

PRODUCT RECOMMENDATIONS WITH CAPABILITY OF ELECTROSTATIC DISCHARGE



TENTE

BETTER MOBILITY. BETTER LIFE.

ESD

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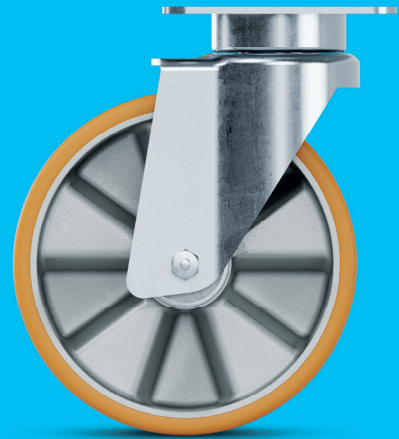
WHEELS

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CASTORS

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BETTER MOBILITY WITH PREMIUM QUALITY

There are some significant terms which are closely associated with the word 'mobility': progress, movement, flexibility and drive. They all shape our modern lives and are essential for success and development. It is for exactly this reason that we at TENTE work on driving mobility forward every day. With our trailblazing castors and wheels, with uncompromising standards of quality and above all, with a clear brand promise: Better Mobility. Better Life.

TENTE has been developing smart mobility solutions since 1923. Solutions which noticeably improve people's lives and their working environment. Solutions which increase productivity, ensure more safety and open up new horizons in matters of design, durability as well as environmental friendliness. No matter whether it's for industrial, commercial, medical technology, heavy goods transport, mechanical engineering, intralogistics, factory equipment or the furniture sector, TENTE's castors and wheels set new standards and put influential changes in motion. By doing this, we enjoy our customers' confidence in our high quality product and innovative spirit, as well as our ability to provide close customer support on all five continents.

It is our global knowledge base which enables us to speak a common language with our customers and to create inspiring solutions anywhere in the world.

The following pages provide an overview of our ESD-compatible mobility solutions. Please feel free to contact us for further technical details or a personal consultation.



The ESD-AKADEMIE (ESD academy) is Germany's leading ESD specialist based in Großmaischeid and has certified our mobility solutions in accordance with the ESD standard. The academy has confirmed the suitability of our products for use in ESD protected areas (EPA).

ESD-AKADEMIE®

UNCOMPROMISING ESD PROTECTION FOR YOUR PRODUCTION

The term ESD is the abbreviation for electrostatic discharge and refers to the electrostatic discharge caused by the contact of two objects with different charges. A natural phenomenon everyone has probably experienced when reaching for a doorknob or an escalator railing. This discharge is caused by friction and the separation of materials. Side note: People only feel a discharge of 3,500 volts or more. This discharge can be perceived as a "small electric shock".

ESD PROTECTION IN AUTOMOTIVE MANUFACTURING

As technological progress continues to grow, the need for ESD protection is getting more and more important, especially in terms of automotive manufacturing. This applies in particular to the production of electric vehicles, since they feature a highly software-intensive design combined with exceptionally complex technology and semiconductor components. This is because electronic and sensitive components are increasingly being used which may already be affected by voltage pulses below the threshold of human awareness. Therefore, voltage levels as low as 35 volts suffice to cause damage to sensitive electronic components. One of the reasons for this phenomenon is an increasing miniaturization of semiconductor components and semiconductor structures of 16 nanometers and smaller! In many cases, electronic components are initially pre-damaged solely by such small discharges. This destabilization might cause severe and delayed consequences.

For this very reason, it is essential to ensure the highest standards of ESD compliance when it comes to transporting sensitive components. As our valued customer, you can rest assured: Our mobility solutions meet these requirements without any exceptions.

