tiantie group

Noise and Vibration Control in Railway Track

Metro
Commuter
Main Lines
High-Speed Lines

www.tiantiegroup.com

Company Overview

Zhejiang Tiantie Science & Technology Co., Ltd, is a Chinese company, specializing in noise & vibration mitigation technology for rail and industrial applications. Tiantie's comprehensive product range includes steel and rubber springs for FST, ballast mats, rail dampers, sleeper boots, rubber level crossings, noise absorption panels, and high-resiliency base plates.

Driven by finding optimum solutions for its clients, Zhejiang Tiantie is built on innovation and strong engineering and manufacturing know-how. In addition, the company provides a range of services, such as on-site advisory and commissioning. Products from Zhejiang Tiantie Industry stand for high reliability, long service life, and effectiveness in reducing noise and vibration.

Key Facts

Founded

2003

Revenue

$267 Mio USD. 2021

Employees

940(Group)

Competences

Noise and Vibration Control, Rubber Technology

Industries

Railway, Buildings, Industry

Headquarters

Tiantai, Zhejiang, China

Affiliates

20

Product Overview

Tiantie's core competency lies in innovation, design, engineering, and fabrication of track-related noise and vibration mitigation products. Individual, resilient components can be combined to achieve greater track performance, such as FST, and highly resilient fastening systems.

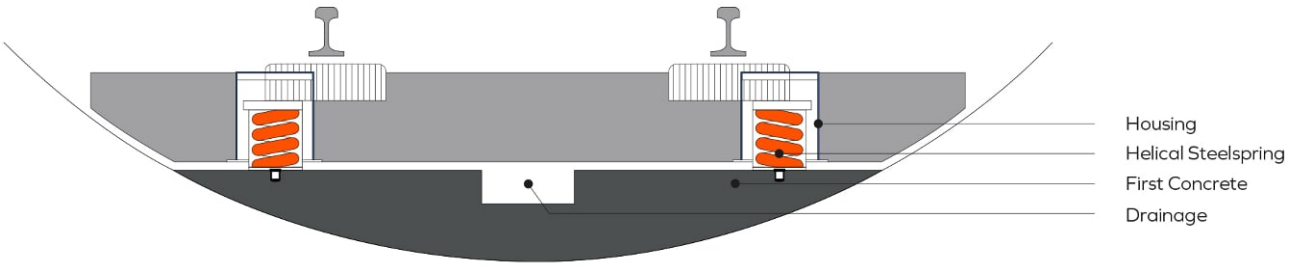
- Steel and Rubber Springs for FST
- Track Mats / Ballast Mats
- Sleeper Boots
- Rail Pads / Highly Resilient Baseplates
- Rail Dampers
- Sound-Absorbing Track Panel

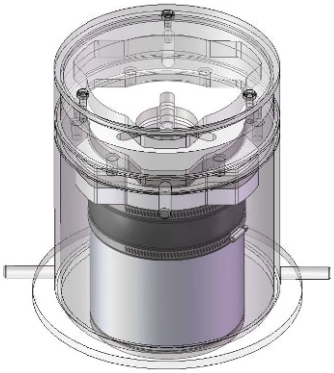
Individual, resilient component layers can be combined to achieve even greater track performance, such as FST and highly resilient fastening systems.

