

 **plastwil**
RAIL FASTENING SYSTEMS



Strength
of a brand

For more than 36 years we support the rail industry

PLASTWIL has been a leading manufacturer of the rail surface elements especially the elements of rail – sleeper assembly for more than 36 years.

In a rail surface in Poland and Central and Eastern Europe, PLASTWIL company installed over 120 mln pieces of different details to rail surface, such as: rail pads, electro-insulating hold down parts, dowels, anchors, insulation etc.

The primary objective, that for many years we keep on successfully fulfill, is to built a brand which is a symbol of high quality, with guaranteed durability and safety. We have our own R&D facility, through which we create complete solutions from design to implementation, providing the solutions that meet the needs of our clients, the industry and the market. There are plenty of granted protective rights and utility models of plastic elements for rail fastening systems, as well as many different technical products from the rail industry, that confirm the innovation of our company.

Our knowledge and experience gives us the leading and recommended position as a partner of the top executive companies, co-operators in the rail and construction industry. The high quality standards of our products are confirmed by the conducted performance tests, admissions and certificates granted by accredited laboratories, technical and research institutions in accordance with the standards of the European Union.

Many years of tradition combined with the innovation and individual approach to the customer makes that



the new project is treated as a dedicated service. We work with a passion.

You are welcome to cooperate!

Izabella Wałkowska

Izabella Wałkowska
CEO



Quality
Control System

Planning and quality assurance

PLASTWIL manufactures the highest quality elements in compliance with using modern production technologies and health and safety.

Environmental protection is an integral part of our core business.

To assure the highest quality of all taken actions, PLASTWIL operates according to the implemented principles of an Integrated Management System in relation to the following standards:

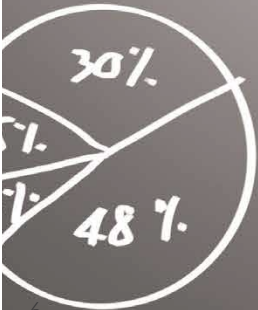
- ISO 9001:2015, Quality Management System,
- ISO 14001:2015, Environmental Management System,
- PN-N 18001:2004, Health and Safety Management System,
- Production Control System (ZKP) with National Technical Assessment and Technical Specifications for Performance & Acceptance,
- TSI-EG Certificate.

All of the products have a required certificates of approval to operation in accordance with the requirements of the European law. In order to raise the standard of service PLASTWIL uses its own, modern laboratory and runs full control over all important areas of production. In this way company ensures, so important in the area of its operations, safety and long life of products built in the track surface.

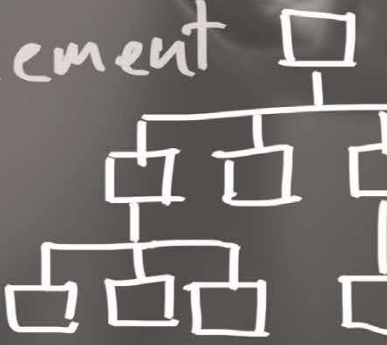
Adaptation of the processes and products to the highest European and world standards allows the company to pursue highly professional and ambitious technological projects, while respecting and ensuring the highest quality parameters.



R&D



Management



SUCCESS

Goal



Target

Development



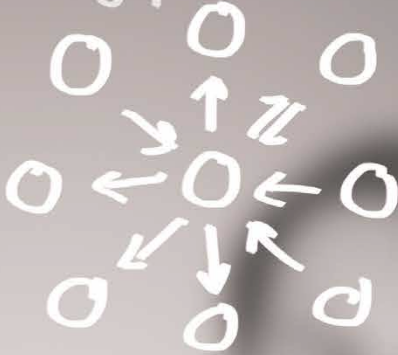
Marketing

Vision



Teamwork

Strategy

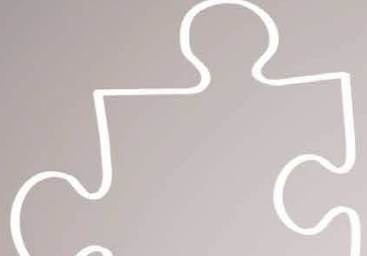


People



Partners

Idea



The knowledge-based company

The company's and staff's commitment to development and innovation is based on the use of knowledge, years of experience and developing human resources.

