropped to 11 km/h.



## ERGONOMIC TEST WITH 100 TEST RIDERS IN LORSCH

Michael Burger of *ExtraEnergy* designed the ergonomic test stations. In the Nibelungenhalle in Lorsch all the pedelecs participating in the test were lined up next to the test stations. The test riders, who had applied for the job via the *ExtraEnergy* website, were handed a list with all test bike numbers, to ensure they do not lose oversight with so many bikes in the test.

All tests at the different stations had to be mastered without directions. The riders had to:

- 1 → Remove the battery (if it was made to be removed)
- 2 → Find the fitting battery charger in a heap of chargers
- 3 → Re-install the battery
- 4 → Carry the pedelec up and down a standard staircase
- 5 → Lift the pedelec onto two different car luggage carriers and fasten it
- 6 → Lift the pedelec onto a landing platform (simulating the loading of the pedelec into a rail transport wagon)
- 7 → Adjust the pedelec to fit the rider's body size and ergonomics
- 8 → Switch the motor on and adjust the riding mode
- 9 → Ride a test round and observe the behaviour of the motor support, noise generated by the motor, and how the vehicle rides without motor support
- 10 → Rate the pedelec for how much riding fun it gives and how easy it is to park
- 11 → Finally, assign the pedelec to different vehicle types with a point system.

For the layman test rider, as well as the *ExtraEnergy* team, this was a major experience. Do you want to test-ride the bikes? You can in Stuttgart. That's where the test bikes are on display in the new *ExtraEnergy* showroom directly opposite the main train station, from where you'll be able to test-ride them.

**Opening times** Monday to Saturday from 11 to 20 hour  
**Address** Kriegsbergstraße 30 · 70174 Stuttgart  
**Telephone** 01 74 549 72 97

The next ergonomic test will be conducted on the second weekend of October in the Stuttgart showroom. To take part in the test, simply send an e-mail to [info@ExtraEnergy.org](mailto:info@ExtraEnergy.org).



## LABORATORY TEST AT VELOTECH AND SLG

*ExtraEnergy* started working with the test laboratories *velotech.de* and *SLG* early in 2009. Since then the organizations have been preparing the way for CS certificates to be awarded to electric bikes from next year. To that end, the bikes are being tested for their mechanical rigidity and conformity to standards.

For the first time in the Spring 2009 Test, one exemplar of every bike was submitted to the test laboratories, where the state of technology is being determined and a scientific basis for comparison developed. The results of the mechanical rigidity tests done by *velotech.de* and standards conformity tests done by *SLG* will not flow into the overall results of bikes tested in 2009.



### 1 Mechanical safety at *velotech.de*

Since a growing number of pedelec frame breaks have been reported in recent years, *ExtraEnergy* developed a test method in cooperation with *velotech.de* in Schweinfurt, to safeguard the mechanical rigidity of electric bikes. In a special test facility, the bikes are subjected to an endurance test.

### 2 Standard conformity at *SLG*

Another problem is the conformity of bikes to the statutory regulations, which are getting ever more complex as far as the electronics are concerned (eg. electro-magnetic compatibility). To assist in this regard, all bikes tested in 2009 will be checked for their conformity to standards by the *SLG Prüf und Zertifizierungs GmbH* in Chemnitz.

### 3 CS certificate from 2010

It is the goal of the three institutions *ExtraEnergy*, *velotech.de* and *SLG* to award CS certificates for electric bikes from 2010 and so safeguard the safety and conformity to standards. The CS certificate will be offered to manufacturers as an additional extra to the *ExtraEnergy Test*.



## THE MOTOR CONCEPTS

The following basic motor concepts were found in the test:

### Transmission-free hub motor in rear wheel

This type was present on the *Diamant (of BionX)*, in both *Riese und Müller (of BionX)*, *Matra (of BionX)*, and the *BionX* add-on kit. Rear wheel motors were also found on *Sparta* and *Koga Miyata* (both *Accell*), as well as *Flying Cranes*.

All these examples also had their power sensors in the rear wheel hub, which measures the muscle power and then regulates the power of the motor via the motor control (also fitted inside the hub). In the cross section picture of the *BionX* motor displayed above, this can be seen clearly.

### Hub motors with transmission

Used on the *Kalkhoff Agattu F (of Panasonic)*, *ave Tour (TranzX)*, *AS VIVA (Bafang)*, *im estelle comfort (Heinzmann)*, *Leviat�ec Eo2 (Bafang)*, *Schmidt Sylt (Bafang)*, *Giant (of Sanyo)*. The geared motor always has the motor control on the outside. In the majority of cases these motors are also placed in the front wheel, which means they cannot measure the muscle power. Accordingly, these vehicles need an external power sensor or alternatively, a pedal movement sensor together with a turn handle on the handlebar. Mostly, these motors are chosen while they leave room for a back-pedal brake in the rear wheel, which is demanded by many electric bicycle clients.

### Bottom bracket motor

There were only two bikes in the test with this type of motor, namely the Yamaha motor, as built into the *Gepida Reptial 1000*, and the Panasonic motor, as built into all models of *Flyer*, *Helkama*, the not yet mentioned *Kalkhoff*, *Raleigh*, *Vital Bike* and *Kettler Layana*. The *Dolphin Express* went its own way with a separate drive chain to the rear wheel and a continuous planetary drive in the rear wheel hub.



## THE BATTERIES IN THE TEST

The quality of the battery is critical for the range, acceleration and push on the hill, as well as the reliability of the pedelec. The rechargeable, lithium-ion battery developed by *Sony* in the 90s, has in the meantime not only proved itself in entertainment electronics, such as mobile phones, digital cameras and laptops, but also in high-stress areas, such as cordless electric screwdrivers and also pedelecs, and e-bikes. Measured by weight per energy volume, the so-called energy density, and also by cost per kilometre, the lithium battery is today the most expedient option. As a result, almost all bikes in the test had lithium batteries. The average buying price of the batteries in the test stood at €575. Prices fluctuated between €199 for the battery of the *AS Viva* (which was not in stock when we enquired) and €970 for the *BionX* battery of *Riese und Müller Delite*. The batteries in the test had an average weight of 3 kg. The lightest weighed 1.9 kg (*Gepida*) and the heaviest 8.5 kg (*Dolphin*).

### Tips for a long battery life\*

- 1 → Store as cool and dry as possible, but avoid frost
- 2 → Recharge the battery after use, irrespective of how much, or little energy was taken from it
- 3 → Always charge the battery to the maximum before storing it away for a long time, and attach it again to the charger as often as possible (with highly developed systems such as the *Panasonic* system, it suffices to connect the battery to the charger once every six months, if it is stored at room temperature)
- 4 → The bikes of the *Accell* group have batteries developed in-house, which must be kept attached to the recharger permanently when stored away for long periods

\* This notice is valid for all lithium and Ni-Mhd batteries sold with bicycles in 2009.

### Life span in relation to discharge depth

In hybrid autos the batteries switch continuously between charge and discharge, which results in battery cycles being broken down into many 10,000s of part-cycles. As a rule, hybrid auto batteries have guarantees of 100,000 km or 8 years.

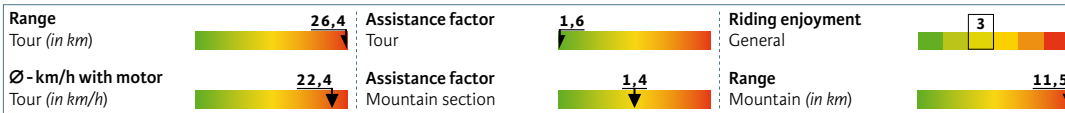
Should the same batteries be discharged 100% every time, their life spans would be reduced to 500 cycles.



**IN A NUTSHELL** Stay away from this product. Rather save a little longer, because not much more is needed for a really good pedelec.

This was the only foldable bicycle in the test. On the one hand, the high assistance factor can be ascribed to the fact that the test riders refrained from pedalling hard for fear the frame might start to wobble. On the other hand, it can be described to the fact that the *As-Boo5* is actually an e-bike in disguise (can roll without assistance from the rider), which means it is not allowed on public roads (e-bikes must be licensed). Furthermore, the *As-Boo5* does not adhere to the stvzo, since reflectors and lamps are absent. In short: This bike is not worth its price of € 1,499. At € 250 it might have been something to consider for the camping site. (On private premises range and public road legality are non-issues.)

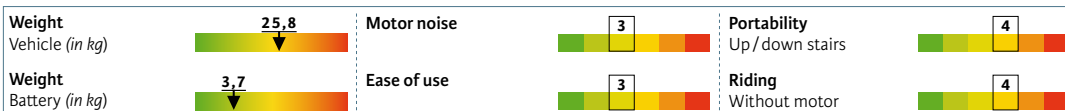
**RIDING PERFORMANCE**



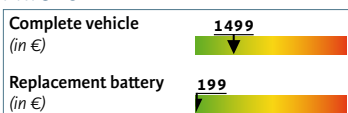
**REFERENCE ADDRESS**

**AsVIVA**  
 Address Carl-Duiesberg-Straße 7  
 41539 Dormagen  
 Germany  
 Telephone 021 33 892 331  
 Mail service@asviva.de  
 Web www.asviva.de

**TECHNOLOGY**



**PRICES**



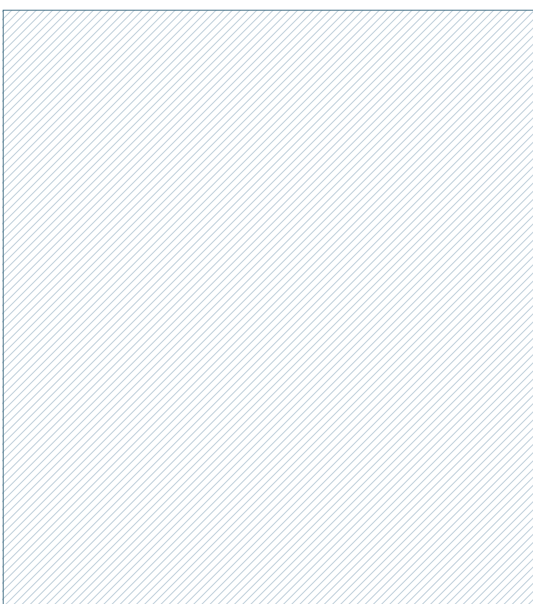
**PROS**

- + Replacement battery inexpensive
- + Foldable
- + Suited to camping site

**CONS**

- Product too expensive
- Not admitted for public roads
- Wobbly frame and fork, Saddle folding mechanism disconnects easily, Battery gauge inaccurate

**TEST SEAL**



**DETAIL**























The sporty capacity gauge on the handlebar is nothing more than a blinking light display, since it merely records the voltage and swings to and fro continuously, depending on the charge. • Cheap bicycle technology, out of line with the selling price of € 1,499.

**COMPONENTS / ACCESSORIES**

**Motor** 240W Bafang Rear wheel hub motor • **Battery** 240 Wh Li-Ionen battery • **Frames** Aluminium **Sizes** 49 cm • **Fork** suspension fork • **Gears** Shimano sis 6-gear • **Brakes** front V-brake, rear drum brake • **Wheels** 20" Alu • **Tyres** Innova 54-406 • **Lights** LED lights in front • **Extras** foldable, luggage rack, shopping bag

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM

*Twenty-eight employees made the biggest ExtraEnergy Test of all times possible. Eleven test riders between the ages of 29 and 75 volunteered for the test for different reasons. In total, they rode almost 7,000 kilometers and got no remuneration for doing it. But, they gathered valuable knowledge about the market.*

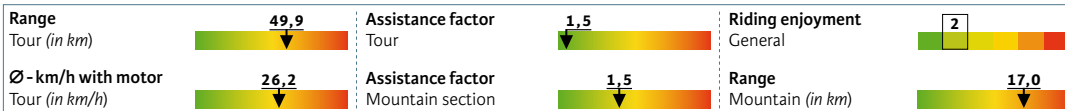
On the following pages they are introduced briefly. →



**IN A NUTSHELL** With the appropriate calibration, the *ave Tour* also pushes forward powerfully in the city.

The name *ave Tour* fits perfectly to this pedelec: It recorded both a good range and high assistance factor on the tour route of the *ExtraEnergy* test. We advise heavy riders to go for the frame with the high pipe, since the deep, step-thru frame is not stiff enough. The control display is easy to use and very readable. An aspect which still needs improvement: the power sensor is adjusted at the back and needs to be calibrated manually afterwards, which can only be done after a glance in the instruction manual. The battery carrier on the back wheel makes a very bulky appearance.

**RIDING PERFORMANCE**



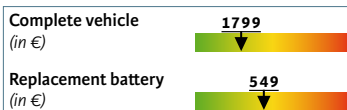
**REFERENCE ADDRESS**

**development engineering GmbH**  
 Address Egmatinger Straße 3  
 85667 Oberpfaffmarn  
 Germany  
 Telephone 080 93 903 60  
 Fax 080 93 903 620  
 Mail info@development-engineering.de  
 Web www.ave-bikes.de

**TECHNOLOGY**



**PRICES**



**PROS**

- + Big range with high assistance factor
- + Back-pedal brake with two rim brakes
- + LCD control panel easy to use and to understand
- + Strong motor

**CONS**

- Stand jams easily, especially when dirty
- Power sensor needs to be re-calibrated often

**TEST SEAL**



**DETAIL**




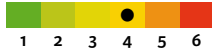



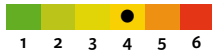














Display is clearly laid out and easy to use. • The calibration function is important! The *TranzX* muscle power sensor is housed here. It measures the non-productive force used.

















**COMPONENTS / ACCESSORIES**

**Motor** 250 W TranzX front wheel hub motor • **Battery** 360 Wh Li-Ionen battery • **Approved overall weight** 120 kg • **Frames** 26" & 28" Alu 6061 T6 • **Sizes** 45 cm (26"), 50 cm (28") • **Fork** Suntour suspension fork • **Gears** Shimano Nexus 7-gear hub gear system • **Brakes** front V-brake, back-pedal brake • **Wheels** Alu hollow pipe wheels • **Tyres** Schwalbe Big Apple 50-559 • **Lights** Basta Halogen lights • **Extras** Hupert double-leg stand, ergonomic handles, front fork adjustable for height and angle

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM

**TEST FAVORITE** BionX motor on the Steppenwolf

*"I'm thinking of moving into a cheaper home and riding to work with a pedelec.."*

**SANDRA BRAUCH**  
29 years · Mannheim  
Test rider

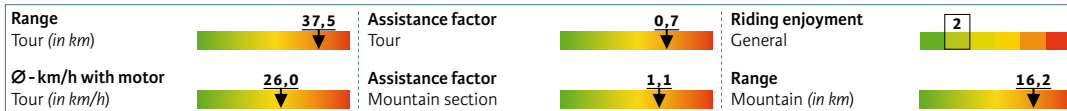




**IN A NUTSHELL** Uncompromised quality, for many years of pedelec cycling enjoyment. There isn't much more one could say...

The *Flyer L9* of Swiss manufacturer Biketec is a wonderful pedelec – for touring as well as for city riding. As for quality, it does not reveal a single shortcoming. In that department, everything is in harmony. The bike's middle motor assists immediately, which helped the riders record an average speed of 26 km/h, thus exploiting the legislator's maximum speed tolerance margin to the limit. Also without motor the *L9* is a very easy-running and light bicycle. The chain tensioning device at the gear hub functioned sub-optimally. People who have not yet ridden with sharp-grabbing brakes, should be careful when they first take the *L9* out.