Applications

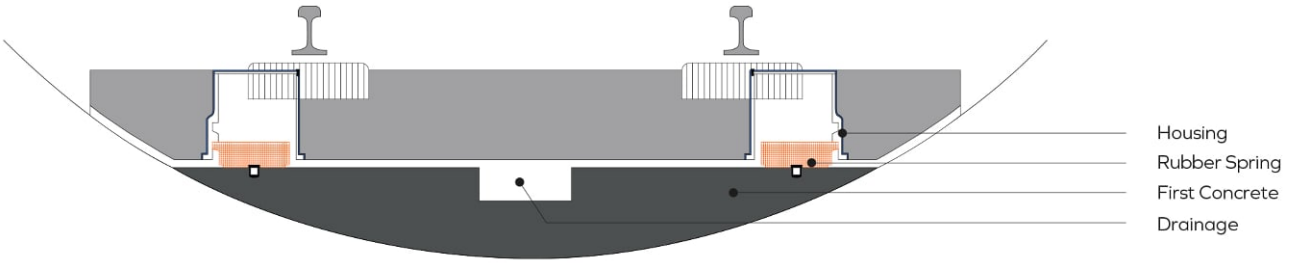
Floating Slab Track

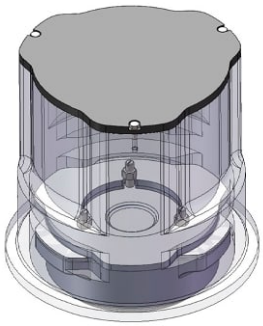
Floating Slab Tracks, or Mass Spring Systems, are proven to provide the best mitigation in a track. These mass-spring-systems (MSS) consist of floating slabs with the rails mounted on top. The slabs are usually constructed of reinforced concrete. Together with a dead load of rails, sleepers, and fastenings (and the ballast, if any), they form a dynamically active mass that is isolated from the sub-structure by means of elastic mounts, which may be of rubber, elastomeric material, or steel.





Floating Slab Track (FST) on Steel Springs



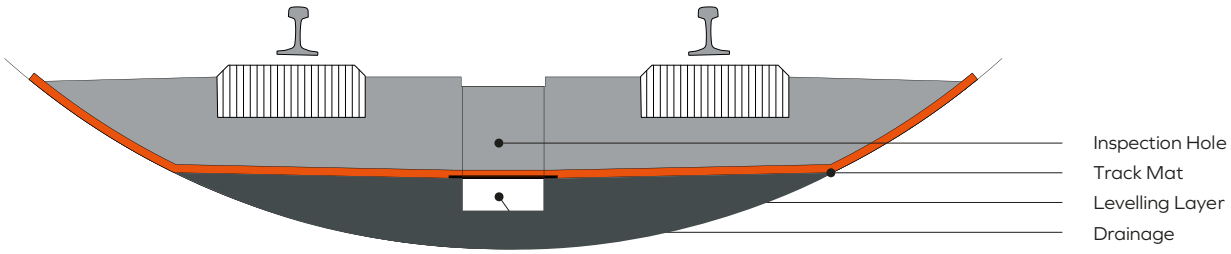


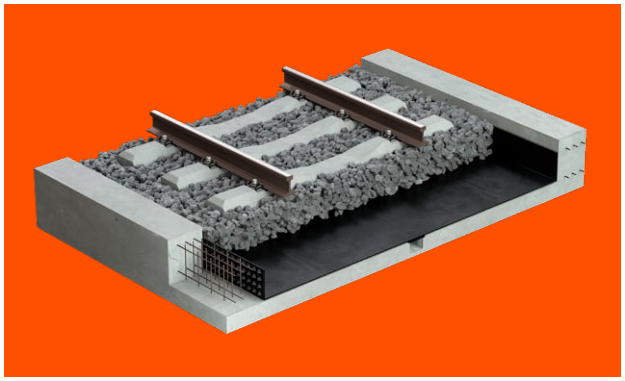
Floating Slab Track (FST) on Rubber Bearings

For optimum support with FST applications, Tiantie offers product options that include steel springs, rubber bearings, and high-resilience track mats.

The steel spring version is integrated into the slab, while the rubber version can be below or also integrated. The FST system frequency can vary between 5 Hz to 15 Hz depending on client specification.

Today, resilient Slab Track Mats are in use at many Metro and Light Rail Systems around the world, especially in applications where tunnels or bridges create ground-borne noise. Tiantie's resilient Track Mats present an ideal solution. Track Mats are installed onto a concrete bed, and fresh concrete is then cast directly onto the mats.