We implement the innovative technologies, which enable to meet the most significant quality standards in the terms of offered products and services.

R+D specialists assist customers in designing the details and mold parts based on the strength and durability parameters. Additional benefit for our customers is the possibility to meet the recommended technological and economic solutions at each stage of the process, that constitute the principal objective of our engineers work.

Company's products are designed, produced and tested in accordance with the applicable standards and Directive Technical Specifications for Interoperability which allow for their introduction to the European market and other overseas markets.

Continuous development and strategic planning guarantee our clients the complexity of services in order to meet the growing demand for innovative solutions. We are able to execute entrusted task on existing molds, keeping them ready and regenerated, starting with project idea through design, 3D documentation preparation, production molds and finally product manufacture.

We develop our competence in products and processes thanks to collaboration with leading scientific research.

The effect of dynamically executed research program are further patent applications implemented over the years.

DESIGNING:

- designing and implementation of new components for rail fastening systems,
- designing and implementation of modern production technology,
- designing of modern rail fastening systems,
- preparation of of technical documentation (technical drawing, 3D models).

ANALYSIS:

- analysis of plastic materials trade due to new material solutions,
- analysis and adaptation of current rail fastening systems to specific demands (e.g. line geometry, modern rail-sleepers types, maximum weight per axis, specific environment demands),
- analysis of global solutions in rail fastening systems.

LABORATORY RESEARCH:

- research and analysis of current rail fastening systems,
- laboratory and operating research,
- ageing tests,
- full research of rail fastening systems according to the current regulations.



Team

Passion, know-how and ambition is PLASTWIL's force

PLASTWIL is made up of people, whose value is not only expertise, but also a personal commitment to the continuous development of the company. We are creative, open to innovations and eager to seek sensational solutions. We work with passion, that changes into the highest quality of our projects and services.

Our specialists are not only engaged in business, but also willing to change the reality, and above all they operate in accordance with ethical values. We follow the rules: freedom, responsibility, quality, efficiency and mutual support. All tasks of each project stage are

made professionally and on time, in the atmosphere of trust and respect, regardless of their degree of complexity. The quality refers to all elements of our work, but in the end it concerns what is delivered to the customers.

We create an attractive working environment for our current and future employees. Our main goal is to make people aware why they want to follow us and respect our values. The power is the people – highly qualified specialists, who thanks to their passion, ambition and hard work, create a strong and solid organization.

A black and white photograph of industrial machinery. In the foreground, a metal component with a hexagonal top and the letters 'NZ' is visible. It is surrounded by dark, curved metal parts. The background shows a large, rectangular metal structure. A red rectangular box is overlaid on the left side of the image, containing the text 'We build the future' in white.

We build
the future

The complex rail fastening systems

PLASTWIL company in 1983 started the production of the elements of the rail surface, such as: dowels and rail pads to the conventional rail fastening system of a K-type. Successively and consistently with other companies and research units PLASTWIL had implemented in Poland the rail fastening system of a SB-type, in particular had developed the most popular in the Central and Eastern Europe the rail pads and insulation parts.

The rail fastening system of SB-type is the most popular and is used in Poland and Central and Eastern Europe since the 80s of the twentieth century. That system can be applied to all categories of railway lines in accordance with EN 13481-2: 2017 and tram lines.

PLASTWIL with many years of experience in the design, testing and implementation of this system has gained a high competence in the knowledge of the rail fastening systems. As a result of continuous development, company gradually implement more innovative products to the rail surface, extending its offer also for the metal parts.