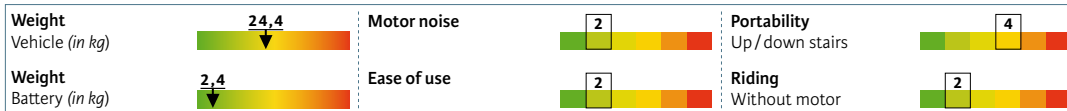
**RIDING PERFORMANCE**



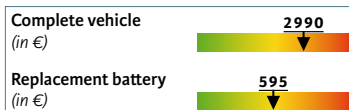
**REFERENCE ADDRESS**

**Biketec AG**  
 Address Industrie Neuhof  
 CH-3422 Kirchberg/Bern  
 Schweiz  
 Telephone +41 (0)34 448 60 60  
 Fax +41 (0)34 448 60 61  
 Mail info@flyer.ch  
 Web www.flyer.ch

**TECHNOLOGY**



**PRICES**



**PROS**

- + Very high-quality components
- + Understandable control panel on handlebar
- + Starting-out assistance
- + Central key for battery and rim lock

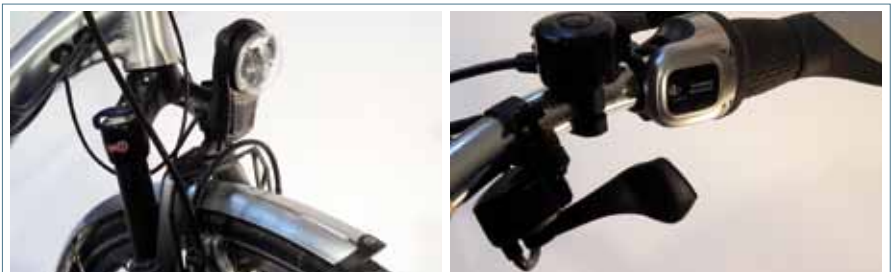
**CONS**

- None

**TEST SEAL**



**DETAIL**




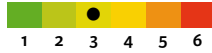















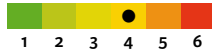


Everything which is good and expensive: adjustable suspension fork, Magura hydraulic brakes, B&M LED head lamp. • The starting-out assistance obtained with the press of a button is helpful, especially when starting out on an incline, or heavily loaded.

















**COMPONENTS / ACCESSORIES**

**Motor** 250 W Panasonic bottom bracket motor • **Battery** 260 Wh Li-Ionen battery • **Approved overall weight** 120 kg • **Frames** 26" & 28" Alu hand-welded • **Sizes** Women 43/50/55 cm • **Fork** suspension fork SR Suntour NCX with lock-out • **Gears** Shimano Alfine Sport 8-gear hub gear system • **Brakes** front Magura HS33 hydraulic rim brakes • **Wheels** Alexrims wheels and Shimano hubs • **Tyres** Marathon Supreme 42-559 (26"), 37-622 (28") • **Lights** B&M Lumotec Fly IQ-Tec • **Extras** suspension seat support, speedlifter for adjusting height of handlebar, system luggage carrier Pletscher

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM

TEST FAVORITE Riese und Müller Delite

*“As electronics engineer, I see the pedelec as the key to future mobility. In Tanna I can look at the latest developments.”*

**NIKOLAUS DECIUS**  
53 years · Lippstadt  
Test rider, member of the technical team

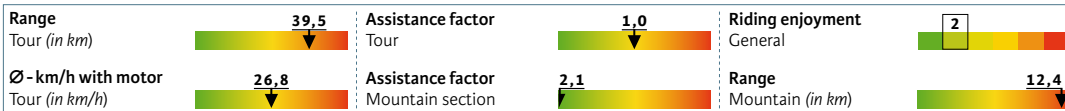




**IN A NUTSHELL** A pedelec in city trekking style. Good to finally see something like this on the market!

With the *Zouma E*, *Diamant* has built a very elegant pedelec, which offers strong assistance. It is the optimal bike for those wanting an electric lightning bolt with a sporty look for everyday use. Select an assistance factor below 3, and the *Zouma E* stretches its range far beyond the one achieved in the test. The silent motor is pleasing on the ear. Early in 2009 *Diamant* released several software updates for this model. The test was conducted with the software version 3.8. In addition, riders can select from a range of characteristics, such as the motor behaviour when starting out and finishing a ride.

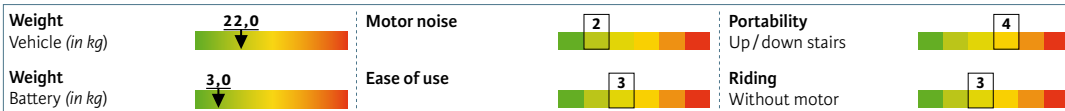
**RIDING PERFORMANCE**



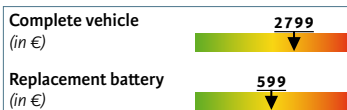
**REFERENCE ADDRESS**

**TREK Fahrrad GmbH**  
 Address Stettbachstraße 2  
 CH-8600 Dübendorf  
 Schweiz  
 Telephone 0180 350 70 10  
 Fax 0180 350 70 15  
 Mail vertrieb@diamant-rad.com  
 Web www.diamant-rad.com

**TECHNOLOGY**



**PRICES**



**PROS**

- + Especially strong assistance on mountain
- + Energy feedback when braking
- + Good lighting system and high-quality fittings all-round

**CONS**

- Battery key can be damaged when removing battery
- Suspension fork hits through
- Waterproof seal of battery loosens

**TEST SEAL**



**DETAIL**






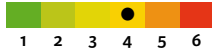



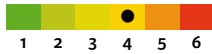












Very classy: the *Supernova* LED headlamp and front fork shaft suspension. • Not so practical is the fact that the battery key gets in the way when removing the battery.

**COMPONENTS / ACCESSORIES**

















**Motor** 250 W BionX Rear wheel hub motor • **Battery** 260 Wh Li-Ionen battery • **Approved overall weight** 130 kg • **Frames** Alu 6061 hydro-formed • **Sizes** 45/50/55/60 cm • **Fork** Bontrager Spa Alu with integrated suspension • **Gears** Shimano Deore LX • **Brakes** Tektro RX6 V-brakes • **Wheels** Grünert Airliner hollow pipe wheels and Deore LX hubs • **Tyres** Schwalbe Marathon Supreme 37-622 • **Lights** front *Supernova E2*, rear integrated in battery box • **Extras** Bontrager handlebar, front fork, saddle support and ergo handles



TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM

TEST FAVORITE Riese und Müller Jetstream

*“As entrepreneur, I want to add electric bikes to my business as another pillar.”*

CLAUDE JOLLER  
40 years · Luzern  
Test rider



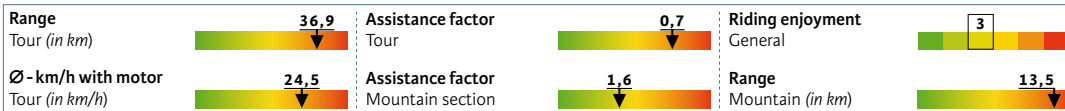


Available in the trend-color white with dark tones and also with a Diamant frame.

**IN A NUTSHELL** Small package, big riding pleasure for the perfect time in the city!

A universal bike with the lightest battery in the test (weighed only 1.9 kg). For tours with longer daily stages without breaks for re-charging, it would be advisable to take a second battery along. The *Gepida Reptila 1000* pedelec was the only bike in the test with the Yamaha bottom bracket motor, which assists very strongly on hilly sections. The control panel on the handlebar is simple and logical to use. There are two levels of support, as well as an automatic mode, which shifts the motor between the two levels of support automatically, to stretch the range. The bike is available in the trend color white and in discreet tones of grey.

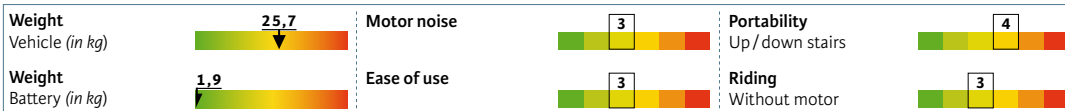
**RIDING PERFORMANCE**



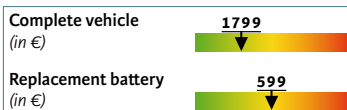
**REFERENCE ADDRESS**

<b>Address</b>	<b>Olimpia Fahrrad GmbH</b> Ostorhegy u. 4 H-1164 Budapest Hungary
<b>Telephone</b>	+49 (0)8 208 958 602 (Deutsche Vertretung)
<b>Mail Web</b>	office@gepida.hu www.gepida-ebikes.com

**TECHNOLOGY**



**PRICES**



**PROS**

- + Control unit on handlebar is understandable
- + Lightest battery in the test

**CONS**

- None

**TEST SEAL**



**DETAIL**


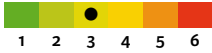



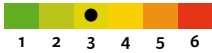

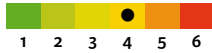



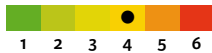










The control panel on the handlebar of the *Gepida* is clearly arranged and simple to use. • Until now the only pedelec in Europe with the *Yamaha* bottom bracket motor, 212 Wh lithium battery.

**COMPONENTS / ACCESSORIES**

**Motor** 250 W Yamaha bottom bracket motor • **Battery** 212 Wh Li-Ionen battery • **Approved overall weight** 130 kg • **Frames** Aluminium 7005 • **Sizes** 46/49/53/57 cm • **Fork** suspension fork RST Mara T8 • **Gear** Shimano Nexus 8-gear hub gear system • **Brakes** front Gepida Alloy V-brake • **Wheels** 28" aluminium hollow pipe wheels • **Tyres** Schwalbe Terra Cruiser 42-622 • **Lights** B&M halogen lights • **Extras** luggage carrier

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM

**TEST FAVORITE** Riese und Müller Delite

*“As design engineer, I see the pedelec as the technology-carrier of double-track vehicles. The knowledge I collected in Tanna, will help me optimize the motors of the future.”*



**FRIEDHELM KIRCHHOFF**

Test rider, member of technical team

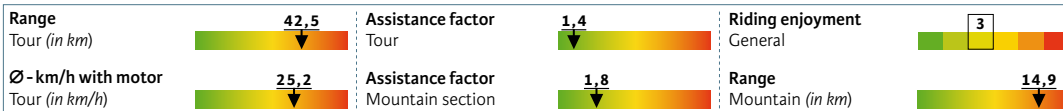


Apart from the frames, the estelle Comfort and the Tour have technically very much in common.

**IN A NUTSHELL** With the *Heinzmann* motor every hill is easily conquered - even when one only pedals along lightly.

With the *Heinzmann estelle Comfort* an electro bike came into the test which was liked by all: a wonderful mix of range and rider-controlled assistance level! The power is increased or decreased as wished with a simple turn handle. The turn handle is activated the moment the pedals are moved. Therefore, the range can fluctuate over a wide spectrum, depending on how strongly the motor is involved. Despite the strong assistance demanded by the test riders, the estelle recorded an enormous range of 42 km. Accordingly, the range can easily be stretched to 60 - 70 km by a less demanding rider. Interesting extra titbit: The *Heinzmann* motor is also available as an upgrade.

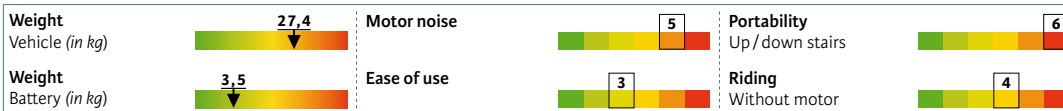
**RIDING PERFORMANCE**



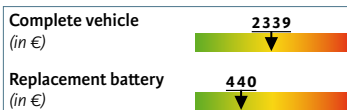
**REFERENCE ADDRESS**

**ElektroRad-Service**  
 Address Altenberger Straße 5  
 48329 Mavikbeck  
 Germany  
 Telephone 02 507 572 96 10  
 Fax 02 507 572 96 11  
 Mail info@elektroRad-service.de  
 Web www.elektroRad-service.de

**TECHNOLOGY**



**PRICES**



**PROS**

- + Assistance to get started
- + Strong-pulling motor
- + Charger unit section in battery bags
- + Rücktrittbremse und 2 v-Felgenbremsen

**CONS**

- Battery not lockable
- Turn handle must always be held in position by rider
- Front wheel tends to slip on slippery surface

**TEST SEAL**



**DETAIL**




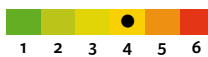









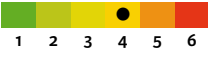

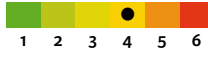

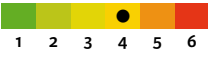

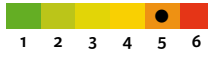


The *Heinzmann* hub motor in front wheel is strong-pulling. • The expensive battery and charger unit are housed in the carrier bags, but cannot be locked.

















**COMPONENTS / ACCESSORIES**

**Motor** 250 W *Heinzmann* front hub motor • **Battery** 212 Wh Li-Ionen battery • **Approved complete weight** 130 kg • **Frames** 26" & 28" Alu • **Fork** Alu Starr fork, or suspension fork • **Sizes** 44 cm (26"), 48/52 cm (28") • **Gears** Shimano Nexus 7-gear hub gear system • **Brakes** front V-brake, rear V-brake and back-pedal brake • **Wheels** Alu hollow pipe wheels • **Tyres** Schwalbe Marathon Plus 47-559 • **Lights** B&M Lu-motec Oval halogen lights, rear Basta Ray steady LED • **Extras** luggage carrier, equipment can be selected individually

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM

**TEST FAVORITE** BionX motor on the Steppenwolf S-Flyer

*“Sustainable mobility concepts and new technologies always interest product designers.”*

**DANIEL KNÜPFER**  
30 years · Konradsreuth  
Test rider

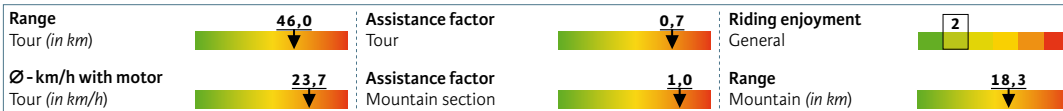




**IN A NUTSHELL** A minimalistic pedelec. Unfortunately, with an automatic gear shift, which is a bit lazy to switch gears!

The *Helkama E2300A* is the ideal bike for the unhurried ride in the city and over low hills. It's also ideal at take-offs and towards the end of trips. It was popular among those test riders who did not place a big value on sportiness. When it comes to clean lines on the handlebar, it has no peer: it is only fitted out with the most vital equipment, namely two hand brakes, a functional and logical control panel and a bell (integrated in the left brake handle). There is no gear shift! The *Shimano* three-speed hub gear shift switches gears all on its own. Unfortunately, on the hills it doesn't always shift gears when the rider wants it to happen! Often most of the momentum is lost, before the automatic gear shift moves into a lower gear.