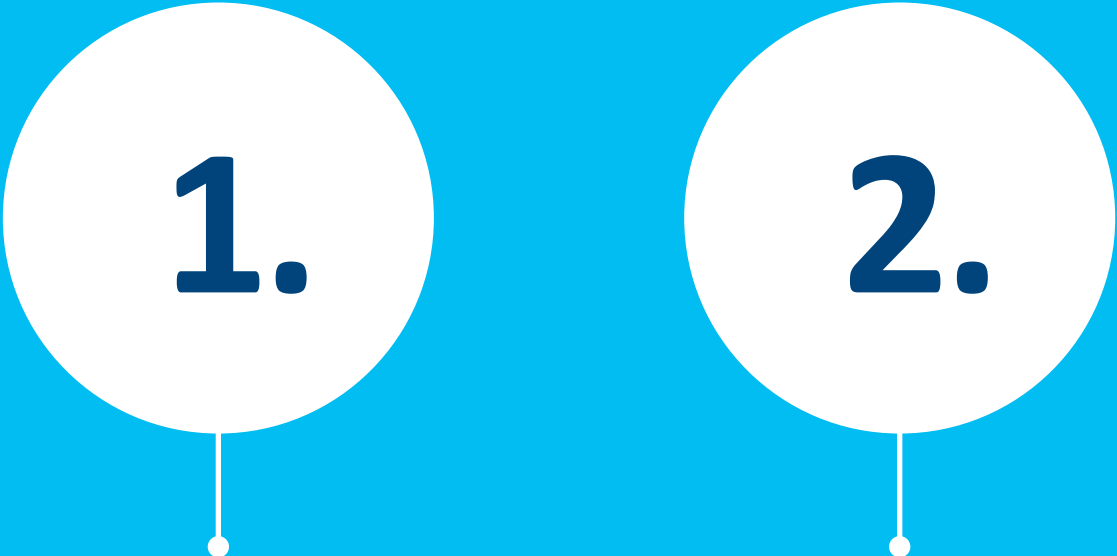
YOU CAN RELY ON US

We offer ESD-compatible mobility solutions designed to prevent electrostatic voltage from being generated at all, and to safely discharge inevitable charges. Voltage peaks can be discharged safely without any unexpected and abrupt discharges. Still, discharges cannot be prevented in full. But due to our ESD-certified mobility solutions, you can count on a high level of protection and safety. Therefore, a TENTE mobility solution with ESD certification testifies to an effective degree of safety.

After all, our experience as a company enjoys the trust of renowned automotive manufacturers and suppliers. Therefore, we are aware of the significant challenges that arise with regard to ESD. As such, we offer numerous mobility solutions that are ESD-certified and thereby provide something invaluable: you can rest assured knowing your sensitive devices will remain safe and sound.

THREE TYPES OF RESISTANCE

When it comes to ESD protection, three degrees are of particular relevance: conductive, discharging and isolating.



1.

CONDUCTIVE MOBILITY SOLUTIONS

Conductive mobility solutions ensure moderate ESD protection. Such solutions achieve an electrical resistance of less than or equal to 10 kilohms (10^4 ohms). Therefore, they are only suitable to a limited extent within the automotive industry. They should only be used for the transport of electronic components that feature a low level of sensitivity. The DIN EN 12530 standard defines the criteria for testing conductive mobility solutions. Any wheel that meets these standards is labeled with a yellow mark or a yellow housing component - such as a yellow covering cap or yellow clips.

2.

DISCHARGING MOBILITY SOLUTIONS

Discharging mobility solutions provide ideal ESD protection for sensitive devices. Their electrical resistance ranges from 10 kilohms (10^4 ohms) to 1 gigohm (10^9 ohms). Voltage peaks may be a hazard for sensitive electronic devices. By means of conductive mobility solutions, these peaks are discharged in a controlled manner by their own internal resistance. Wheels that fulfill these conditions are marked with the symbol for ESD protection. These wheels are suitable for moving sensitive electronic devices within the EPA (electrostatic protection area).

Limits of resistance for transport trolleys and mobility solutions are regulated by the standard DIN EN 61340-5-1:2017 Tab. 3. Based on this standard, strict requirements and corresponding test methods are defined. All wheels must conform to these standards in order to be classified and certified as "discharging".



3.

ISOLATING MOBILITY SOLUTIONS

Naturally, this standard also forms our framework when it comes to testing and certifying our mobility solutions. In this regard, it does not matter if the wheels are part of a platform trolley, a roll container or an equipment trolley - when testing, the application needs to be examined and checked as a complete system.