The company's goal is to be a professional manufacturer of a complete rail fastening system in the framework

of a long-term strategy. In the next stage of business development, company implemented the production of spring clips. Currently, company designs and optimizes all elements of the system making sure they are the best. As a result of all these activities combined with the technical and scientific inputs, PLASTWIL developed two optimized SB-type systems:

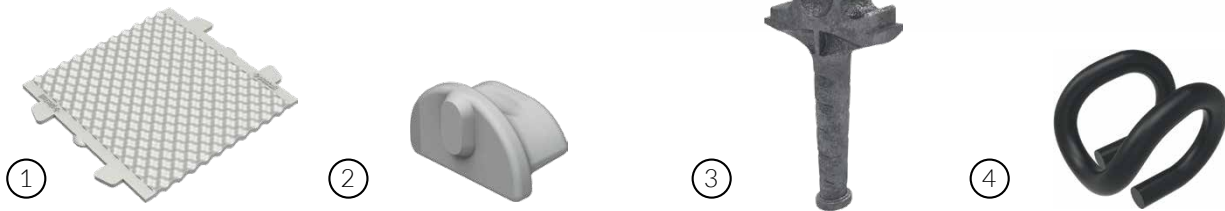
- resilient rail fastening system of SB W3-type and
- rail fastening system W14 type for EVA pad
- rail fastening system W14 type for TPE pad
- rail fastening system W14 HH type
- rail fastening system KE1/4 MOST type
- rail fastening system ME1/2 type
- rail fastening system KE1/2 type and KE1/4

All systems are characterized by a rapid and simple installation, vibration damping coming from the rolling stock as well as the electrical insulation limit to minimum traction stray currents.

These products provide the best resistance to the load, the highest damping coefficients, the highest quality and economical efficiency of the use.

The rail fastening system of SB-type

The rail fastening system of SB-type is used only on the pre-stressed monoblock sleepers. The rail laid on the surface of the rail pad between anchors (constantly sunk in the sleeper) is mounted with the SB-type spring clip, connected from one side to the anchor, on the other hand like a spring pressing the top of rail foot. Under the rail foot additionally the rail pad is placed, while the rail foot is insulated from the rail clip and anchors with electro-insulating hold-down parts.



CHARACTERISTICS AND ADVANTAGES OF THE RAIL FASTENING SYSTEM OF SB-TYPE:

reducing the transmission of vibrations from the rail to the sleepers and ballast

electrical insulation reducing to minimum traction stray currents

high durability in service and adaptation to the high speed railway

reducing the level of noise in the passenger cars

a small number of the components; rapid and easy installation

the possibility of using the mechanical mounting devices

THE COMPONENTS OF A SB-TYPE RAIL FASTENING SYSTEM:

- ① Rail pad of PKW-type
- ② Electro-insulating hold-down part of WKW-type
- ③ Casting iron anchor SB 3/4
- ④ Rail clip SB-type

The rail fastening system of SB W3-type

The rail fastening system of SB W3-type is a next modification of SB-type rail fastening system, where all of the rail mounting elements are designed and produced by PLASTWIL. The technological innovation has been applied to the construction and characteristics of electro-insulating hold-down part of WIW type and rail pad of PWE type. This system is characterized by the optimized parameters responsible for the way rail is fastened. The SB4-type rail clip can be used alternative to other SB-type rail clips. The unique bending technology and high quality material guarantee that the product ensures the required pressure of the rail to the sleeper, as well as the possibility of resilient deformation of the rail in a horizontal plane by the action of lateral forces.