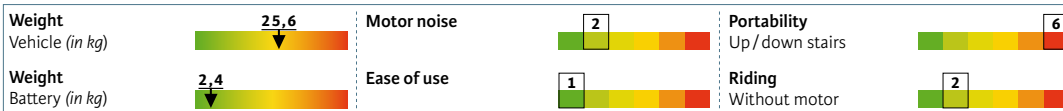
**RIDING PERFORMANCE**



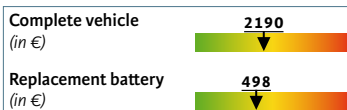
**REFERENCE ADDRESS**

**Helkama Velox**  
 Address Beethovenstraße 8-10  
 60325 Frankfurt/Main  
 Germany  
 Telephone 069 97 55 45 03  
 Fax 069 97 55 41 00  
 Mail hannu.salminen@helkamavelox.fi  
 Web www.helkamavelox.fi

**TECHNOLOGY**



**PRICES**



**PROS**

- + Simple to use; climb on and the rest happens by itself
- + Replacement battery reasonably priced

**CONS**

- On mountainous terrain the gear shift is very lazy to react

**TEST SEAL**



**DETAIL**


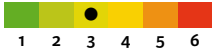

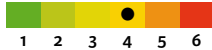


















The automatic gear shift is mounted on the back fork, close to the *Panasonic* motor – if the gear shift could only tune itself into the motor via the switch point, everything could work together smoothly!  
 The handlebar – very beautiful in its simplicity!

















**COMPONENTS / ACCESSORIES**

**Motor** 250 W *Panasonic* bottom bracket motor • **Battery** 260 Wh Li-Ionen battery • **Approved overall weight** 150 kg • **Frames** 26" Alu • **Sizes** 44 cm • **Fork** suspension fork with lock-out • **Gears** *Shimano* Nexus 3-gear automatic hub gear system • **Brakes** front *Shimano* roller brakes • **Wheels** Alu hollow pipe wheels • **Tyres** *Michelin* Pilot City 47-559, puncture-protected • **Lights** B&M Lumotec IQ Fly • **Extras** suspension support for saddle, ergonomic handles

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM

TEST FAVORITE Diamant

*"I live in a hilly area and have a pedelec. Here I want to compare the new pedelecs with mine, to know what to buy next time."*



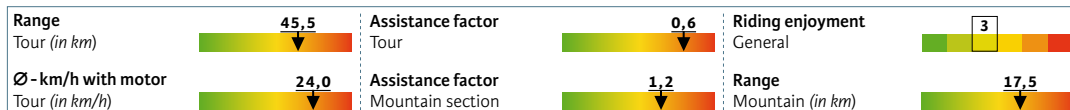
**HANS KOCH**  
74 years · Würzburg  
Test rider



**IN A NUTSHELL** Top technology, lucid design, fair conditions!

The *Helkama E2800* captivates with its clear lines and simple, functional, but high-quality components. It distinguished itself in the *ExtraEnergy* test with good values in the test rides. And promises to be a loyal companion for many years, thanks to the proven motor technology of *Panasonic* used here. In case the client wants a longer range, or the battery eventually kicks the bucket, Helkama has the fairest offer of all in the test: the battery on this bike is about €100 cheaper than anything the competition can offer. Thanks Finland!

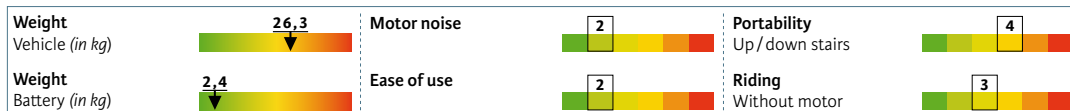
**RIDING PERFORMANCE**



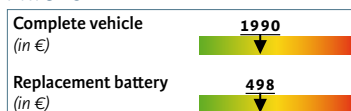
**REFERENCE ADDRESS**

**Helkama Velox**  
 Address Beethovenstraße 8-10  
 60325 Frankfurt/Main  
 Germany  
 Telephone 069 97 55 45 03  
 Fax 069 97 55 41 00  
 Mail hannu.salminen@helkamavelox.fi  
 Web www.helkamavelox.fi

**TECHNOLOGY**



**PRICES**



**PROS**

- + High-quality components
- + Understandable control panel on handlebar
- + Most reasonable price for replacement battery

**CONS**

- None

**TEST SEAL**



**DETAIL**






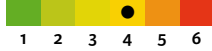



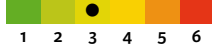



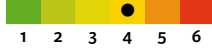



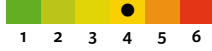




At the *Helkama*, all cables and bowden wires vanish in the cable shaft at the bottom of the main frame pipe. • Intuitive use and beautiful integration of the brake handle, bell and electro control panel.

**COMPONENTS / ACCESSORIES**

**Motor** 250 W Panasonic bottom bracket motor • **Battery** 260 Wh Li-Ionen battery • **Approved overall weight** 150 kg • **Frames** 26" or 28" Alu • **Sizes** 44 cm (26"), 50 cm (28") • **Fork** suspension fork with lock-out • **Gears** Shimano Nexus 8-gear hub gear system • **Brakes** front Shimano roller brakes • **Wheels** Alu hollow pipe wheels • **Tyres** Michelin Pilot City, puncture-protected, 42-622 (28") 47-599 (26") • **Lights** B&M Lumotec IQ Fly • **Extras** suspension support for saddle, ergonomic handles



TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM

TEST FAVORITE Ave

*“In bike shops one can usually only test-ride two, or three models. Tanna was our chance to test 30 models. When we are ready to buy, we’ll be informed.”*

**RENATE PÜTZ**  
71 years · Overath  
Test rider

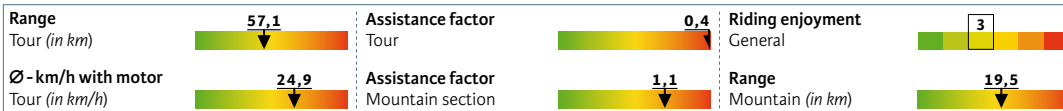




**IN A NUTSHELL** The Kalkhoff Agattu F is a good choice for those looking for a pedelec with back-pedal braking.

A well-equipped, robust pedelec, which is suited to everyday use, and to tours. Since the test, the software for this bike has been upgraded. The new software is claimed to have improved the assistance. In turn, this would certainly have reduced the range. Care must be taken not to confuse *Agattu F's* battery with the similarly looking battery of a bottom bracket motor, since that would deactivate the dynamo function of the front wheel motor (light from battery). An interesting fact: the *Agattu F's* motor always brakes slightly when turned off. *ExtraEnergy* suggests this front wheel version to people looking for a back-pedal brake in addition to two hand brakes.

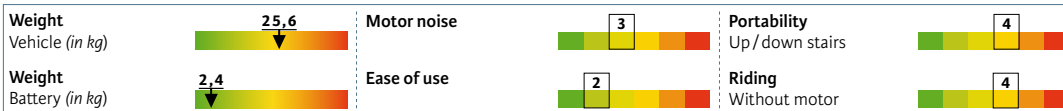
**RIDING PERFORMANCE**



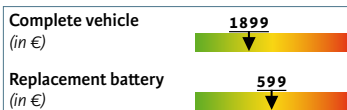
**REFERENCE ADDRESS**

<b>Address</b>	Derby Cycle Werke GmbH Siemensstraße 1-3 49661 Cloppenburg Germany
<b>Telephone</b>	04 471 96 60
<b>Mail</b>	info@derby-cycle.de
<b>Web</b>	www.kalkhoff-bikes.de

**TECHNOLOGY**



**PRICES**



**PROS**

- + Back-pedal brake plus two hand brakes
- + Control panel on handlebar easy to understand
- + Smooth-running motor
- + The dynamo function of the motor in the front wheel

**CONS**

- Front wheel motor acts as dynamo when riding without motor and brakes lightly when the motor isn't activated.
- The battery is not compatible with the bottom bracket models of *Panasonic*.

**TEST SEAL**



**DETAIL**






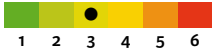

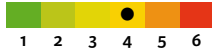














The front wheel hub motor of *Panasonic* is almost just as big as a hub dynamo. • The battery of the *Agattu F* may not be exchanged with the battery of an *Agattu C* with bottom bracket motor.

















**COMPONENTS / ACCESSORIES**

**Motor** 250 W *Panasonic* front wheel hub motor • **Battery** Wh Li-Ionen battery • **Approved overall weight** 120 kg • **Frames** Alu • **Sizes** Women 45/49/53/57 cm, men 49/53/57/61 cm • **Fork** suspension fork Kalkhoff Verso ADJ, adjustable • **Gears** Shimano Nexus 8-gear hub gear system • **Brakes** Concept SL Sirius V-brake • **Wheels** 28" double hollow pipe wheels • **Tyres** Continental CityRide 42-622, puncture-protected • **Lights** B&M Lumotec • **Extras** suspension support saddle, adjustable front section, luggage carrier

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM

TEST FAVORITE Diamant

“We are also collecting information and impressions for our friends.”

**WERNER PÜTZ**  
75 years · Overath  
Test rider



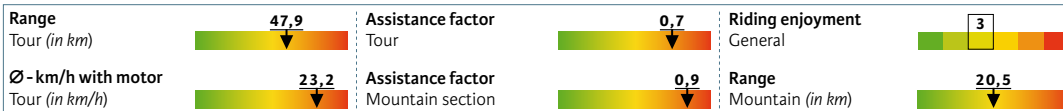


The Hybritec Twin Sport, one of several pedelecs in the Kettler range.

**IN A NUTSHELL** A pedelec which functions perfectly and gives fashion signals when shopping, or on the way to the coffee shop.

The *Layana Hybritec* is a discrete pedelec. Features which worked especially well for us, were the enclosed chain case and the optical appearance of the bike created by special fittings everywhere on the bike. The grip in the step-thru area is meant to make carrying easier, but could not improve the rating of the bike at the ergonomic "carry test" in Lorsch. Other lighter models were easier to carry, even though they lacked similarly positioned grips. This is a pedelec with which a female can parade in the city. But, it will also cut a good figure on a tour. *Kettler* offers a number of attractive designs. Interesting: A high-quality back carrier shopping bag is standard for the bike.

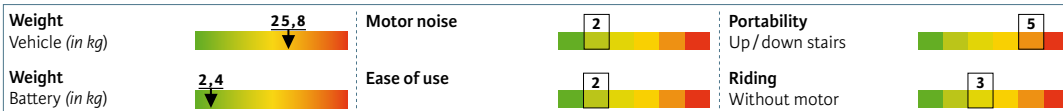
**RIDING PERFORMANCE**



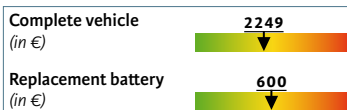
**REFERENCE ADDRESS**

**Heinz Kettler GmbH & Co.**  
 Address Hauptstraße 28  
 59469 Ense-Parsit  
 Germany  
 Telephone 02938 810  
 Fax 02938 81 91 000  
 Mail contact@kettler.net  
 Web www.kettler.net

**TECHNOLOGY**



**PRICES**



**PROS**

- + High-quality components
- + Control panel on handlebar is understandable
- + Chic carrier bag included
- + Carrier bag fixed to frame

**CONS**

- None

**TEST SEAL**



**DETAIL**




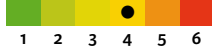

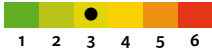

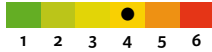














The carrier bag fixed to the frame with color fitting to the frame is beautiful. • The enclosed chain is not only optically successful, but also protects the clothing from dirt.

















**COMPONENTS / ACCESSORIES**

**Motor** 250 W Panasonic bottom bracket motor • **Battery** 260 Wh Li-Ionen battery • **Approved overall weight** 120 kg • **Frames** Alu 7005 • **Sizes** 47/53/57 cm • **Fork** suspension fork Kettcom NCX D with lock-out • **Gears** Shimano Nexus 8-gear hub gear system • **Brakes** front V-brakes with Kettler KBS system • **Wheels** Rodi Vision wheels with 2 mm stainless steel spokes • **Tyres** Continental Contact • **Lights** front Kettler Fly IQ Tec Senso, rear Kettler triple LED • **Extras** suspension support saddle, adjustable front section, luggage carrier built into frame, circular chain protection from Kettler

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM

**TEST FAVORITE** BionX motor on the Steppenwolf Koga (for touring)

*"I work in a bank and regularly ride with my electric bike, because I enjoy it so much. That's also why I decided to get to know the latest models."*

**THOMAS RENNAU**  
34 years · Dresden  
Test rider

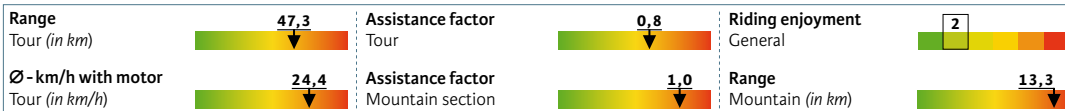




**IN A NUTSHELL** A full-suspension pedelec weighing only 25 kg – that is a sparkling performance!

Back in 2008 the *riese und müller Jetstream hybrid* was first tested as a pre-production bike. Since then it has been improved upon in many ways. Especially the feel of the motor has been improved noticeably by new software. When the maximum assistance speed is reached, the rider does not feel the loss of support. The change-over is almost undetectable. Congratulations to the manufacturer in Darmstadt for completely eliminating the motor noise. Now one can ride in nature with full suspension – and without a noise!

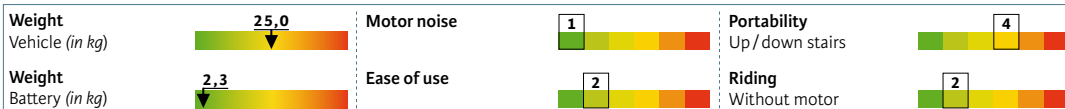
**RIDING PERFORMANCE**



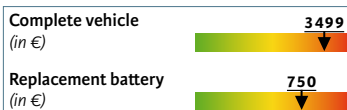
**REFERENCE ADDRESS**

	<b>riese und müller GmbH</b>
Address	Haasstraße 6 64293 Darmstadt Germany
Telephone	06151 36 68 60
Mail	team@r-m.de
Web	www.r-m.de

**TECHNOLOGY**



**PRICES**



**PROS**

- + Full suspension and still light-weight
- + Absolutely noiseless motor
- + Luggage carrier fixed to frame
- + Also rides well with child seat attached

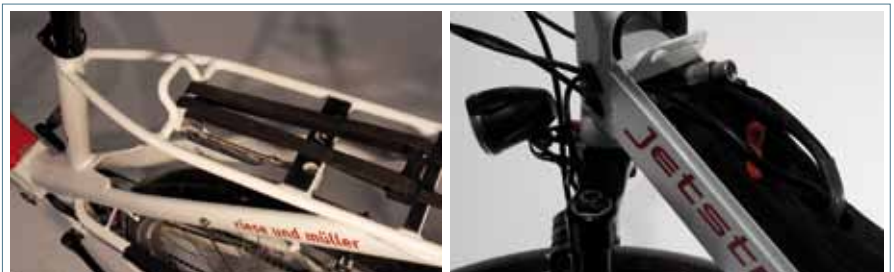
**CONS**

- Battery slightly difficult to remove

**TEST SEAL**



**DETAIL**




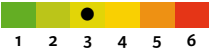



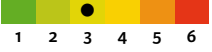









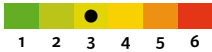

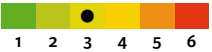


Fast-closing luggage carrier has suspension and is fixed to frame. Holder for bags, baskets and child seats. The cable connections to the frame-hidden battery are a bit finicky.