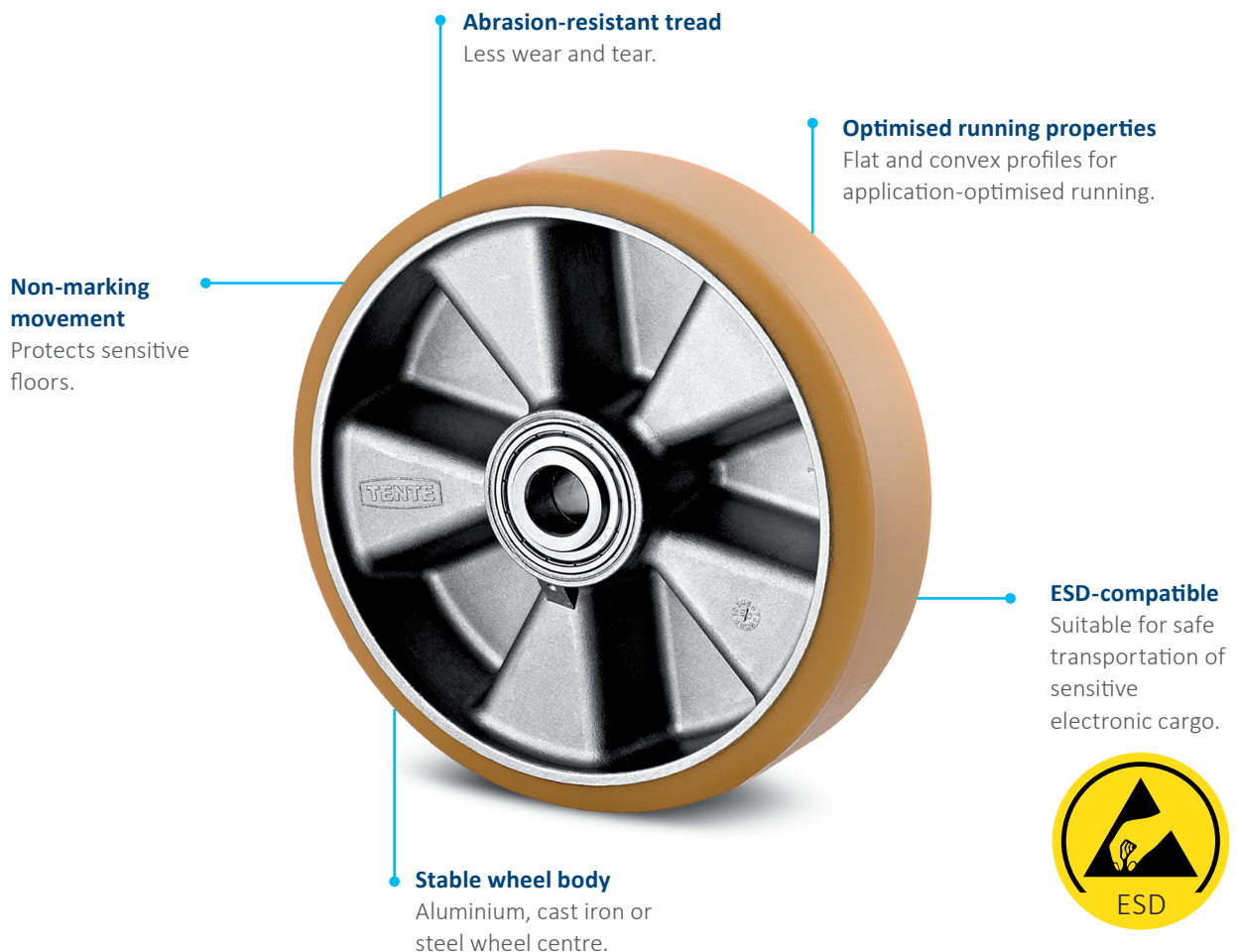
Note: Our mobility solutions are tested according to distinct requirements and standards. However, our castors and wheels are frequently installed within an application beyond our control. Consequently, all aspects of the application must be tested to ensure complete ESD protection. Accordingly, the manufacturer of the particular application needs to inspect the entire system according to the ESD regulations prior to delivery.

This type of resistance does not guarantee ESD protection and, therefore, it is not marked. Wheels within this classification are not suitable for moving highly sensitive electronic devices. They can only be used outside the EPA in an unprotected area (UPA).

HIGH LOAD CAPACITY WITH NOVATECH WHEELS

 **300 - 1.000 kg**  **100 - 250 mm**  **30 - 55 mm**

Thanks to cut-resistant and anti-static material, Novatech wheels are the optimal low-maintenance solution for both tough operating conditions and sensitive environments.