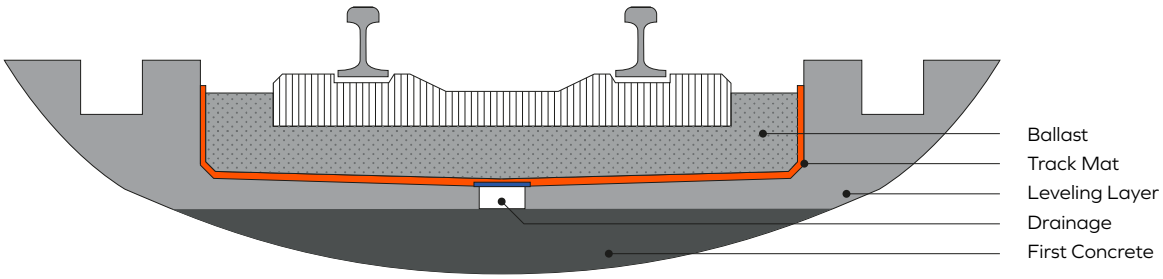
Track Mat Installation: Slab Track

Features and Benefits

- Provides greatest isolation efficiency, up to 30 dB
- Broad product range of FST bearings
- System frequencies from 5 Hz to 15 Hz
- Customized solutions
- Low profile
- Fatigue-resistant

Ballast Track

Tiantie Track Mats are one of the most effective methods of reducing vibration transmission from ballasted or slab track. When installed under ballast, Ballast Mats isolate the track structure from the supporting foundation or substrate, and can attenuate the vibration transmission by 20 dB in many cases.



Track Mat Installation: Ballast Track

Tiantie Track Mats are designed for optimum static and dynamic performance, specifically suitable for applications with main line, urban light rail, and metro axle loads. Track Mats are proven to perform reliably over a very long service life, and under any climate.

Mat Type	Width (mm)	Thickness (mm)	Static Bedding Modulus (N/mm^3)
G 1015	1550	15	0.100
G 1023	1500	23	0.060
G 1027	1500	27	0.030
G 1032	1550	32	0.020
USM 1000	1550	30	0.019
USM 1000W	1550	30	0.016
USM 2020	1550	27	0.020
USM 2025	1550	27	0.025
USM 2030	1550	27	0.030
USM 3000	1550	27	0.041
USM 3060	1550	27	0.060
USM 3080	1550	27	0.080
USM 4010	1550	14	0.100
USM 4015	1550	14	0.150