**COMPONENTS / ACCESSORIES**

**Motor** 250 W rear wheel hub motor • **Battery** 230 Li-Ionen battery • **Approved overall weight** 130 kg • **Frames** Alu 7005 T6 WIG-welded • **Sizes** 46/55 cm • **Fork** RST Capa ML, lock-out • **Gears** Shimano SLX 8-gear chain gear system • **Brakes** Shimano Alfine disc brakes • **Wheels** 26" Ritchey wheels, Sapim spokes • **Tyres** Schwalbe Marathon • **Lights** front B&M Lumotec IQ Fly, rear B&M Toplight Flat plus • **Extras** rear wheel suspension X-fusion Glyde R-PV, steel springs & oil insulation, adjustable, cushion pumps, frame-fixed luggage carrier

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM

TEST FAVORITE Sparta Ion Koga

*“As bike mechanic I must be able to tell clients which bikes suits them best from own experience.”*

**MARION UHLAND**  
46 years · Mannheim  
Test rider

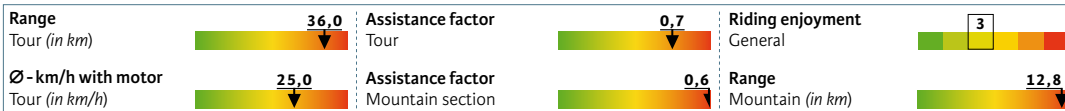




**IN A NUTSHELL** A well-engineered product, which will give many years of riding pleasure at a pre-calculated cost, thanks to a warranty which can be extended to five years!

Europe's best-selling pedelec is especially loved in Holland. After the motor was given more power, it is now also suited to the hilly south-German terrain. The assistance is very discreet, but nevertheless clearly noticeable. Suited to people which do not have to carry their pedelecs up and down stairs, and can re-charge batteries on the ground level (since the battery is built onto the frame and cannot be removed). Exemplary: The warranty extension to five years offered. This makes running costs calculable. Also worth mentioning, is the big, intuitive-to-use display unit on the handlebar. It can easily be removed and then functions as an electronic key. The new display unit is a bit bulky for the pocket, though.

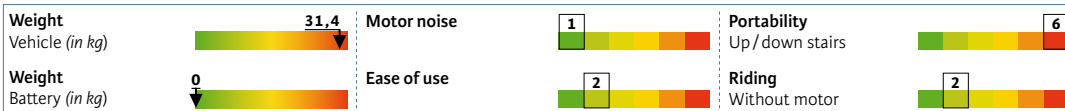
**RIDING PERFORMANCE**



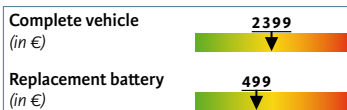
**REFERENCE ADDRESS**

Address	Sparta b.v. Postbus 5 7300 AA Apeldoorn Netherlands
Telephone	+31 553 57 8700
Mail	info@sparta.nl
Web	www.sparta.nl

**TECHNOLOGY**



**PRICES**



**PROS**

- + Almost invisible und absolutely noiseless electro-motor
- + Display unit also functions as electronic key
- + Very reasonable warranty extension to 5 years
- + Precise, lighted battery gauge

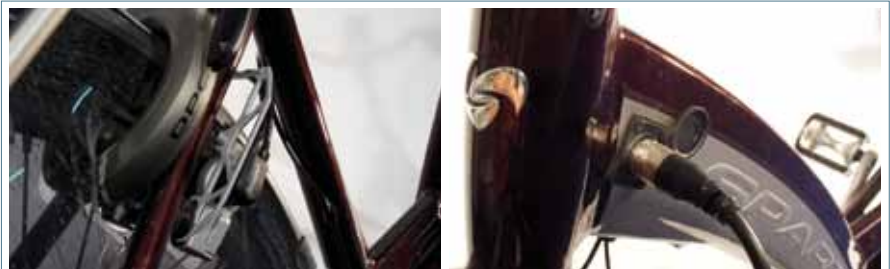
**CONS**

- Battery cannot be removed
- One of the heaviest pedelecs in the test

**TEST SEAL**



**DETAIL**










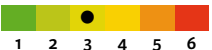












Solid: The practical and high-quality ring lock as well as the Magura hydraulic brakes. • The battery is built into the frame and recharged by attaching the charger to the frame plug.

**COMPONENTS / ACCESSORIES**

Motor 250 W Accell rear wheel hub motor • Battery 264 Wh nickel metal hybrid battery • Approved overall weight 140 kg • Frames Alu 7005 • Sizes 48/53/57/61 cm • Fork Alu suspension fork adjustable with lock-out • Gears Shimano Deore 24-gear chain gear system • Brakes front Magura hydraulic rim brakes • Wheels Rigida Alu rims • Tyres Schwalbe Energizer • Lights front Betavus LED • Extras suspension support saddle, front section adjustable without tools for angle and height



TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

<p>Riding enjoyment of bike</p> <p>Design and optics</p> <p>Motor noise</p> <p>Riding experience with motor</p> <p>Riding experience without motor</p> <p>Ergonomic adaptability</p> <p>Ease of control panel use</p> <p>Stability when parked</p>	<p>Removing battery</p> <p>Clear classification of charger</p> <p>Grip possibilities on frame</p> <p>Ease of lifting bicycle</p> <p>Ease of carrying up/down stairs</p> <p>Lifting over trunk sill</p> <p>Bike carrier coupling height</p> <p>Bike carrier level with ground</p>
--	--

THE EXTRAENERGY TEST TEAM

**TEST FAVORITE** BionX motor on the Steppenwolf

*“As product designer, I use the test for further education and market research.”*

**STEFAN WALLMANN**  
30 years · Hamburg  
Test rider

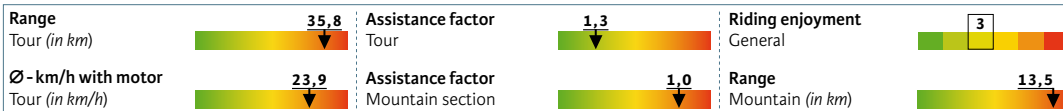




**IN A NUTSHELL** Although it's conceptually good, it's not worth the price!

A sleek, modern bike, which offers some value in the divisions riding performance and riding enjoyment – and at a really good price of €1,399. It is fitted with a back-pedal brake and two hand brakes. But, there are so many defects, that one must come to the conclusion that the *Schmidt Sylt* is not worth its price. In fact, we think the battery is extremely dangerous (the issue is still under investigation). The pedelec has only three gears, which makes it very difficult to pedal effectively at high speeds. When starting out, the motor only kicks in very late and the frame has a tendency to wobble. So, stay away from this bike!

**RIDING PERFORMANCE**



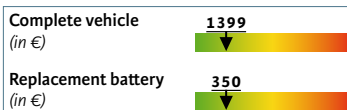
**REFERENCE ADDRESS**

<b>Address</b>	<b>Bikesking</b> Hoffnung-Privatweg 92 39118 Magdeburg Germany
<b>Telephone</b>	03 910 636 65 47
<b>Mail</b>	info@bikesking.de
<b>Web</b>	www.bikesking.de

**TECHNOLOGY**



**PRICES**



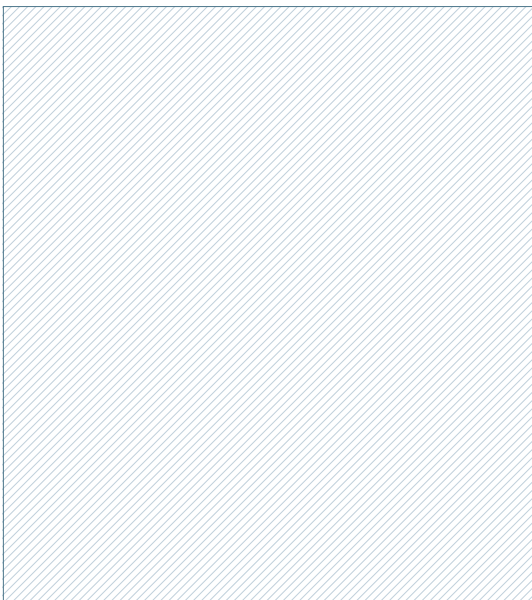
**PROS**

- + Maintenance-shy Kardan motor
- + Battery price low
- + Back-pedal brake and two hand brakes

**CONS**

- Battery pack dangerous
- Thumb shift not usable, because fitted wrong way around
- Parts fell off the saddle during the test
- Battery box tilts easily

**TEST SEAL**



**DETAIL**























Irritating: The battery rattles in the casing. Dangerous: The battery contacts are separated from the aluminium casing with a very thin foil only. • The thumb shift is almost unusable, because it was fitted the wrong way around.

















**COMPONENTS / ACCESSORIES**

**Motor** 250 W front wheel hub motor • **Battery** 240 Wh Li-Ionen battery • **Approved overall weight** 144,4 kg • **Frames** Alu • **Sizes** 52 cm • **Fork** suspension fork, Alu • **Gears** 3-gear hub gear system • **Brakes** front V-brake, rear drum brake with back-pedal • **Wheels** 26" Alu wheels • **Tyres** front 13-225, rear 14-251 • **Lights** halogen headlamps • **Extras** universal drive

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM



MELANIE WIEDERKEHR  
Tanna

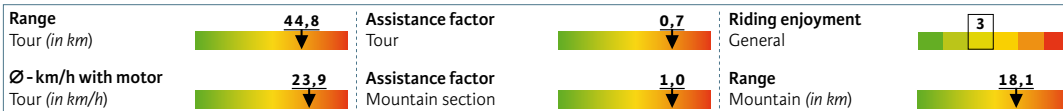
Member of the technical team, ExtraEnergy e. V. staff member



**IN A NUTSHELL** The Vital Bike is always a good choice, irrespective of whether you ride in the city, or the countryside.

The *Vital Bike City Pedelec* revealed itself as an universal pedelec, which is equally at home on everyday trips and tours. Since the battery is very light, one can take a second battery along on tours without hesitation, to double the already good range of 44,8 km. By selecting lower gears when starting out and on hills, the rider can stretch the range considerably. Also interesting, is the rain/sun roof offered as an optional extra, which can be folded with a few movements of the hands. The reliable *Panasonic* motor provides a powerful push at the start, as well as intuitive controls.

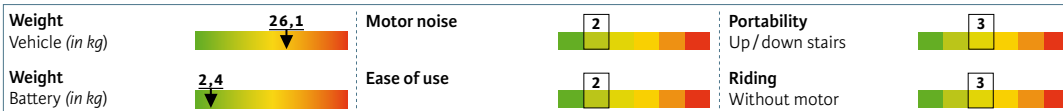
**RIDING PERFORMANCE**



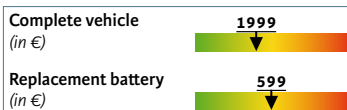
**REFERENCE ADDRESS**

**MVB GmbH**  
 Address Rathausstraße 3-7  
 97922 Lauda  
 Germany  
 Telephone 093 43 627 05 70  
 Mail info@vital-bike.de  
 Web www.vital-bike.de

**TECHNOLOGY**



**PRICES**



**PROS**

- + High-quality components
- + Easy-to-understand control panel on handlebar
- + Creative optional extras offered

**CONS**

- None

**TEST SEAL**



**DETAIL**




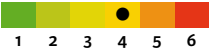











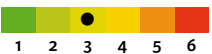

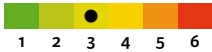

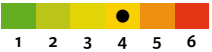


Beautiful accessories: The spacious carrier rack bag is attached with KLiCKfix • Vital Bike Veltop sun/rain protection accessory.

**COMPONENTS / ACCESSORIES**

**Motor** 250 W Panasonic front wheel hub • **Battery** 260 Wh Li-Ionen • **Approved overall weight** 120 kg • **Frame** 26" & 28" Alu 7005 T6 • **Sizes** 45 cm (26"), 49 cm (28") • **Fork** Forksuspension SR Suntour CR-8V, adjustable • **Gear** shift Shimano Inter 8-gear hub • **Brakes** Shimano V-Brake • **Wheels** Alu cavity frame • **Tyres** Schwalbe Marathon Plus, flat-tyre protection • **Lights** B&M Lumotec in front, Basta halogen at back • **Extras** coil-seat support, adjustable front-end, luggage carrier, luggage carrier bag and Veltop sun/rain protection.

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike	●	Removing battery	●
Design and optics	●	Clear classification of charger	●
Motor noise	●	Grip possibilities on frame	●
Riding experience with motor	●	Ease of lifting bicycle	●
Riding experience without motor	●	Ease of carrying up/down stairs	●
Ergonomic adaptability	●	Lifting over trunk sill	●
Ease of control panel use	●	Bike carrier coupling height	●
Stability when parked	●	Bike carrier level with ground	●

THE EXTRAENERGY TEST TEAM



**FRIEDER HERB**  
Stuttgart

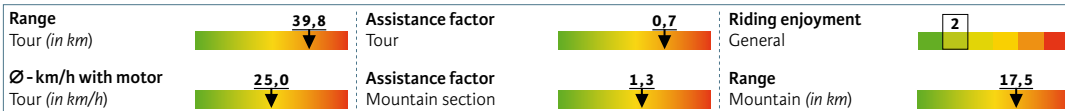
Member of the technical team, ExtraEnergy e. V. staff member



**IN A NUTSHELL** Easy to operate and quality-wise without compromise. All test riders reckoned this bike was worth its price!

The *Biketec Flyer C8 Premium* is a wonderfully plain bike, which nevertheless convinces in every detail – among them the stiff frame, intuitive control elements and high-quality suspension fork. The fork, which can be adjusted up or down per quick-release fastener, is also very comfortable on tour. The quick-release fastener enables riders to regularly change their seat positions and complete long tours in more relaxed states of mind. For longer trips, a second battery is certainly a good idea – although expensive. The wide tyres also roll easily over single track and forest roads. The rider can influence the range materially with his gear selection. With a little practice, a range of 60 km is absolutely no problem with this *Flyer*.