<p>CHARACTERISTICS AND ADVANTAGES OF THE RAIL FASTENING SYSTEM OF SB W3-TYPE:</p>
<p>the construction of SB4-type rail clip effects on smaller change of the clamping force as a result of exposure to repeated loading</p>
<p>guaranty of stability of SB4-type rail clip during the long-term service (without the risk of disconnection by itself)</p>
<p>improved quality of SB4-type rail clip, favorable stress distribution in the arms of the rail clip</p>
<p>WIW-type electro-insulating hold-down part of WIW-type reduces the utility costs without loss of performance parameters, thanks to the reduced weight and its asymmetrical shape</p>
<p>the used combination of PWE-type rail pad and SB4-type of rail clip allows to obtain a very high ability to attenuate impact loads of 61,2%</p>



THE COMPONENTS OF A SB W3-TYPE RAIL FASTENING SYSTEM:

- ① Rail clip SB4
- ② Electro-insulating hold-down part of WIW-type
❗ PLASTWIL INNOVATION!
- ③ Rail pad of PWE-type
❗ PLASTWIL INNOVATION!
- ④ Casting iron anchor SB 3/4
❗ PLASTWIL INNOVATION!

in accordance with EN 13481-2:2017

The rail fastening system of SB type to the tram lines

The rail fastening system of SB-type to the tram lines works with the pre-stressed monoblock sleepers using tram rails types R1, R2, 180S and 49E1 type of rail.

The rail laid on the surface of the rail pad between anchors (constantly sunk in the sleeper) is mounted with the SB4-type rail clip (or interchangeably with other SB-type rail clip), connected from one side to the anchor, on the other side like a spring pressing the top of rail foot.

Under the rail foot additionally the rail pad is placed, while the rail foot is isolated from the spring clip and anchors with electro-insulation hold-down part.



①



③



④



CHARACTERISTICS AND ADVANTAGES OF SB TYPE RAIL FASTENING SYSTEM TO THE TRAM LINES:

reducing the transmission of vibrations from the rail to the sleepers and ballast

electrical insulation reducing to minimum traction stray currents

high durability in service

reducing the level of noise

a small number of the components; rapid and easy installation

the possibility of using the mechanical mounting devices

THE COMPONENTS OF SB-TYPE RAIL FASTENING SYSTEM TO THE TRAM AND METRO LINES:

- ① Rail clips SB4 (or other SB-type)
- ② Electro-insulating hold-down parts of WIW or WKW-type
- ③ Rail pad TPP-SB/125/7/G, TPP-SB/125/7/TPU, TPP-SB/180/12/G, TPP-SB/180/12/TPU
- ④ Casting iron anchor SB3/4

in accordance with EN 13481-2:2017

Rail clip SB4-type

The rail clips are used in the rail fastening system to the rails of a type: 49E1 or 60E1 and tram lines of types: R1, R2 and 180S. The rail clip ensures the suitable pressure to prevent the rails displacement relative to the sleepers.

The SB4 rail clip thanks to its geometry provides significantly lower tensile stress and reduced contact stress in the insulating insert while maintaining the clamping force above 10kN.

It guarantees high elasticity, ensuring adequate longitudinal resistance of the rail and the possibility of using it on high speed railway lines.

The SB4 rail clip used with SB W3 fastening system components meets all the requirements of norm EN-13481-2:2017.



CHARACTERISTIC	VALUE
SB4	
Hardness	42-46 HRC
Clamping force	10,7-10,9 kN
Fatigue strength	5 million cycles, 10 Hz, clip deflection 1,0 mm
Longitudinal rail resistant	15,4 kN
Steel grade	48Si7 or alternative



SB4

The fastening system of W14 type

The rail fastening system W14 type is designed for railway lines representing the A, B, C and D category according to EN 13481-2: 2017 norm with a maximum permissible axle load of 260kN. Depending on the requirements of the client, the system is provided with a rail pad of high or low static stiffness. Due to the mid-loop of the clip, which is situated over the rail foot, the rail fastening is characterized by additional elasticity. This eliminates the possibility of overloading the clips' arms and their plastic deformation as well as prevents the rotation of the rail. The system meets the requirements of norm EN 13481-2: 2017.