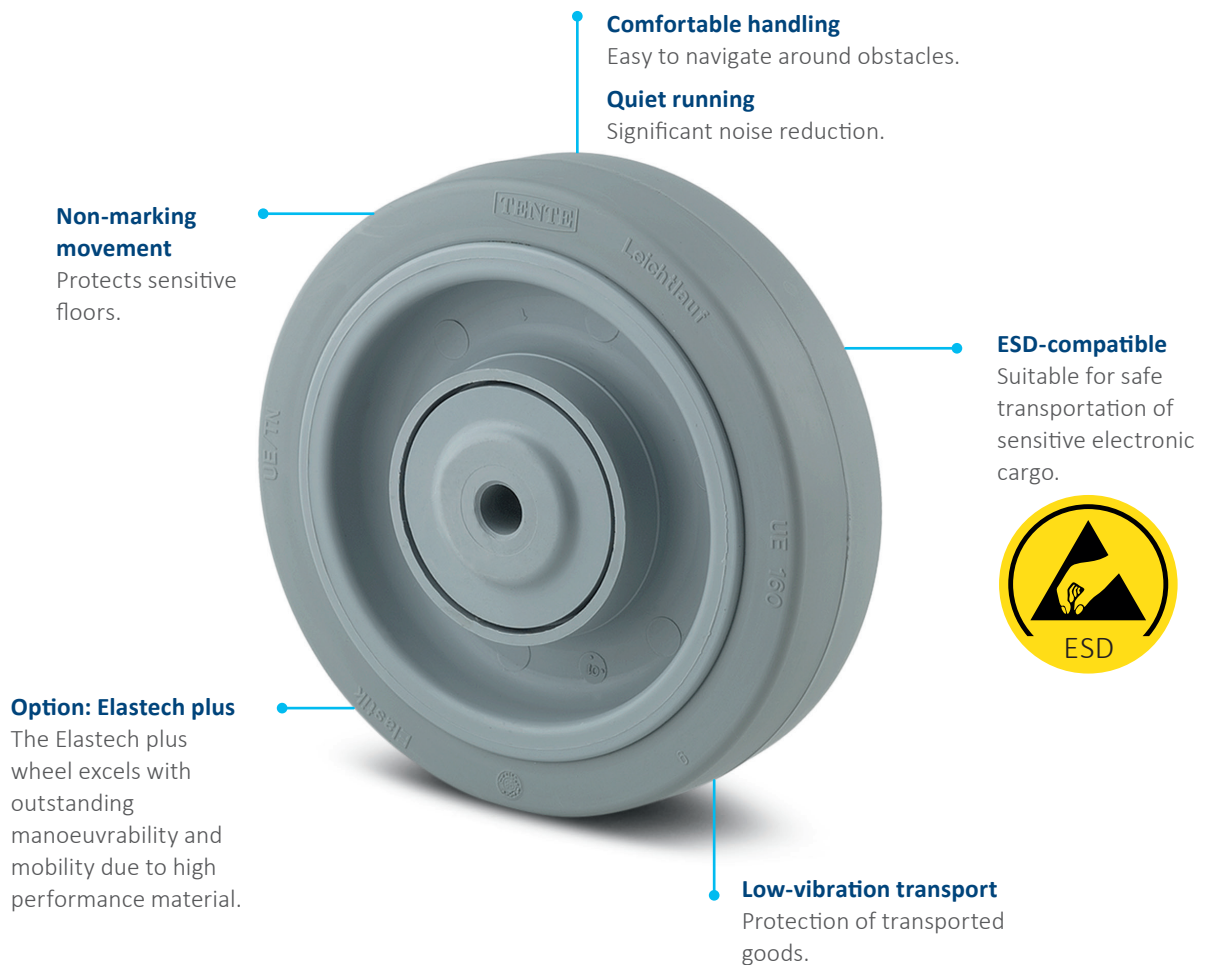


Standard shore hardnesses
Shore hardnesses: 92 A and 80 A

QUIET WORKING ENVIRONMENT WITH ELASTECH WHEELS

 **150 - 400 kg**  **100 - 200 mm**  **34 - 46 mm**

Quiet runners made of elastic and silicone rubber for the highest running comfort to reduce noise emission.