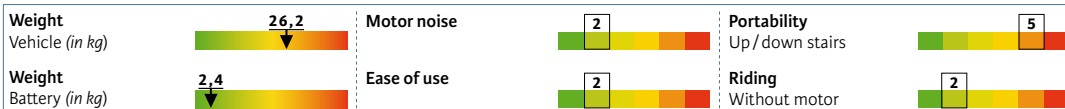
**RIDING PERFORMANCE**



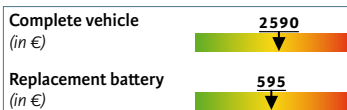
**REFERENCE ADDRESS**

**Biketec AG**  
 Address Industrie Neuhof  
 CH-3422 Kirchberg/Bern  
 Schweiz  
 Telephone +41 (0)34 448 60 60  
 Fax +41 (0)34 448 60 61  
 Mail info@flyer.ch  
 Web www.flyer.ch

**TECHNOLOGY**



**PRICES**



**PROS**

- + Unblockable brakes
- + Very high-quality fittings all-round
- + Big and very legible control panel
- + Central key for battery and rim lock

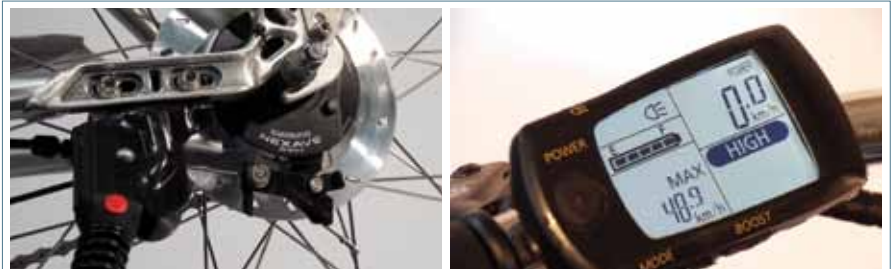
**CONS**

- Price is high; otherwise nothing to criticize

**TEST SEAL**



**DETAIL**




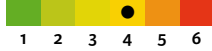



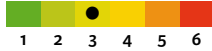














The *Shimano* disc brakes are good for touring. They do not block – also not when braking sharply. • The big, lighted handlebar display is intuitive to use.















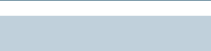
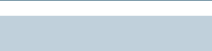
**COMPONENTS / ACCESSORIES**

**Motor** 250 W Panasonic bottom bracket motor • **Battery** 260 Wh Li-Ionen battery • **Approved overall weight** 120 kg • **Frames** Alu hand-welded • **Sizes** women 43/50/55 cm, men 45/50/55 cm • **Fork** suspension fork SR Suntour NCX with lock-out • **Gears** Shimano Nexus Premium 8-gear hub gear system • **Brakes** front Shimano roller brakes BR-1M 70/75 • **Wheels** Alexrims wheels & Shimano hubs • **Tyres** Marathon Plus 47-559 • **Lights** B&M Lumotec Fly IQ Tec • **Extras** coil saddle support, speedlifter for height-adjustment of handlebar, system luggage carrier Pletscher

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM

*“As designer of sports equipment, I believe the pedelec is the future of the bicycle.”*

**ANDREAS TÖRPSCH**  
Berlin

*Member of the technical team, ExtraEnergy e. V. staff member*

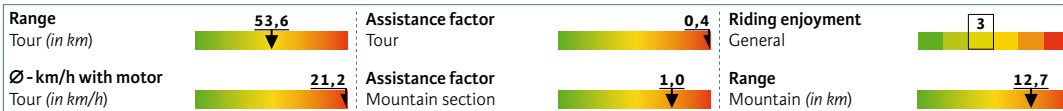




**IN A NUTSHELL** Unfortunately, this pedelec can still be improved upon. It seems to be too expensive for what it offers.

The *Recovery Plus* is a bike for coasting along slowly and not suited to riders with sporty ambitions. It recorded a good range on the tour route, although it assisted weakly and recorded the lowest average speed of all bikes in the test. The motor did support quite strongly at the start and on steep inclines. In one respect this model is clearly better than its predecessor: it is now possible to switch the automatic recovery function off (which cuts the motor out when the highest allowed speed is reached). But, the control panel (previously an example of simplicity) is now very difficult to understand. For the price, the bicycle is fitted out very Spartan. One of the two bikes in the test had to be exchanged after encountering problems with the electronics.

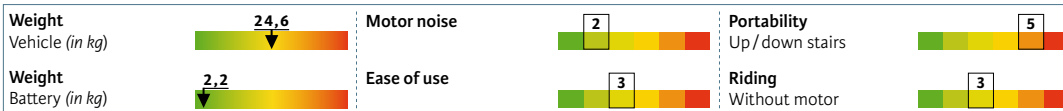
**RIDING PERFORMANCE**



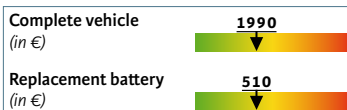
**REFERENCE ADDRESS**

<b>Address</b>	<b>Kranich Trading AG</b> Industrie Haslen 13 CH-9245 Oberbüren Schweiz
<b>Telephone</b>	+41 (0)71 955 0100
<b>Mail</b>	info@flying-cranes.ch
<b>Web</b>	www.flying-cranes.ch

**TECHNOLOGY**



**PRICES**



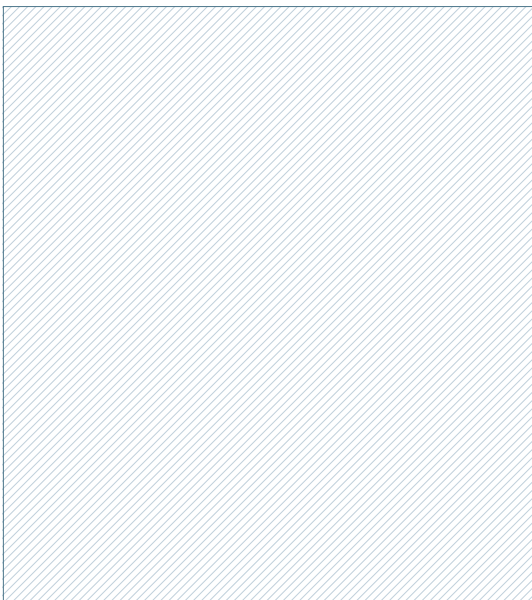
**PROS**

- + Energy feedback possible when braking
- + Light-weight battery and motor with low noise level

**CONS**

- Danger of short-circuit on charger plug when casing is touched with metal object.
- Weak assistance on tour route.

**TEST SEAL**



**DETAIL**










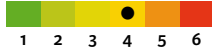












The Twist Elegance CS has an even deeper step-through, here shown without the supplied luggage bags.

**COMPONENTS / ACCESSORIES**

















**Motor** 250 W rear wheel hub motor • **Battery** 320 Wh Li-Ionen battery • **Approved overall weight** 125 kg • **Frames** Alu 7003 • **Sizes** 45,7 cm • **Forks** suspension fork, aluminium • **Gears** Shimano 7-gear chain gear system • **Brakes** front disc brakes, rear Tektro V-brake • **Wheels** 26" Alu hollow pipe wheels, double-stapled • **Tyres** Kenda 47-559 • **Lights** front halogen lights, rear diode lights • **Extras** luggage carrier



TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM

*“I conducted rigidity tests on electric bikes at velotech as part of my study as a designer of sports equipment. Therefore, I found the test in Tanna very exciting.”*

**THOMAS BLOSSFELD**  
Magdeburg

Member of the technical team, Velotech staff member



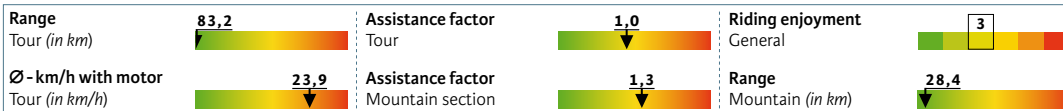


The Twist Elegance CS has an even deeper step-through, here shown without the supplied luggage bags.

**IN A NUTSHELL** The long-distance vehicle with a high assistance level to boot! Unique test results!

The *Giant Twist* has come out on top in the range division of *ExtraEnergy* tests for many years now. No wonder, because the bike has two batteries as standard equipment – which also made the *Giant Twist* the heaviest bike in this year's test. The front wheel motor pulled strongly. On soft surfaces, a short front wheel spin was even possible. Its ability to freewheel extended the range, since the motor doesn't brake when the bike coasts slowly on a level surface. Unfortunately, freewheeling is noisy. One also needs to get used to the power sensor in the chain ring. It causes the pedals to slip slightly, with the result that pedalling feels a little spongy. The high handlebar enables the rider to sit in a relaxed, upright riding position.

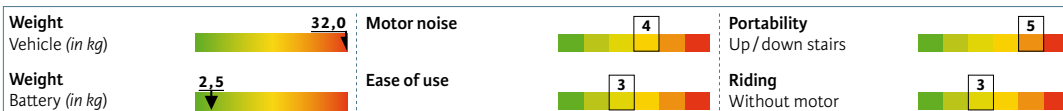
**RIDING PERFORMANCE**



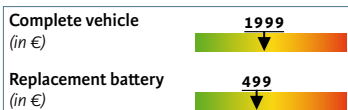
**REFERENCE ADDRESS**

**Giant Deutschland GmbH**  
 Mettmanner Straße 25  
 40699 Errath  
 Germany  
 Telephone: 0211 99 89 40  
 Mail: info@giant-bikes.de  
 Web: www.giant-bicycles.com

**TECHNOLOGY**



**PRICES**



**PROS**

- + Back-pedal brake and two hand brakes
- + Also goes with a single battery only
- + Longest range in the test

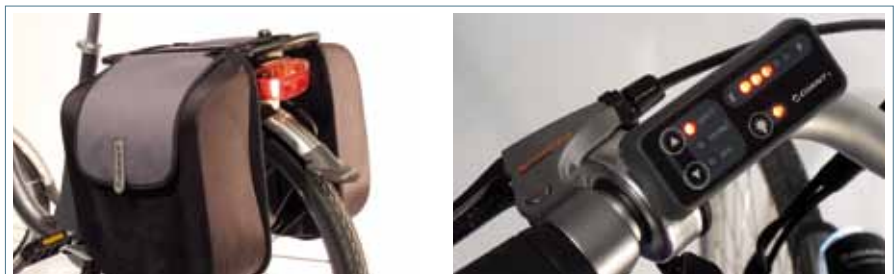
**CONS**

- Heaviest pedelec in test
- Spongy pedal resistance

**TEST SEAL**



**DETAIL**




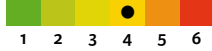

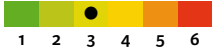

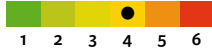














The two batteries responsible for the long range, are hidden beneath the provided saddle bags. • Intuitive control panel, bell and brakes all ergonomically simple to reach.

















**COMPONENTS / ACCESSORIES**

**Motor** 250 W Sanyo front hub motor • **Battery** 468 Wh Li-Ionen battery • **Approved overall weight** 130 kg • **Frames** Alu 6061 • **Sizes** 44/50/56/61 cm • **Fork** oversize Monoshock suspension fork • **Gears** Shimano Nexus 8-gear hub gear system • **Brakes** front V-brakes and back-pedal brake • **Wheels** Alu hollow pipe wheels • **Tyres** Kenda 47-559 • **Lights** Panasonic LED light system • **Extras** suspension support for saddle, luggage carrier, angle of front section adjustable without tools, closed chain casing

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

<p>Riding enjoyment of bike</p>  <p>Design and optics</p>  <p>Motor noise</p>  <p>Riding experience with motor</p>  <p>Riding experience without motor</p>  <p>Ergonomic adaptability</p>  <p>Ease of control panel use</p>  <p>Stability when parked</p> 	<p>Removing battery</p>  <p>Clear classification of charger</p>  <p>Grip possibilities on frame</p>  <p>Ease of lifting bicycle</p>  <p>Ease of carrying up/down stairs</p>  <p>Lifting over trunk sill</p>  <p>Bike carrier coupling height</p>  <p>Bike carrier level with ground</p> 
--	--

THE EXTRAENERGY TEST TEAM

TEST FAVORITE Raleigh Dover 40

“As a designer, the theme interests me.”

LUKAS SEIFERT  
Berlin  
Member of the technical team

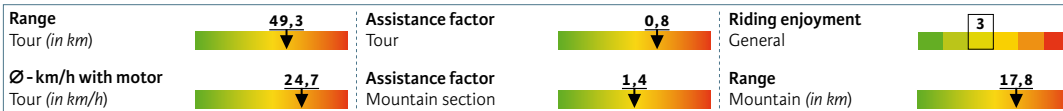




**IN A NUTSHELL** For the purists who do not want to draw attention on themselves, but also accept no compromises when it comes to quality!

*Helkama TE2800* – the straightforward name reflects the agenda: put everything on which is important to the rider, such as an 8-gear *Shimano* hub gear shift, u-lock, light-weight, easily removed battery, the proven *Panasonic* bottom bracket motor, dynamo light... Everything of good quality and kept in the color silver and tones of grey. With the *TE2800* one isn't only well underway in the city, but is also well-equipped for those overland trips.

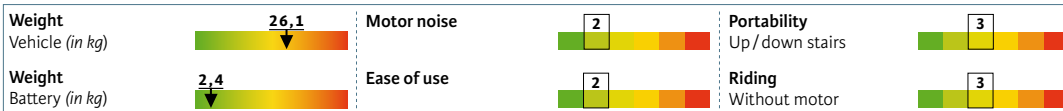
**RIDING PERFORMANCE**



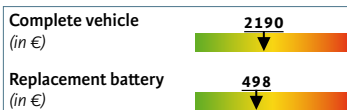
**REFERENCE ADDRESS**

**Helkama Velox**  
 Address Beethovenstraße 8-10  
 60325 Frankfurt/Main  
 Germany  
 Telephone 069 975 545 03  
 Fax 069 975 541 00  
 Mail hannu.salminen@helkamavelox.fi  
 Web www.helkamavelox.fi

**TECHNOLOGY**



**PRICES**



**PROS**

- + Robust, straightforward bike for everyday use
- + Second battery reasonably priced

**CONS**

- None

**TEST SEAL**



**DETAIL**




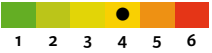













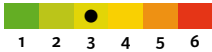




The handlebar has a plain and simple appearance. • The control panel captures the imagination with its extreme simplicity, the bell integrated in the brake handle is beautiful.

















**COMPONENTS / ACCESSORIES**

**Motor** 250 W *Panasonic* bottom bracket motor • **Battery** 260 Wh Li-Ionen battery • **Approved overall weight** 150 kg • **Frames** 28" Alu • **Sizes** 52 cm • **Fork** suspension fork with lock-out • **Gears** *Shimano* Nexus 8-gear hub gear system • **Brakes** front *Tektro* V-brake • **Wheels** Alu hollow pipe wheels • **Tyres** *Michelin* Pilot City 37-622, puncture-protected • **Lights** B&M Lumotec IQ Fly • **Extras** suspension saddle support, ergonomic handles

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM



**FRIEDERIKE MENZ**  
Potsdam  
Member of the technical team

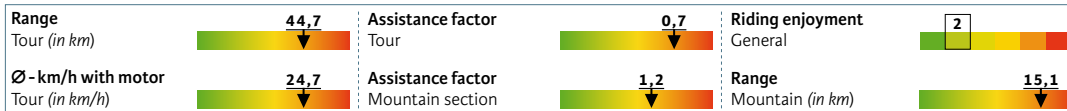


**IN A NUTSHELL** From a technical point of view, everything one needs is there. From a price-performance point of view, the Agattu XXL was the clear winner of the test.

With the *Agattu XXL*, Kalkhoff was the only manufacturer in the test with a product targeted at bikers with heavy loads to carry. Or, at bikers who are heavy themselves - or both. Most pedelecs have a load capacity of between 95 and 100 kg. As a standard, the XXL offers a load capacity of up to 144.4 kg, which might sound like a lot, but get on the scale with your groceries, or your luggage, child seat and child...

The XXL is not only suited to use in daily traffic, but also appears to be the ideal bike for renting to tourists. Technically, everything one needs is there. The bikes are easy to operate, good in their performance and well-priced.