FEATURES AND ADVANTAGES OF W14 TYPE SYSTEM:

installation, all of the components can be pre-assembled to the sleeper before taking it to the construction site

the construction and characteristic of spring clip Skl 14 limiting the rotation of the rail when running through a narrow track curves

rails high rail resistance value to longitudinal displacement, which prevents the dangerous deformations of the rail in the contactless tracks

use of different widths of angled guide plate Wfp14k, enables horizontal adjustment in the range ± 5

interchangeability of all fastening elements

material of the rail pad: EVA, TPU

COMPONENTS OF FASTENING W14 TYPE SYSTEM:

- ① Dowel Sdu9 or Sdu25
- ② Rail pad Zw660a, Zw654a, Zw649a, Zw860t, Zw854t, Zw849t
- ③ Angled guide plate Wfp 14k 12
- ④ Spring clip Skl 14
- ⑤ Sleeper screw + flat washer Ss25/Ss35 + ULS7 and DHS25/DHS35 + ULS7

The fastening system of W14HH type

The rail fastening system W14 HH type is designed for heavy rail traffic with a maximum acceptable axle load of 350 kN. Underneath the rail foot, there is a rail pad of high static stiffness. Due to the mid-loop of the spring clip, that is situated over the rail foot, the rail fastening is characterized by additional elasticity. This eliminates the possibility of overloading the clips' arms and their plastic deformation, as well as prevents the rotation of the rail. Implementation of an anti-abrasive pad allows to prevent excessive wear of the fastening elements and prevents the sleepers from abrasion. Anti-abrasive pad provides particular advantages in the environment, where there is a large sanding of the track and the seats, where the rail is fastened.



FEATURES AND ADVANTAGES OF W14 HH TYPE SYSTEM:
simple installation, all of the components can be pre-assembled to the sleeper before taking it to the construction site
the construction and characteristic of spring clip Skl 14 R limiting the rotation of the rail when running through a narrow track curves
rails high rail resistance value to longitudinal displacement, which prevents the dangerous deformations of the rail in the contactless tracks
interchangeability of all fastening elements
optionally, the system can be equipped with an anti-abrasive pad to prevent excessive wear of the fastening elements

COMPONENTS OF FASTENING W14 HH TYPE SYSTEM:

- ① Dowel Sdu25
- ② Rail pad Zw860HH
- ③ Angled guide plate Wfp 14k 12 HH
- ④ Spring clip Skl 14 R
- ⑤ Sleeper screw + flat washer Ss35+ Uls7 and DHS35+Uls7
- ⑥ Anti-abrasive pad Abr166.

Fastening system of K type for concrete sleepers

Fastening system of a K type is a classic screw fastening encountered on the railway lines. They are used on prestressed concrete sleepers around the world. In the fastening system of a K type the sleeper is connected to ribbed plate. In case of fastening system of a K type, the under-base plate pad needs to be mounted under the ribbed plate. Rail seat pad is mounted under the rail foot. The rail is fixed using Łp 2 clip type.



COMPONENTS OF FASTENING K TYPE FOR CONCRETE SLEEPERS:

- ① Clip Łp2
- ② Base plate Ps60 or Ps49A
- ③ Rail pad B60 (60E1) or B49 (49E1)
- ④ Protective pads under base plate (insulation pad) P410
- ⑤ Dowel
- ⑥ Sleeper screw according to PN-60/K-80021 as well as BN-85 8934-09
- ⑦ Double coiled elastic ring (for screws) Pds25a
- ⑧ Triple elastic ring (for T-bolt) Pds 25b
- ⑨ T-bolt M22 z with cap Ssb 16-65