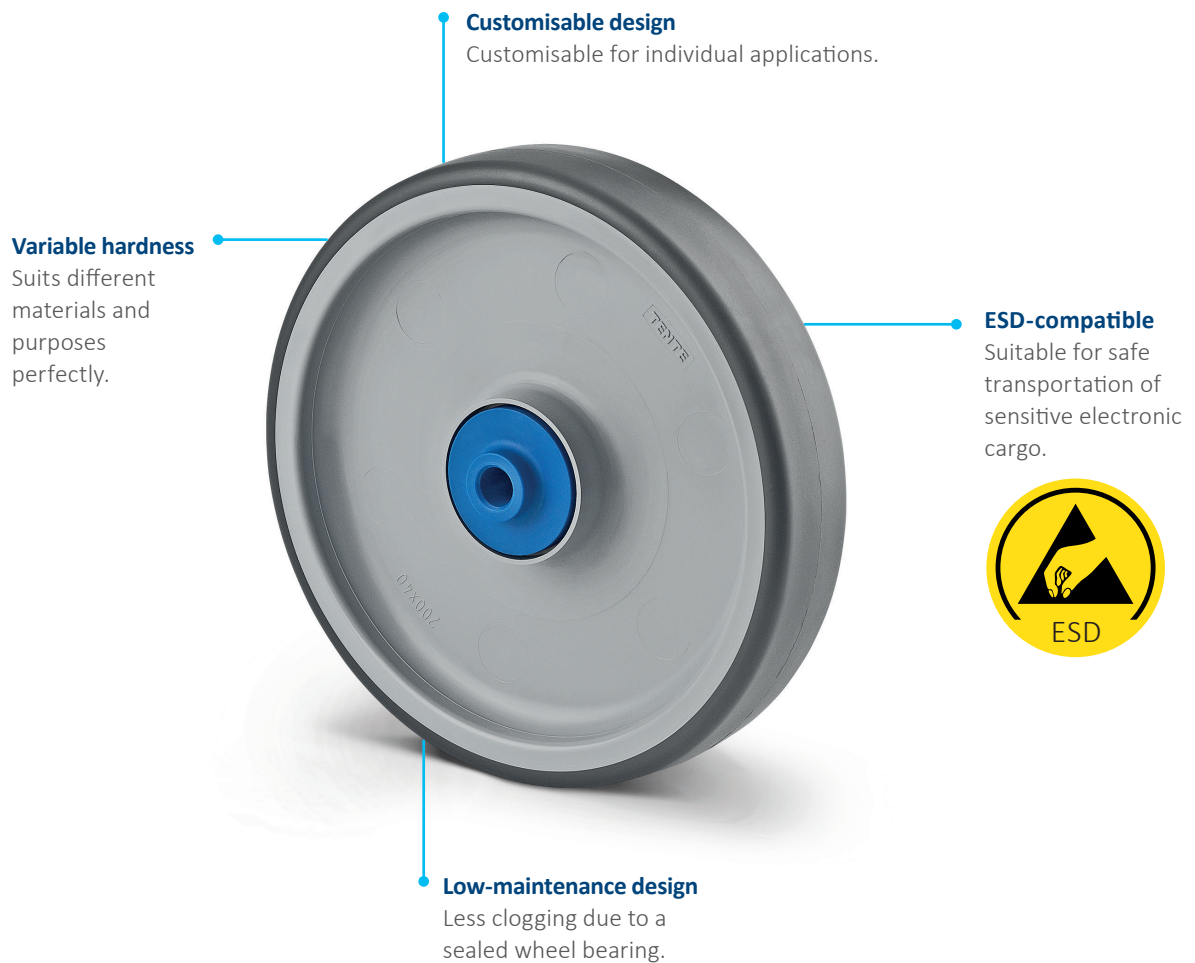
Standard shore hardnesses

Shore hardnesses: 67 A and 64 A.

EASY HANDLING WITH MAXTECH WHEELS

 **150 - 500 kg**  **100 - 200 mm**  **32 - 50 mm**

Perfect for functional design made of injection moulded polyurethane.
Maxtech wheels suit different materials and purposes perfectly. The wheel centre is made of polyamide.

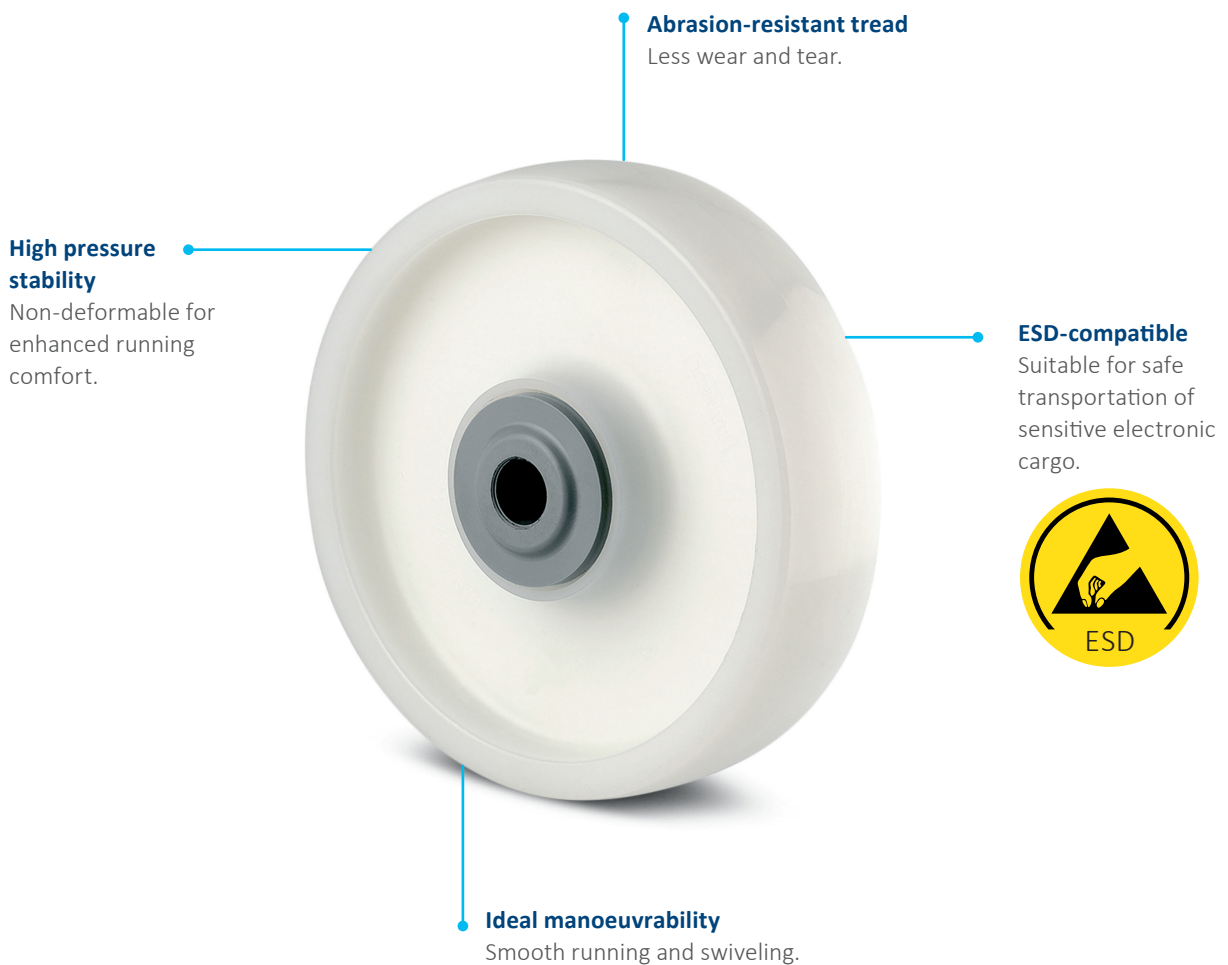


Standard shore hardnesses
Shore hardnesses: 40 D and 85 A.