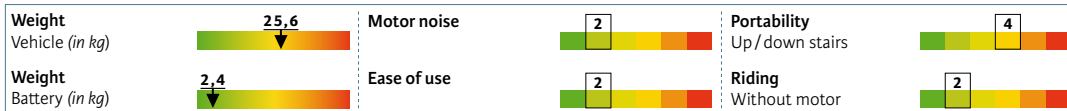
**RIDING PERFORMANCE**



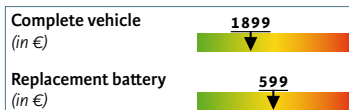
**REFERENCE ADDRESS**

**Derby Cycle Werke GmbH**  
 Address Siemensstraße 1-3  
 49661 Cloppenburg  
 Germany  
 Telephone 04 471 96 60  
 Mail info@derby-cycle.de  
 Web www.kalkhoff-bikes.de

**TECHNOLOGY**



**PRICES**



**PROS**

- + The pedelec with the highest load capacity in the test
- + Optimal for pedelec rental systems

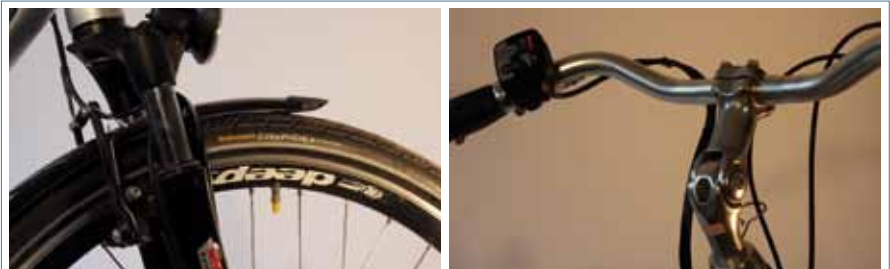
**CONS**

- None

**TEST SEAL**



**DETAIL**




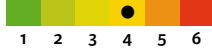



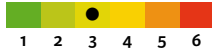














Here one sees a few of the extra highly resilient parts: heavy-load tyres and fork. • A stable front end and tidied-up optics on the handlebar with an intuitive control unit.

















**COMPONENTS / ACCESSORIES**

**Motor** 250 W Panasonic bottom bracket motor • **Battery** 260 Wh Li-Ionen battery • **Approved overall weight** 171 kg • **Frames** Alu-strengthened • **Sizes** 45/49/53/57 cm • **Fork** suspension fork Kalkhoff Verso ADJ, adjustable • **Gears** Shimano Nexus 8-gear hub gear system • **Brakes** Concept SL Sirius V-brake • **Wheels** Rodi Keppler XXL double hollow pipe wheels, strengthened • **Tyres** Continental City Ride 42-622, puncture-protected • **Lights** B&M Lumotec • **Extras** suspension saddle support Humpert X-Act SP 5.0 XXL strengthened, adjustable front section, luggage carrier

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM

UWE SCHLEMENDER  
Tanna

Event manager, ExtraEnergy e. V. staff member, pub manager



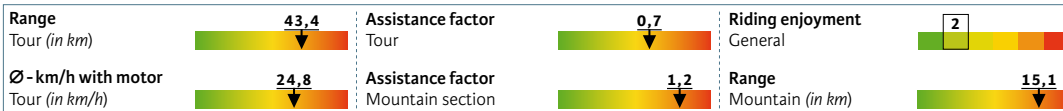


The Tesla Tour with the frame for men.

**IN A NUTSHELL** The ideal pedelec for laid-back tours, when socializing is more important than being sporty.

With the *Tesla Tour*, Koga Miyata has constructed a very comfortable pedelec. With its discreet motor, which pushes along in the background without making the slightest noise, it is wonderful for daily use, as well as tours. The range can easily be extended to 70 km by selecting a lower assistance level. On flat terrain an even longer range is possible, thanks to the easy-running bike. Compared to the previous year's model, the motor now has noticeably more power in reserve - a fact especially appreciated by the test riders. Also good was the simple-to-operate and legible control panel on the handlebar. One must question the practicality of leather grips, which need a long time to dry after a rain shower.

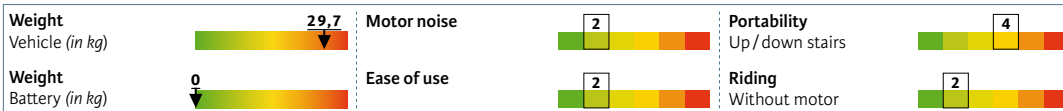
**RIDING PERFORMANCE**



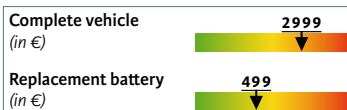
**REFERENCE ADDRESS**

<b>Address</b>	<b>Koga b.v.</b> Tinweg 9 NL-8445 PD Heerenveen Niederlande
<b>Telephone</b>	0180 404 0122
<b>Mail</b>	info@koga.com
<b>Web</b>	www.koga.com

**TECHNOLOGY**



**PRICES**



**PROS**

- + Warranty can be lengthened at reasonable cost to five years
- + Almost invisible and noise-free electro-motor
- + Exact, lighted battery gauge
- + Coded for electricity

**CONS**

- Battery cannot be removed
- One of the heaviest pedelecs in test

**TEST SEAL**



**DETAIL**






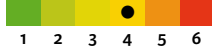



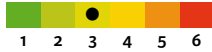












The battery hides elegantly in the frame (could therefore not be weighed separately). Beautiful detail: the B&M lights in the mudguard and suspension in the front fork shaft. • The big, intuitive control unit on the handlebar is operated with small keys within reach of the thumb on the right hand.

**COMPONENTS / ACCESSORIES**

















**Motor** 250 W Accell rear wheel hub motor • **Battery** 264 Wh nickel metal hydraulic battery • **approved overall weight** 140 kg • **Frame** Alu 7005 hand-welded, triple-hardened • **Sizes** 54/57/60/63 cm • **Fork** Koga lightweight with integrated suspension • **Gears** Shimano Deore 21-gear chain gears with Nexave gear-change buttons • **Brakes** Shimano roller brakes • **Wheels** Koga hollow pipe wheels, double-stapled, Sapim spokes • **Tyres** Schwalbe Energizer 37-622 • **Lights** front Koga Rayo (B&M integrated), rear B&M Lumiance • **Extras** suspension support for saddle, saddle bags, water bottles with holder



TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM

*“We are conducting this test, because the market needs reliable, comparative statistics.”*

**HANNES NEUPERT**  
Tanna  
Chairman of ExtraEnergy e. V.

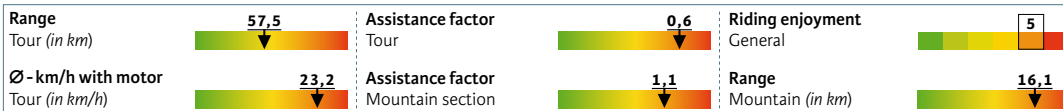




**IN A NUTSHELL** A tour and everyday pedelec for the small pocket, with assistance level controlled by way of a turn handle.

The *Rabeineick Elite 8-Gear* is a neat bike – once one understands how the non-intuitive turn handle functions. The bike’s range and assistance on the hill are both above average, when ridden at moderate speeds. The frame tends to wobble at high downhill speeds. When approaching an incline, the rider must do the initial pedalling and wait for the motor to kick in. When it eventually does, it is a very powerful helper. The assistance level is controlled with the turn handle on the handlebar. This resulted in a widely fluctuating range measurement during the test. When the bike is parked, the motor do not switch off automatically. At €449 the replacement battery is cheap. One of the few pedelecs with a back-pedal brake! Exemplary: three independent brake systems.

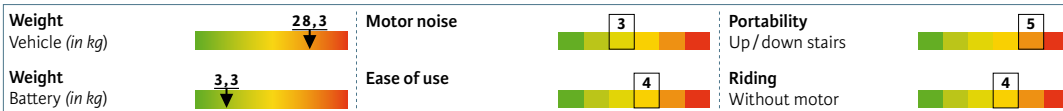
**RIDING PERFORMANCE**



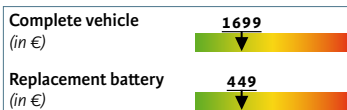
**REFERENCE ADDRESS**

<b>Address</b>	<b>cycle union GmbH</b> An der Schmiede 4 26135 Oldenburg Germany
<b>Telephone</b>	04 41 92 08 90
<b>Mail</b>	info@rabeneick.de
<b>Web</b>	www.rabeneick.de

**TECHNOLOGY**



**PRICES**



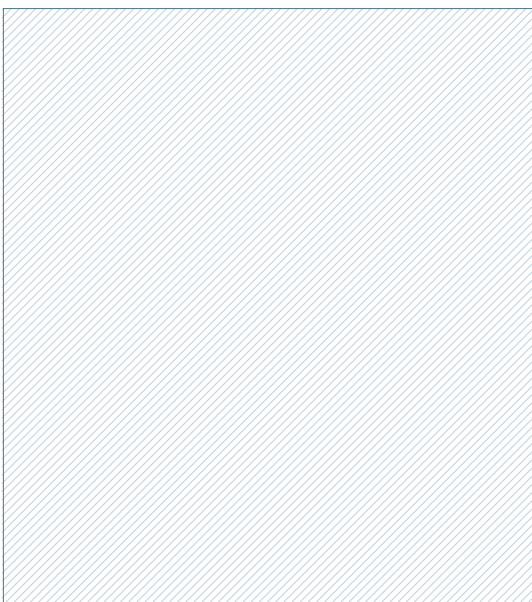
**PROS**

- + Back-pedal brake plus two rim brakes
- + Closed chain casing

**CONS**

- Electricity does not switch off automatically when bike parked
- Turn handle not self-explanatory
- Turn handle must be held in position all the time during the ride

**TEST SEAL**



**DETAIL**


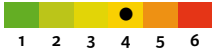



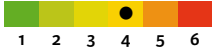

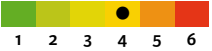














The completely enclosed chain makes a good appearance. On the top right-hand photo: the front motor. The controls on the handlebar is not self-explanatory. • The LEDs do not, as widely assumed, indicate the capacity, but the riding mode. The capacity reading must be made on the battery.

















**COMPONENTS / ACCESSORIES**

**Motor** 250 W front hub motor • **Battery** 352,8 Wh Li-Ionen battery • **Approved overall weight** 120 kg • **Frames** Alu 7005 • **Sizes** 45/50 cm • **Fork** suspension fork Wave Hi-ten • **Gear** Shimano Nexus 8-gear hub gear system • **Brakes** front V-brake and back-pedal brake • **Wheels** 28" aluminium wheels • **Tyres** Cit-yreifen 42-622 • **Lights** halogen headlight • **Extras** luggage carrier, handlebar basket

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM



HEIKE ZSCHÄCHNER  
Tanna

ExtraEnergy e. V. administrative staff member



The parts in the kit

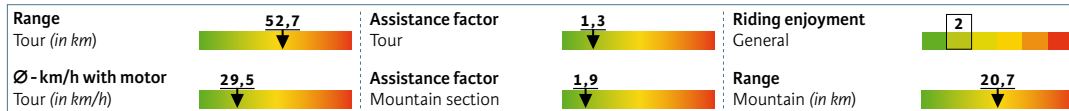


The kit was tested on a bike of Steppenwolf

**IN A NUTSHELL** Extremely efficient, a pleasure to ride and very simple to install – the answer to electrification of your dream bike.

Anyone who loves his bicycle with chain gear shift and does not want to buy a new pedelec, should seriously consider fitting an expansion kit as an alternative. It must be remembered that it is mostly cheaper to buy a complete pedelec with *BionX* motor. But, with many bikes (such as tandems, low-lying, or load-carrying bikes) fitting an expansion kit is the only alternative. The tests were conducted with a smooth-running *Steppenwolf* bike. It normally takes between 30 minutes and an hour to fit the kit. When it comes to special kinds of bikes, care should be taken to lengthen the cables properly.

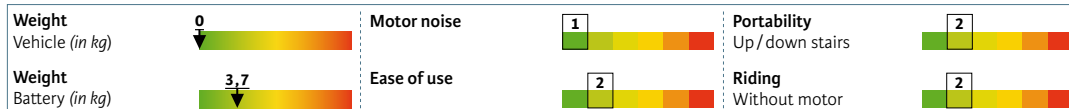
**RIDING PERFORMANCE**



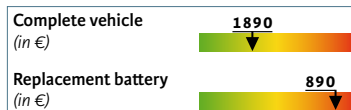
**REFERENCE ADDRESS**

**eps Europe GmbH**  
 Address Johann-Karg-Straße 44  
 85540 Haar/Salmdorf  
 Germany  
 Telephone 089 420 79 69 90  
 Mail office@bionx.de  
 Web www.bionx.de

**TECHNOLOGY**



**PRICES**



**PROS**

- + Long range at high average speed
- + Battery holder fits to almost all frames, with drinking bottle
- + Energy feedback possible

**CONS**

- As kit more expensive than built into new pedelec
- Expansion kit not compatible with all bicycles
- Push assistance not easy to regulate

**TEST SEAL**



**DETAIL**























Take note: When ordering the expansion kit, also order a set of difficult-to-find crown screw pinions! • On handlebar control panel, choice is between four assistance levels and four brake levels.

















**COMPONENTS / ACCESSORIES**

The BionX expansion set is delivered fitted in a spoked wheel. Rim sizes: 20", 24", 26" and 28". The battery is available in three types: NiMhd 24V, Li-Ion 26V and Li-Ion 37V. Used in test: 28" and 37 volt system with 355 Wh. The system is delivered without crown screw pinion set!

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM



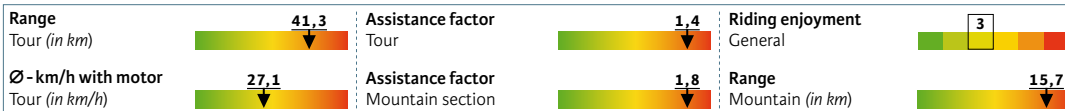
**SONJA GLAUERT**  
Charenton (France)  
Client management at ExtraEnergy e. V.



**IN A NUTSHELL** Dangerous, cheap merchandise. Clearly, a candidate for a call-back action by the consumer protection authorities.

At €749 the cheapest pedelec in the test. On first glance, a racy speedster and at only 22.6 kg also one of the lightest vehicles in the test. But, there was so much play on the stem, fork and saddle, that the problem could not even be solved by tightening all the bolts! The pedelec revealed itself to be an e-bike, because it could be ridden without pedalling! If you push it back a short distance, while holding the turn handle half-cocked, it will shoot out of the starting blocks at full speed. In this way one can ride without pedalling, which means it is illegal to take the Leviatec on public roads. If you do, you'll get fined. In addition, the battery is charged at a plug for low-heat devices. This is not allowed when using continuous current, since mix-ups endanger the user.