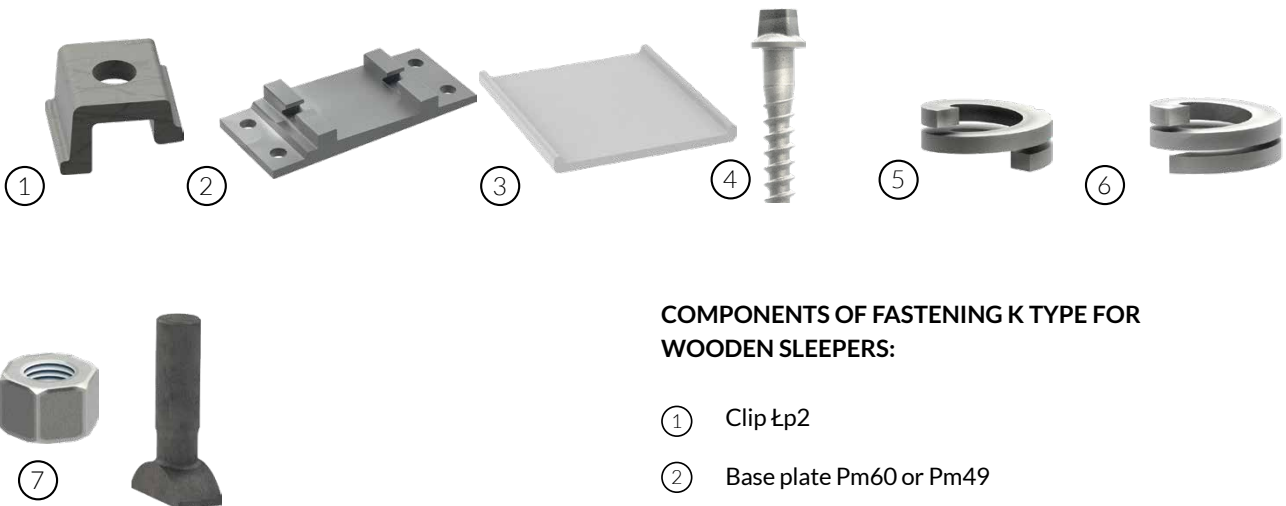
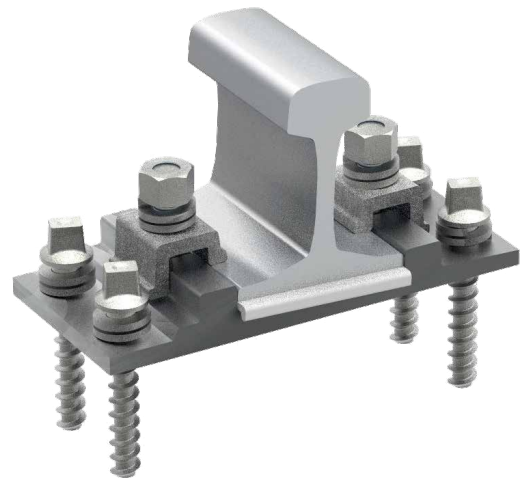
FEATURES AND ADVANTAGES OF K TYPE SYSTEM

the possibility of using the prestressed sleepers

providing proper insulation between the rail foot and the sleeper

Fastening system of K type for wooden sleepers

Fastening system of a K type is a classic screw fastening encountered on the railway lines. They are used on wooden sleepers around the world. In the fastening system of a K type the sleeper is connected to ribbed plate. In case of fastening system of a K type, the under-base plate pad needs to be mounted under the ribbed plate. Rail seat pad is mounted under the rail foot. The rail is fixed using Kp 2 clip type.