LESS WEAR AND TEAR WITH DURATECH WHEELS

 **250 - 400 kg**  **100 - 200 mm**  **34 - 46 mm**

Our robust Duratech wheels are stable and almost indestructible, made of polyamide and duroplastic.



Standard shore hardness
Shore hardness: 40 D.

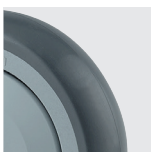
RELIABLE AND ROBUST WITH AGILA

 **40 - 100 kg**  **135 - 188 mm**  **100 - 125 mm**

The tried-and-tested Agila product is suited for a wide range of applications – either made of galvanised steel or high-quality V2A stainless steel, this all-rounder can easily cope with a range of demands.



CAN BE COMBINED WITH:



MAXTECH
Injected
polyurethane

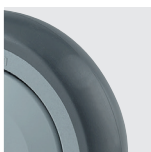
MORE EFFICIENCY WITH ALPHA

 **150 - 400 kg**  **108 - 240 mm**  **80 - 200 mm**

The robust and reliable castor is made of steel or stainless steel. This material increases the castor's durability and excels with a long-term performance of the product.



CAN BE COMBINED WITH:



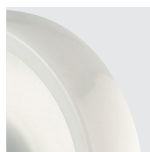
MAXTECH
Injected polyurethane



ELASTECH
Elastic rubber



NOVATECH
Cast polyurethane



DURATECH
Polyamide

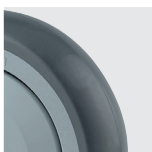
INCREASED PRODUCTIVITY WITH DELTA

 **300 - 600 kg**  **178 - 250 mm**  **125 - 200 mm**

Due to the ball-bearing swivel head, Delta enables good running and swivelling behaviour, allowing easy manoeuvring and requiring little effort. In addition, directional locks, in applications with four swivel castors, ensure improved driving stability in curves and smooth running on long straights.



CAN BE COMBINED WITH::



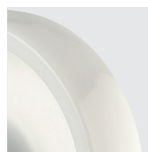
MAXTECH
Injected polyurethane



ELASTECH
Elastic rubber



NOVATECH
Cast polyurethane



DURATECH
Polyamide

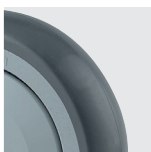
LOW MAINTENANCE COSTS WITH ZETA

 **300 - 800 kg**  **164 - 290 mm**  **125 - 250 mm**

Hardened bearing shells ensure low wear. Maintenance costs are also significantly reduced due to the robust, low-maintenance design. With its high performance and high load capacity thanks to heavy sheet steel, Zeta is the perfect solution for many applications.



CAN BE COMBINED WITH:



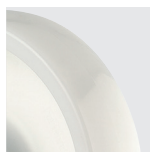
MAXTECH
Injected polyurethane



ELASTECH
Elastic rubber



NOVATECH
Cast polyurethane

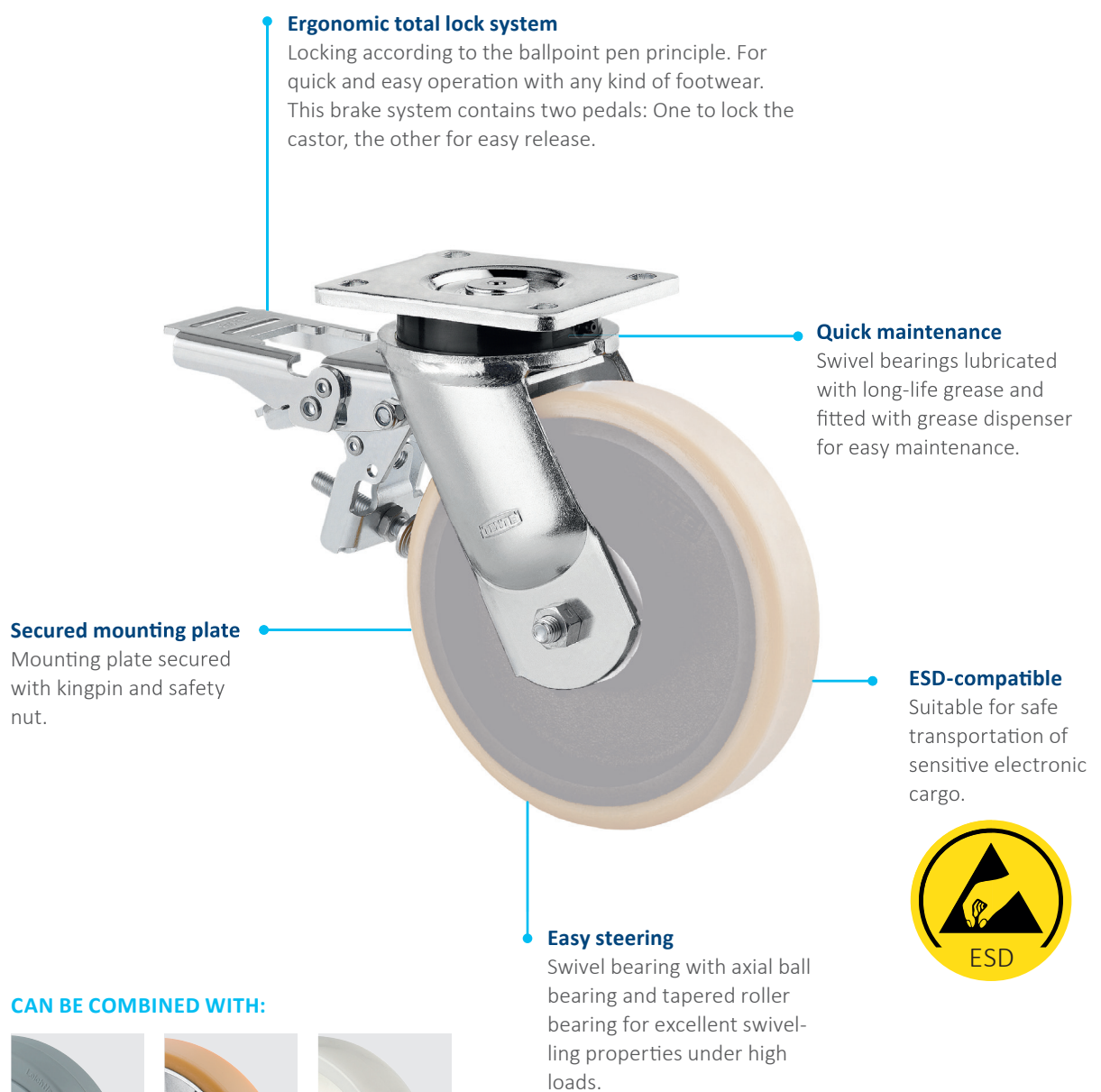


DURATECH
Polyamide

HIGH LOAD CAPACITY WITH KAPPA

 **300 - 1.200 kg**  **145 - 305 mm**  **100 - 250 mm**

The housings are made of welded solid steel, galvanically finished surfaces for maximum rust protection. Constructed for highest load capacity and tough conditions.



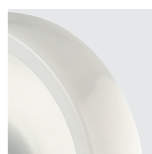
CAN BE COMBINED WITH:



ELASTECH
Elastic rubber



NOVATECH
Cast polyurethane



DURATECH
Polyamide

IMPROVED ERGONOMICS WITH LINEA

 **120 - 150 kg**  **125 - 177 mm**  **100 - 150 mm**

Unlike a castor with only one wheel, the TENTE Linea with two wheel action has an extremely low swivel resistance for easy maneuverability with little physical effort. Additionally, the combination of metal and plastic has numerous advantages for the user: The metal components offer high stability, and the plastic components have low vibration properties.



TREAD MADE OF:



MAXTECH

Injected polyurethane

EVERY REQUIREMENT MEETS ITS OWN SERVICE



OUR TEST CENTRE – EVERYDAY LIFE AS A BENCHMARK

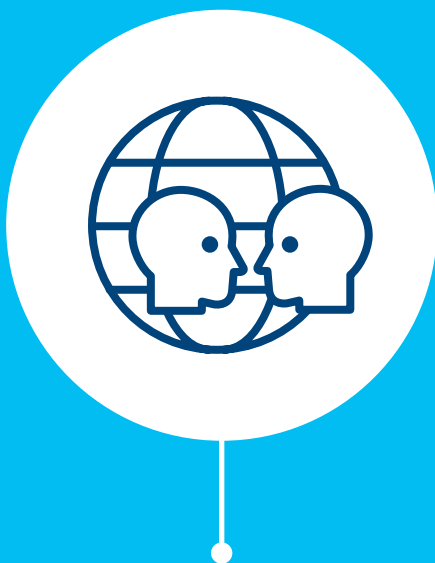
The everyday use of castors and wheels does not hold itself to standards. Therefore, the testing requirements are often far above those of the specifications specific to the use. Whether it be wheel, castor or individual component, in our testing laboratory, every part must stand up to significantly higher requirements. For example, we test the samples in a temperature chamber. There, under extreme temperatures, the products are subjected to all kinds of tensile and compression tests. In addition, we also check the static and dynamic load capacity above the standard. The same applies to changing loads during continuous swivel and collision tests. We also test the interaction of the products with a wide variety of surfaces according to customer specifications.

Our castors and wheels must prove outstanding longevity and endurance during analysis of abrasion volume as well as in harsh salt spray tests. The result: solutions that impress with their premium quality and are proven to increase mobility in their applications.