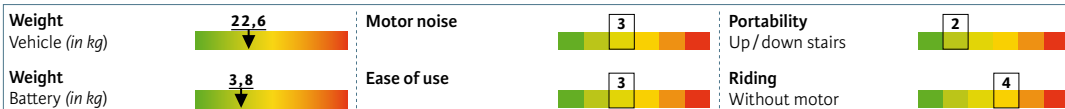
**RIDING PERFORMANCE**



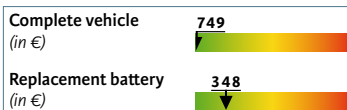
**REFERENCE ADDRESS**

**TNCP Vertriebs GmbH**  
 Address: Werner-Siemens-Straße 29  
 22113 Hamburg  
 Germany  
 Telephone: 040 881 414 70  
 Mail: [tncp@tncp.de](mailto:tncp@tncp.de)  
 Web: [www.elektrofahzeugmarkt.de](http://www.elektrofahzeugmarkt.de)

**TECHNOLOGY**



**PRICES**



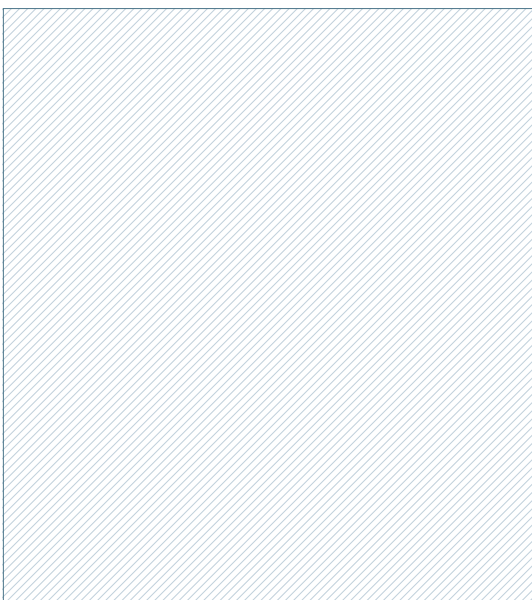
**PROS**

+ Very low price, for both bike and replacement battery

**CONS**

- Not allowed on public roads
- The plug of the low-heat device is potentially dangerous
- Bottom bracket sensor only measures movement, not the direction of movement

**TEST SEAL**



**DETAIL**


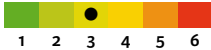

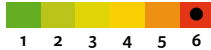



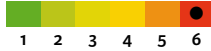



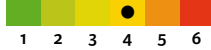










Difficult to believe: a low-heat device plug for 36 volt! Against the regulations and dangerous! • The very powerful Bafang motor has been matched with a very simple Shimano control unit.

**COMPONENTS / ACCESSORIES**

**Motor** 250 W Bafang rear wheel hub motor • **Battery** 360 Wh Li-Ionen battery • **Approved overall weight** 132 kg • **Frames** Alu • **Fork** suspension fork • **Gears** Shimano SIS 21-gear chain gear system • **Brakes** disc brakes • **Wheels** 26" aluminium wheels • **Tyres** 26 x 2,0 • **Lights** none • **Extras** suspension support for saddle, water bottle

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM



SUSANNE BRÜSCH  
Berlin

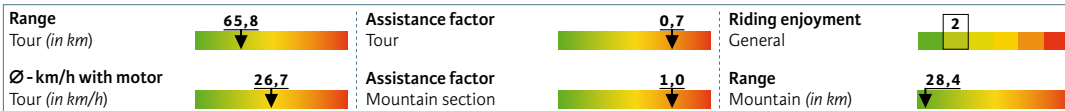
Head of the editorial team at ExtraEnergy.org



**IN A NUTSHELL** A winner thanks to its “hill track function”. A very unusual bike, but nonetheless roadworthy, thanks to a lighting system and reflectors!

With the *i-step racer*, Matra created a category of its own. It is a sports bike through and through, with an enormous range. Its secret: The bike rolls so freely, that the rider can easily maintain the speed of 25 km/h, where the motor cuts out (as a pedelec should, since it doesn't have to be licensed), by just pedalling lightly. In this way, the motor is only used when starting out and on inclines. Test rider Thomas Rennau managed a range of 154 km with an average muscle performance of 286 W. However, the average assistance factor only came to 0,2. This is not for speed fanatics, but ideal for sportsmen and –women who do not want to be bothered by steep hills.

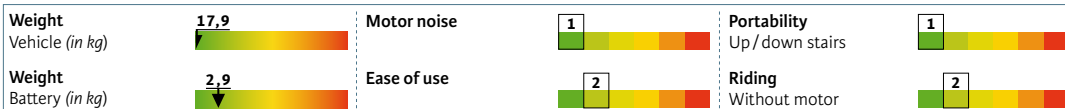
**RIDING PERFORMANCE**



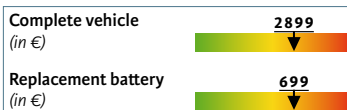
**REFERENCE ADDRESS**

<b>Matra MS</b>	
Address	18 av Jean d'Alembert BP4 F-78996 Elancourt Cedex Frankreich
Telephone	+33 (0)130 68 60 20
Fax	+33 (0)130 68 60 21
Web	www.matra-ms.com

**TECHNOLOGY**



**PRICES**



**PROS**

- + Long range at high average speed, energy feedback possible
- + Racing bike/fitness bike appearance, nonetheless with light and reflectors
- + Lightest bike in test

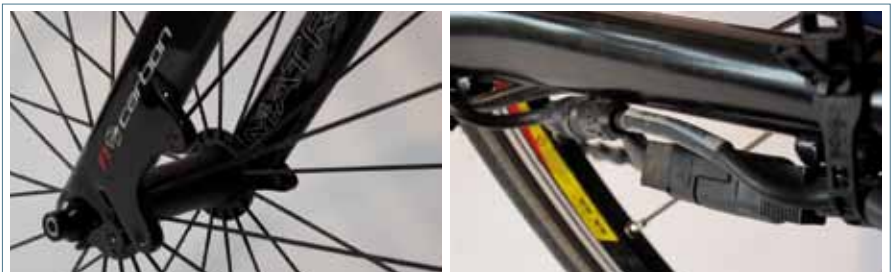
**CONS**

- No stand and mudguards
- Due to thin tyres, only partially suited to everyday use
- Separate plug for lights on battery
- Black battery casing produces unnecessary battery heat

**TEST SEAL**



**DETAIL**








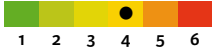

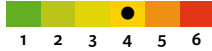












Stylish light-weight and aerodynamic: Starr fork from carbon and Messer spokes. • Less stylish is the rest of the connector assembly on back fork, which is simply protected from wet and dirt by a neoprene band.

**COMPONENTS / ACCESSORIES**

**Motor** 250 W BionX rear wheel hub motor • **Battery** 248 Wh Li-Ionen battery • **Approved overall weight** 135 kg • **Frames** Alu 7005 T4 T6 • **Sizes** S/M/L/XL • **Fork** carbon fork Matra Sports • **Gears** Shimano Deore 18-gear chain transmission system • **Brakes** Shimano Deore LX V-brakes • **Wheels** Mavic CXP22 with knife spokes • **Tyres** Continental Sports Contact 28-700 • **Lights** front Basta halogen headlight, rear LED • **Extras** carbon support for saddle, pedals with SPD click system and for normal street shoes



TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

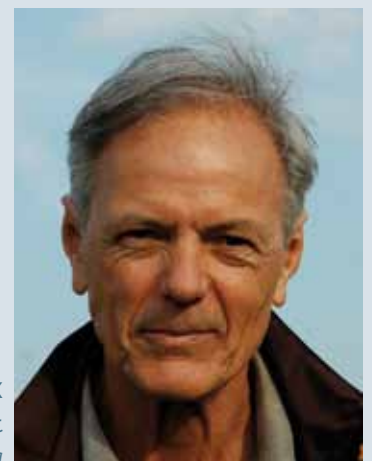
EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM

CHRISTOFFEL VOLSCHENK  
Stuttgart

Member of the editorial team at ExtraEnergy.org

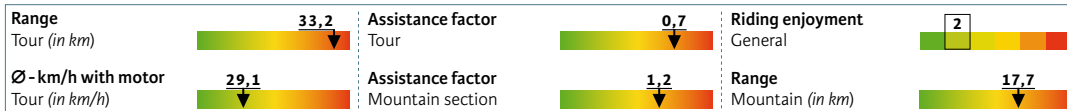




**IN A NUTSHELL** The sporty look and ride. Very exclusive - not only when it comes to the price.

Flyer's s-Series Street model is a light-weight and nimble, modern bike, which is at home on good street surfaces with its narrow tyres. For rougher surfaces, the sister model Urban is better suited. Well suited to commuting to and from work and to doing short weekend trips. On longer tours, the outer-limit of the range is reached after about an hour, riding with full support the whole time. But, the range can be doubled quite easily by riding in lower gears and with lower assistance levels. The Magura hydraulic rim brakes and Busch & Müller lights are needed for the top speeds. If needed, a suspension fork can be fitted for an extra €150.

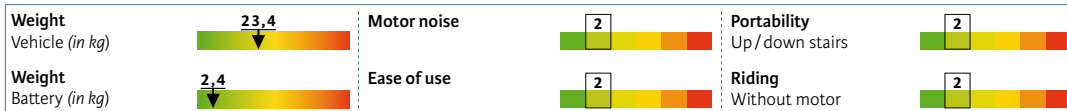
**RIDING PERFORMANCE**



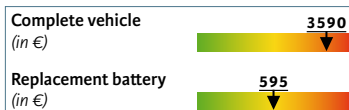
**REFERENCE ADDRESS**

**Biketec AG**  
 Address: Industriehof Neuhof CH-3422 Kirchber/Bern Schweiz  
 Telephone: +41 (0)34 448 60 60  
 Fax: +41 (0)34 448 60 61  
 Mail: info@flyer.ch  
 Web: www.flyer.ch

**TECHNOLOGY**



**PRICES**



**PROS**

- + Very high-quality fittings all-round
- + Cheap to insure against theft with insurance registration plate
- + Brake lever good to apply and ergonomic

**CONS**

- Can only be ridden with mofa inspection certificate, or driving license
- Number plate holder breaks off easily
- Dual drive gear shift needs getting used to

**TEST SEAL**



**DETAIL**


















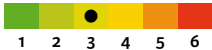




The legislator prescribes to fast pedelecs: a big back-mirror. • The brake lever contravenes the law, while it doesn't have a rounded end-piece! The thumbs have lots to do here: hub gear shift, electric gear shift and bell.

















**COMPONENTS / ACCESSORIES**

**Motor** 250 W Panasonic bottom bracket motor • **Battery** 260 Wh Li-Ionen battery • **Approved overall weight** 120 kg • **Frames** 26" & 28" Alu hand-welded • **Sizes** men 45/50/55/60 cm • **Fork** Alu Starr fork • **Gears** SRAM Dual Drive 3-gear hub gear and 8-gear chain gear system (24 gears) • **Brakes** Magura Louise disc brakes • **Wheels** Alexrims wheels and Alfine hubs • **Tyres** Marathon Supreme 50-559 (26"), 32-622 (28") • **Lights** B&M Lumotec Fly IQ-Tec • **Extras** Parallelogram suspension saddle support, speedlifter for adjusting handlebar height, system luggage carrier

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM

PATRICK KNAPPICK  
Berlin

Photographer in the editorial team at ExtraEnergy.org



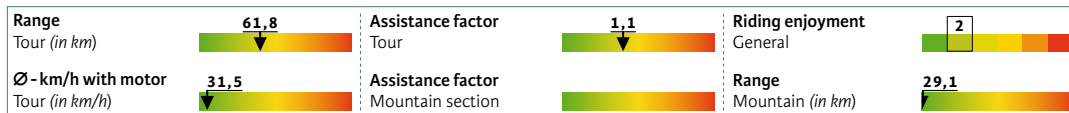


The tested bike was a pre-production model.

**IN A NUTSHELL** Convincing performance as far as range and assistance factor is concerned – a trend-setting product!

Admittedly, with a weight of 30.2 kg the *Dolphin Express* was one of the heaviest bikes among the faster models in the test. But, it also recorded the longest range on the second highest assistance level on the tour route. It was really sensational to ride at an average speed of 31.5 km/h for 60 km without having to recharge. That makes the *Dolphin Express* a candidate for commuters who ride 30 to 40 km daily to and from work. On the mountain route the *Dolphin* showed its origin, namely the Swiss mountains. With a single charge and a sensational assistance factor of 1.3 on the mountain, it climbed about 2,300 meter!

**RIDING PERFORMANCE**



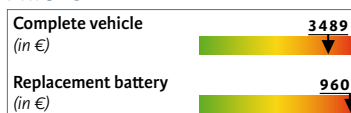
**REFERENCE ADDRESS**

<b>Address</b>	<b>Stromrad</b> Naststraße 43 70376 Stuttgart Germany
<b>Telephone</b>	0711 468 892 95
<b>Mail</b>	info@stromrad.com
<b>Web</b>	www.stromrad.com

**TECHNOLOGY**



**PRICES**



**PROS**

- + Longest range on mountain of all bikes in test
- + With trailer adaptor well-suited pulling child & baggage trailers
- + On long trips at high average speeds riding experience is unique in the world

**CONS**

- Can only be ridden with mofa inspection certificate, or drivers license
- Model still in pre-production stage
- Gearless motor needs some getting used to

**TEST SEAL**



**DETAIL**


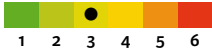

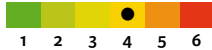

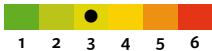
















The top range of the *Dolphin* explained: it has the biggest battery of all by far! The assistance level can be adjusted, the LEDs indicate the remaining battery capacity.

















**COMPONENTS / ACCESSORIES**

**Motor** 500 W continuous current motor • **Battery** 648 Wh Li-Ionen battery • **Approved overall weight** 130 kg • **Frames** Alu • **Fork** suspension fork Suntour NCX • **Sizes** M/L • **Gears** SRAM X-7 chain gear system (27 gears) • **Brakes** Avid disc brakes • **Wheels** 26" Alu hollow pipe wheels • **Tyres** Kenda Kwickroller 40-559 • **Lights** Busch&Muller CYO IQ Tec • **Extras** adapted luggage carrier, Parallelogram suspension saddle support Suntour SPB-NEX

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM



**NORA MANTHEY**  
Berlin

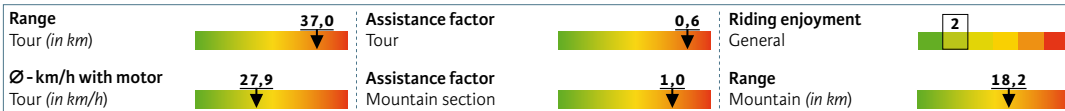
Member of the editorial team at ExtraEnergy.org



**IN A NUTSHELL** Best price-performance ratio among the “fast pe-delecs” – and the lightest weight! This is the optimal commuter vehicle.

The *Dover 40* convinced with its good price-performance ratio and low weight of only 21.2 kg, despite being fitted with a suspension fork and all the fittings needed for everyday use. Some clients may certainly want to have a spring seat fitted. Viewed from a distance, the speedy *Dover 40* is a very unobtrusive contemporary, which gets good marks in the division everyday use. The high-performance *Busch & Müller* lighting system and the *Magura* hydraulic rim brakes perform well at the high speeds reached by the *Dover 40*. This is the optimal commuter vehicle for distances of 20 to 30 km in a single direction, with the possibility to recharge the battery at the workplace.