COMPONENTS OF FASTENING K TYPE FOR WOODEN SLEEPERS:

- ① Clip Kp2
- ② Base plate Pm60 or Pm49
- ③ Rail pad D60 (60E1) or D49 (49E1)
- ④ Sleeper screw according to PN-60/K-80021 and BN-85 8934-09 lub 49A
- ⑤ Double coiled elastic ring (for screws) Pds25a
- ⑥ Double/triple elastic ring (for T-bolt) Pds 25b
- ⑦ T-bolt M22 with cap Ssb 16-65

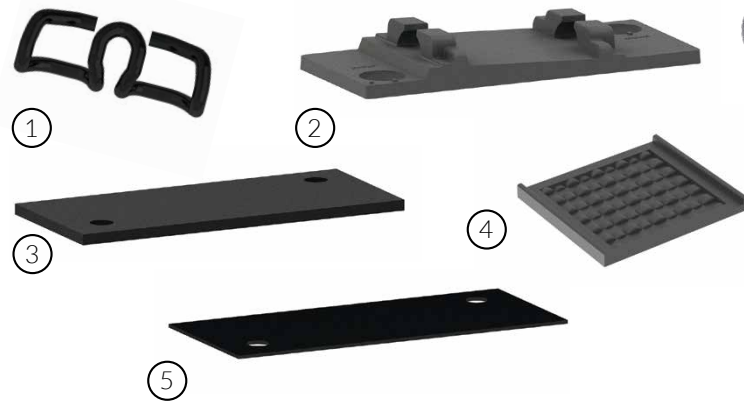
FEATURES AND ADVANTAGES OF K TYPE SYSTEM:

the possibility of using the wooden sleepers

providing proper insulation between the rail foot and the sleeper

The rail fastening system of KE1/2 and KE1/4 type

The rail fastening system of KE1/2 and KE1/4 type are dedicated for railway surfaces with balastless structure. KE1/2 system is dedicated for railway lines of D category, however KE1/4 system is dedicated for railway lines of C category acc. to EN 13481-5:2017 standard. The rail fastening system of KE1/2 and KE1/4 type system comply with the EN 13481-5:2017 and EN 13146-1:9 standard.



CHARACTERISTICS AND ADVANTAGES OF THE KE1/2 AND KE1/4 SYSTEMS:

system enables adjusting in the horizontal position within ± 5 mm (with 1 mm step) from the nominal position by means of eccentrics

system provides excellent electrical insulation, by using a regulation collar and insulation bushing made of plastic

regulation of vertical position through the usage of regulation pads

use of nuts with non-standard size polyamide inserts makes difficulty to dismantle the system, by unauthorized persons

static stiffness of the system in standard version: up to 25 kN/mm (it is possible to adjust static stiffness according to the customer's needs)

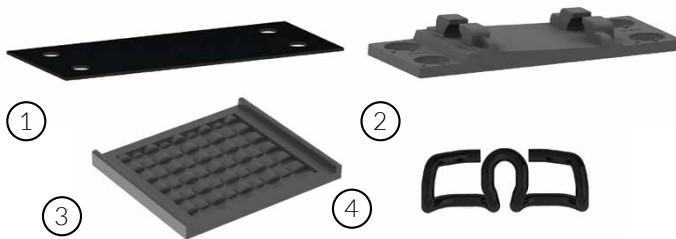
KE1/2 AND KE1/4 FASTENING SYSTEM COMPONENTS:

- ① Rail clip Skl12
- ② Base plate E2 or E4
- ③ Intermediate pad P-E2 or P-E4
- ④ Rail pad PWE60KE1
- ⑤ Regulating pad REG-E2 or REG-E4
- ⑥ Rail anchor + spring + stop-nut + collar
- ⑦ T-bolt M22 with flat pad Uls 6 Ssb 16-65 and nut

The rail fastening system of KE1/4 MOST type

The rail fastening system of KE1/4 MOST type system is designed for bridge ballastless track. The KE1/4 MOST type of rail fastening system is dedicated for 60E1 and 49E1 rail, to ensure the required track gauge and rail clamping force, and to limit the rails displacement, relatively to the steel plate of ballastless track. Using anchors from the KE1/2 or KE1/4 system instead of screws, enables the KE1/4 MOST system to be applied to a concrete slab of ballastless track. The KE1/4 MOST fastening system has been positively

tested for compliance with the EN 13481-5:2017 standard, category D.