CAD SERVICE – SIMPLY FASTER

With our CAD service, you save valuable working time and increase the efficiency of your development processes. On top of that, we also have the diverse TENTE product world which is available around the clock, quickly and conveniently in our online library. We can support your design and development department with several 2D and 3D data formats and can give you support through our teams if needed.





GLOBAL SUPPORT – COMPLETELY PERSONAL

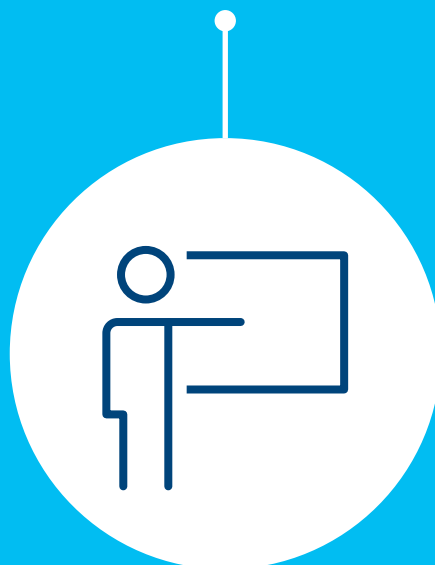
No matter where your company is located, we offer qualified support on five continents and are there for you on site. You can rely on our experienced solution experts, who know your country's cultural characteristics inside out and are able to provide you with perfect support as native speakers – especially if things are not running smoothly. With our global network, we are capable of responding to your concerns quickly and with the highest problem-solving expertise – all over the world.

TRAINING – DEVELOPING COMPETENCE

Train your staff to become mobility specialists. Selecting, fitting and using castors, wheels and complete systems is a diverse and complex subject that requires numerous influential factors to be taken into account.

For this reason, we offer instruction and training courses for planners and users which are specifically geared to the different areas of the company.

We would be pleased to conduct courses on your premises or centrally in our modern training and information centre. Our TENTE Campus brings innovative solutions to life and provides inspiration for better mobility.



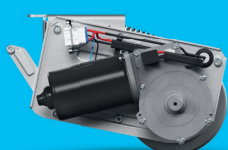
DIVERSITY WITH A SYSTEM: OUR CASTORS

All of our products have their own specific qualities and strengths. Whether it is high design standards, specialist applications or exceptional load capacities – our range can meet your needs and be adapted to fit different models.

From the correct dimensions and technical specifications to the required configuration, our product families are able to offer the ideal solution – whatever you need.

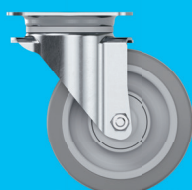
Contact us for more information or visit our website: www.tente.com

E-Drive



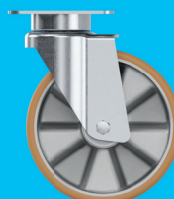
⌀ 125 mm

Alpha



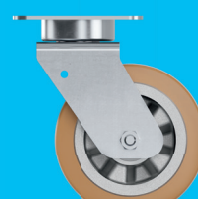
⌘ 70 - 500 kg
⌀ 80 - 200 mm

Delta



⌘ 300 - 600 kg
⌀ 125 - 200 mm

Delta twin



⌘ 600 - 750 kg
⌀ 125 - 200 mm

Zeta



⌘ 300 - 800 kg
⌀ 125 - 250 mm

Kappa



⌘ 300 - 3.000 kg
⌀ 80 - 300 mm

Kappa flex

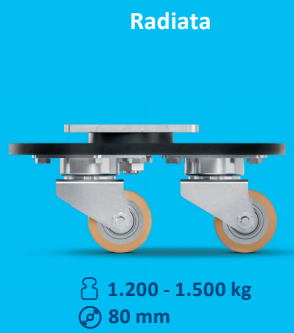


⌘ 360 - 750 kg
⌀ 160 - 200 mm

Omikron



⌘ 900 - 11.000 kg
⌀ 100 - 500 mm



EXPERTISE THAT INSPIRES

CONTACT US

We are a globally operating company supporting you on five continents. This means on-site support with service on a level playing field - along with in-depth knowledge. Additionally, our solution experts will advise you on the best mobility concept for your needs. Go here to find your nearest TENTE location: www.tente.com/locations

INCREASE YOUR EFFICIENCY

Our intelligent mobility solutions help you save time, effort, energy, and operating expenses. This allows you to improve your operating methods and working conditions, thereby optimising your processes and ensuring higher productivity, profitability and safety. Ask for our solutions catalogue or read about how our customers benefit from our tailor-made solutions on our website: www.tente.com/solutions

SAVE DEVELOPMENT TIME

On our website you will find technical drawings, product data sheets and 2D and 3D CAD files in various formats: www.tente.com/products

GET MORE INFORMATION

In addition to our informative website, you can easily download various catalogues and brochures on mobility solutions, customer references, and much more: www.tente.com/download





www.tente.com



PRODUKTIVITÄT



SICHERHEIT



DESIGN



HALTBARKEIT



UMWELT