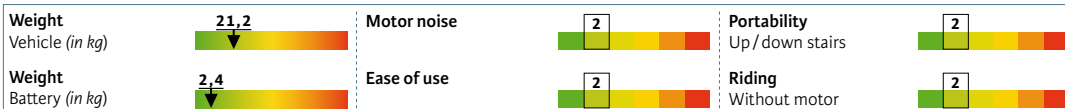
**RIDING PERFORMANCE**



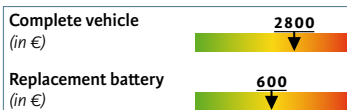
**REFERENCE ADDRESS**

**Raleigh Univega GmbH**  
 Address Siemensstraße 1-3  
 49661 Cloppenburg  
 Germany  
 Telephone 044 71 923 40  
 Mail info@raleigh-univega.de  
 Web www.raleigh-bikes.de

**TECHNOLOGY**



**PRICES**



**PROS**

- + Very low price and light-weight
- + Can be insured against theft at low cost with insurance registration plate
- + Good all-round bike

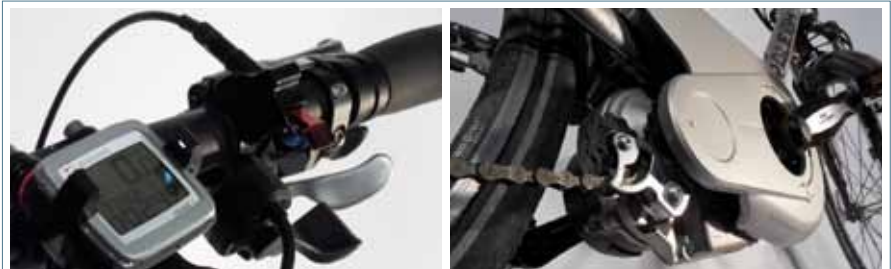
**CONS**

- Can only be taken on public roads with mofa inspection certificate, or driver's license.
- Cockpit overcrowded with all the fittings, including the suspension fork lock-out handle.

**TEST SEAL**



**DETAIL**




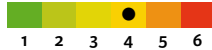







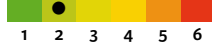



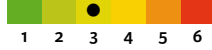






Appears somewhat makeshift: the external LED lighting for the bicycle computer, since it doesn't have the background lighting prescribed by law. • The *Panasonic* bottom bracket motor leads its power to the muscle-power chain strand via a pinion gear.

















**COMPONENTS / ACCESSORIES**

**Motor** 250 W *Panasonic* bottom bracket motor • **Battery** 260 Wh Li-Ionen battery • **Approved overall weight** 120 kg • **Frames** Alu • **Sizes** 40/50/55/60 cm • **Fork** suspension fork Verso RL adjustable, hydraulic remote lock-out, magnesium • **Gears** Shimano Deore XT chain gears • **Brakes** front *Magura* HS33 Evo2 hydraulic rim brakes • **Wheels** Black Jack Spot Dural hollow pipe wheels & Niro spokes • **Tyres** Schwalbe Marathon Supreme 37-622, puncture-protected • **Lights** B&M Fly IQ Tec Sensor plus 40 Lux, rear B&M Flat Plus • **Extras** adjustable front end, ergonomic handles, luggage carrier

TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM

*“As editor of the e-bike portal Vehiculosverdes.com, I’m collecting knowledge to be able to advise readers of my portal properly.”*

**ANDRÉS MORENO**  
Cologne  
Editor of Vehiculosverdes.com

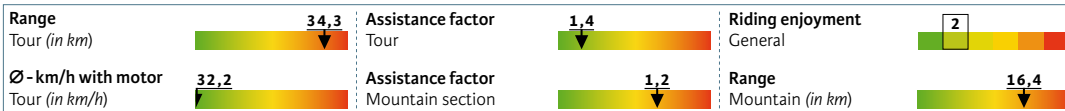




**IN A NUTSHELL** It was difficult to get the test riders off this bike. Thirty kilometers were “handled” in no time and with little effort. A new dimension in cycling.

The *Delite hybrid 500 HS* is a real space glider, which introduces the rider to a new dimension in cycling. The combination of full suspension with a long spring deflection and the powerful and pervasive motor, results in the rider easily underestimating the actual speed. Its wide tyres offer good grip, also on gravel roads. The suspension needs careful adjustment to the size and weight of the rider, especially when a heavy load sits on the luggage carrier. Surprising is the low weight of only 25.5 kg – given all the fittings. The range can be stretched noticeably with a frugal driving mode – but that requires a lot of self-discipline.

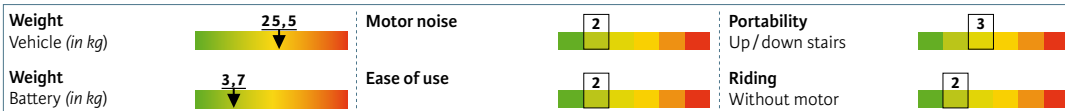
**RIDING PERFORMANCE**



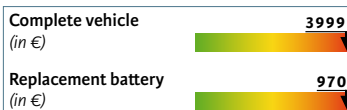
**REFERENCE ADDRESS**

<b>riese und müller GmbH</b>	
Address	Haasstraße 6 64293 Darmstadt Germany
Telephone	06 151 36 68 60
Fax	06 151 366 86 20
Mail	team@r-m.de
Web	www.r-m.de

**TECHNOLOGY**



**PRICES**



**PROS**

- + Can be insured against theft at low cost with an insurance registration plate
- + Excellent suspension
- + Very comfortable sitting position

**CONS**

- May only be ridden on public roads with a mofa inspection certificate
- For optimal functioning, the suspension should be adjusted to the weight of the rider.

**TEST SEAL**



**DETAIL**






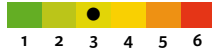



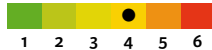



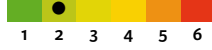








The suspension provided unique comfort. The battery assisted strongly, but as a consequence, it was quickly empty. • The 500W *BionX* motor was powerful and the disc brakes effective.

**COMPONENTS / ACCESSORIES**

**Motor** 500 W *BionX* rear wheel hub motor • **Battery** 355 Wh Li-Ionen battery • **Approved overall weight** 130 kg • **Frames** Alu 7005 T6 WIG-welded • **Sizes** 54/60 cm • **Fork** Marzocchi Corsa TST 2100 mm, lock-out • **Gears** Shimano SLX 16-gear chain gear system, SRAM Attack turn-handle • **Brakes** Shimano SLX disc brakes • **Wheels** Ritchey MTN Pro Girder wheels with Sapim spokes • **Tyres** Schwalbe Supreme 50-559 • **Lights** front bumm Lumotec IQ Fly, rear bumm Topflight Flat plus • **Extras** rear wheel suspension X-fusion Glyde R-PV adjustable, cushion pumps



TARGET GROUP-SPECIFIC RESULTS OF ERGONOMIC TEST IN LORSCH

 <p><b>Easy pedelec</b> A mode of transport, recreation vehicle and exercise tool for those who find ordinary cycling too strenuous.</p> 	 <p><b>Transport pedelec</b> Multi-functional vehicle for carrying loads and for public transport.</p> 
 <p><b>City / Comfort pedelec</b> Comfortable city and suburban transport for the daily commute to work or school, for shopping and going out.</p> 	 <p><b>Reha pedelec</b> A mode of transport and an exercise tool for handicapped people.</p> 
 <p><b>Foldable pedelec</b> Small and light-weight. Ideal for hybrid commuters, ie. people who use different modes of transport, such as the bus, car, train or metro, to reach their destinations.</p> 	 <p><b>Touring pedelec</b> For long distance rides at good cruising speeds. A vehicle for travelling, tourism and leisure time.</p> 
 <p><b>Courier pedelec</b> For everyday commuters and courier services which deliver in a radius of 20 km.</p> 	 <p><b>Wellness pedelec</b> In line with the new trend: leisure time, fitness and fun all in one.</p> 
 <p><b>Family pedelec</b> Safe, everyday transport for mothers with children in cities and suburban areas. Ideal for low-budget family holidays.</p> 	 <p><b>Sport pedelec</b> The ultimate sport and image vehicle for young cyclists.</p> 

EVALUATION OF ERGONOMIC TEST IN LORSCH

Riding enjoyment of bike		Removing battery	
Design and optics		Clear classification of charger	
Motor noise		Grip possibilities on frame	
Riding experience with motor		Ease of lifting bicycle	
Riding experience without motor		Ease of carrying up/down stairs	
Ergonomic adaptability		Lifting over trunk sill	
Ease of control panel use		Bike carrier coupling height	
Stability when parked		Bike carrier level with ground	

THE EXTRAENERGY TEST TEAM



**MICHAEL BURGER**  
Hamburg  
*Designer of the test stations*



## ACKNOWLEDGMENTS

*ExtraEnergy* wants to thank all participants, without whose partly voluntary cooperation it would not have been possible to conduct this test.

We are also thankful to the company *Calantec* for developing and continuously improving the measuring technology, especially of the data logger, which is the heart of our measuring technology, and *Otec GmbH* for manufacturing 15 pairs of power measuring pedals.



Furthermore, we want to thank the test laboratories *velotech.de* (examiners of the mechanical rigidity) and *Prüf- und Zertifizierungs GmbH SLG* (examiners of the conformity to the standards, eg. *emv*) for the fruitful working relationship and look forward to a continued successful cooperation.

# OVERVIEW IN TABLE FORMAT

Pedelects	Riding performance						Technology				Prices	
	Tour			Mountain			Overall weight in kg	Battery weight in kg	Certified total weight in kg	Type of motor	Complete vehicle in €	Replacement battery in €
	Average speed in km/h	Range in km	Assistance factor	Average speed in km/h	Range in km	Assistance factor						
AS VIVA AS-8005	22,4	26,4	1,58	14,1	11,5	1,42	25,8	3,7	n/a	RW	1.499,00	199,00
AVE Tour	26,2	49,9	1,51	17,8	17,0	1,54	28,0	3,7	120	FR	1.799,00	549,00
Biketec Flyer c8 Premium	26,0	37,5	0,73	18,3	16,2	1,13	26,2	2,4	120	Middle	2.590,00	595,00
Biketec Flyer L9 Premium	25,0	39,8	0,74	16,7	17,5	1,33	24,4	2,4	120	Middle	2.990,00	595,00
Biketec Flyer S-Serie Street	29,1	33,2	0,69	19,3	17,7	1,19	23,4	2,4	120	Middle	3.590,00	595,00
BionX PL 250 HT (Steppenwolf)	29,5	52,7	1,33	24,1	20,7	1,89	-	3,7	-	RW	1.890,00	890,00
Diamant Zouma Elite E	26,8	39,5	0,98	22,9	12,4	2,14	22,0	3,0	130	RW	2.799,00	599,00
Dolphin Express	31,5	61,8	1,13	25,0	29,1	1,34	30,2	8,5	130	RW	3.480,00	969,00
Flying Cranes Recovery Plus	21,2	53,6	0,38	15,8	12,7	1,00	24,6	2,2	125	RW	1.990,00	510,00
Gepida Reptila 1000 Pedelec	24,5	36,9	0,69	17,6	13,5	1,55	25,7	1,9	130	Middle	1.799,00	599,00
Giant Twist Comfort cs	23,9	83,2	1,01	17,7	28,4	1,28	32,0	2x2,5	150	FR	1.999,00	499,00
Heinzmann estelle Comfort	25,2	42,5	1,43	20,5	14,9	1,76	27,4	3,5	130	FR	2.099,00	440,00
Helkama E 2300A	23,7	46,0	0,70	15,3	18,3	1,00	25,6	2,4	150	Middle	2.190,00	498,00
Helkama E 2800	24,0	45,5	0,59	16,3	17,5	1,16	26,3	2,4	150	Middle	1.990,00	498,00
Helkama TE2800	24,7	49,3	0,82	17,4	17,8	1,36	26,1	2,4	150	Middle	2.190,00	498,00
Kalkhoff Agattu Pedelec F	24,9	57,1	0,40	17,0	19,5	1,07	25,6	2,4	120	FR	1.899,00	599,00
Kalkhoff Agattu xxl Pedelec c	24,7	44,7	0,73	16,7	15,1	1,24	25,6	2,4	171	Middle	1.899,00	599,00
Kettler Layana Hybritec	23,2	47,9	0,68	15,6	20,5	0,85	25,8	2,5	120	Middle	2.249,00	600,00
Koga Miyata Tesla Tour	24,8	43,4	0,84	17,1	15,3	0,97	29,7	-	140	RW	2.999,00	499,00
Leviatec EO2	27,1	41,3	0,56	17,4	15,7	0,89	22,6	3,8	132	RW	7.49,00	348,00
Matra Sports i-step Racer	26,7	65,8	0,69	19,8	16,5	1,00	17,9	2,9	135	RW	2.899,00	699,00
Rabeneck Vitality Elite 8-Gang	23,2	57,5	0,60	14,0	16,1	1,09	28,3	3,3	120	FR	1.699,00	449,00
Raleigh Dover 40	27,9	37,0	0,59	18,0	18,2	1,03	21,2	2,4	120	Middle	2.800,00	600,00
riese und müller Delite hybrid 500HS	32,2	34,3	1,39	24,3	16,4	1,20	25,5	3,7	130	RW	3.999,00	970,00
riese und müller Jetstream hybrid	24,4	47,3	0,84	16,7	13,3	0,95	25,0	2,3	130	RW	3.499,00	750,00
Schmidt Syllt	23,9	35,8	1,27	16,6	13,5	0,96	24,4	2,5	144,4	FR	1.399,00	350,00
Sparta Ion GLS	25,0	36,0	0,69	16,1	12,8	0,63	31,4	-	140	RW	2.399,00	499,00
Vital Bike City Pedelec	23,9	44,8	0,68	16,3	18,1	1,01	26,1	2,4	120	Middle	1.999,00	599,00
<b>Average values</b>	<b>25,6</b>	<b>46,1</b>	<b>0,87</b>	<b>18,0</b>	<b>17,0</b>	<b>1,21</b>	<b>25,8</b>	<b>3,0</b>	<b>132,6</b>		<b>2.335,00</b>	<b>575,00</b>



# *Das Zeichen für sichere Batterien*

Die Norm für sichere Batterien  
bei Pedelecs und E-Bikes.  
Fragen Sie beim Kauf nach dem  
BATSQ-Zeichen auf der Batterie!

Mehr unter [www.batso.org](http://www.batso.org)

Ein Gemeinschaftsprojekt von:

ExtraEnergy e. V.

*Unabhängiger  
Verbraucherschutzverband  
mit Sitz in Deutschland.*



[WWW.EXTRAENERGY.ORG](http://WWW.EXTRAENERGY.ORG)

ITRI - Industrial Technology  
Research Institut

*Staatliches Technologie  
Forschungsinstitut mit  
Sitz in Taiwan.*



[WWW.ITRI.ORG.TW](http://WWW.ITRI.ORG.TW)

TÜV Rheinland

*Internationales Test- und  
Zertifizier-Unternehmen mit  
Hauptsitz in Deutschland.*



[WWW.TUV.COM](http://WWW.TUV.COM)

UL Underwriter Laboratories

*Internationales Test- und  
Zertifizier-Unternehmen mit  
Hauptsitz in den USA.*



[WWW.UL.COM](http://WWW.UL.COM)