CHARACTERISTICS AND ADVANTAGES OF THE KE1/4 MOST SYSTEM:

specialy shaped surface of the regulation pad and base plate allows the adjustment of each single base plate in the horizontal direction within ± 5 mm from the nominal position (with 1 mm step), which allows the adjustment of the track width within ± 10 mm with a 1 mm pitch

system provides excellent electrical insulation, by using a regulation collar and insulation bushing made of plastic

regulation of vertical position through the usage of regulation pads

use of nuts with non-standard size polyamide inserts makes difficulty to dismantle the system, by unauthorized persons

the possibility of using the additional base plate pads in order to determine the proper static stiffness of the system

KE1/4 MOST FASTENING SYSTEM COMPONENTS:

- ① Regulation pad REG-E4
- ② Base plate E4
- ③ Rail pad PWE60KE1
- ④ Rail clip Sk12
- ⑤ Anchoring system (Bolt M27 + collar + spring + bushing + washer + nut)
- ⑥ T-bolt Ssb 16-65 + flat pad Uls6 + nut M22

The rail fastening system of ME1/2 type

The ME1/2 rail fastening system is dedicated for mounting 60E1/49E1/54UIC profile rails to ensure the required track gauge and rail clamping, and to limit rail displacement relative to sleepers.

The system is designed for Metro and Trams for a 180 kN axle load (according to EN 13481-5: 2017 category B) and rolling stock for a maximum 260 kN axle load (according to EN 13481-5: 2017 category C).

The main element of the ME1/2 fastening system is the base plate made of reinforced plastic, which is embedded in the concrete ballastless track and is integrated with the W14 system with a rail pad.

Depending on the rail pad used, the fastening is dedicated for Metro and Trams – static stiffness ≤ 30 kN/mm and Railways – static stiffness > 30 kN/mm.



ADVANTAGES OF THE ME1/2 SYSTEM:

vertical adjustment by changing the level of plate embedment in the concrete slab of the ballastless track

horizontal adjustment ± 5 mm thanks to the use of different angle guides

the fastening system gives the possibility of preliminary assembly on temporary supports

the PUR rail pad allows you to adjust the static stiffness of the fastening depending on customer requirements and the application of the fastening

fixing is available in two versions: for categories B and C according to EN 13481-5:2017

ME1/2 FASTENING SYSTEM COMPONENTS:

- ① Base plate ME1
- ② Rail pad Zw1060
- ③ Spring clip Skl 14
- ④ Angled guide plate Wfp 14k12
- ⑤ Sleeper screw Ss35/DHS35 + UIs7 galvanized
- ⑥ Dowel Sdu25

Rail clip SKL-type

The spring clips are used in the rail fastening system to the rails of a type: 49E1 or 60E1 and tram lines of types: R1, R2 and 180S. The spring clip ensures

the spring clip ensures proper clamping force to prevent the rails displacement relative to the sleepers

CHARACTERISTIC	VALUE
SKL12	
Hardness	42-46 HRC
Clamping force	8,6-9,2 kN
Fatigue strength	5 million cycles, 10 Hz, clip deflection 1,4 mm
Longitudinal rail resistant	17,6-19,2 kN
Steel grade	38Si7 or alternative
SKL14	
Hardness	42-46 HRC
Clamping force	10,6 kN
Fatigue strength	5 million cycles, 18 Hz, clip deflection 1,7 mm
Longitudinal rail resistant	11,1-11,4 kN for EVA pad 18,6 kN for TPU pad
Steel grade	38Si7 or alternative
SKL14R	
Hardness	42-46 HRC
Clamping force	10,3-10,9 kN
Fatigue strength	3 million cycles, 5 Hz, clip deflection 1,8 mm
Longitudinal rail resistant	12,1 kN
Steel grade	38Si7 or alternative



SKL12



SKL14



SKL14R



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