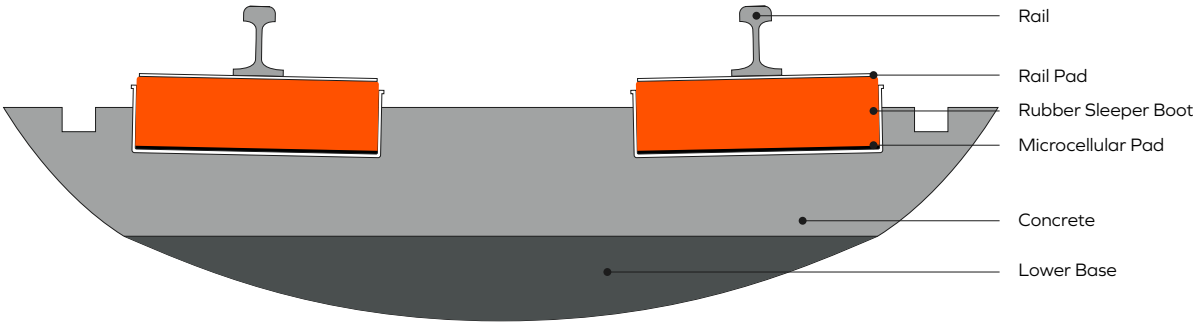
Features and Benefits

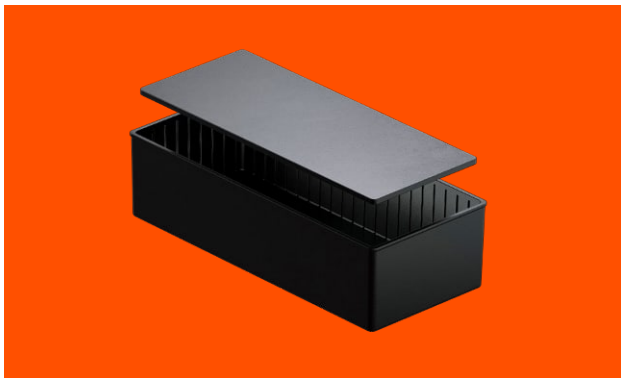
- Profiled Sheet Technology from Germany
- Enhanced acoustical performance
- Dynamic stiffening only cdyn/ cstat=1.4
- Reduces degradation of ballast by more than 50%
- Reduces stress on structures
- Provides bridge deck and waterproofing protection
- Reduces maintenance costs

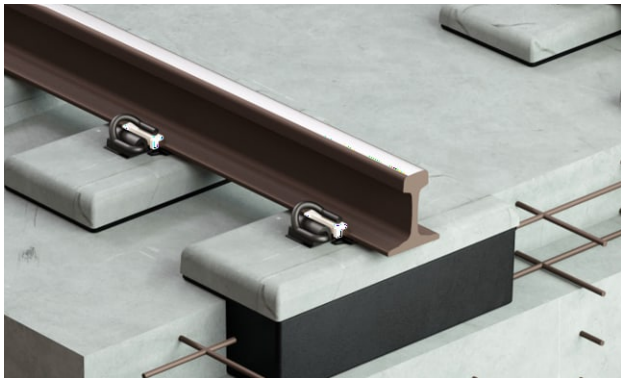
Sleeper Boots

Sleeper Boots provide excellent noise and vibration control. They are used with conventional slab tracks, and provide a degree of elasticity to help control smooth track deflection. The system consists of a concrete block surrounded by a rubber boot, and a block pad embedded in slab concrete.

Zhejiang Tiantie offers various elasticities for their rubber boots depending on loading and requested isolation efficiency.



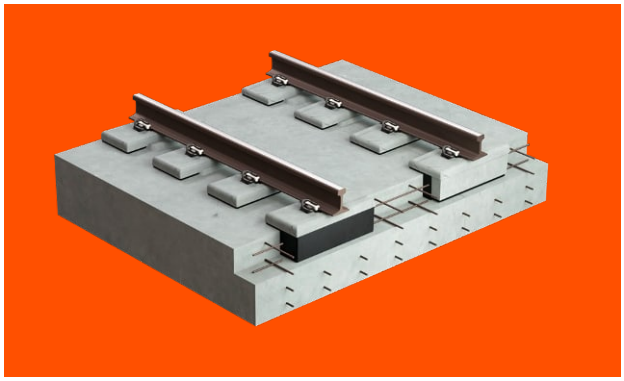




Sleeper Boots

Features and Benefits

- Available in different thicknesses, with stiffness as low as 14kN/mm
- Exceptional acoustic performance
- Custom-engineered solutions



Rail Pad / Highly Resilient Baseplates

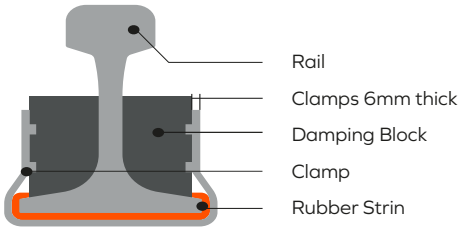
Rail pads are elastic rubber mats mounted between steel rails and the fastening system, to protect the sleeper top from wear and impact. A rail pad is also essential reducing shock and vibration in a rail system. Highly elastic pads offer the following features and benefits:

Features and Benefits

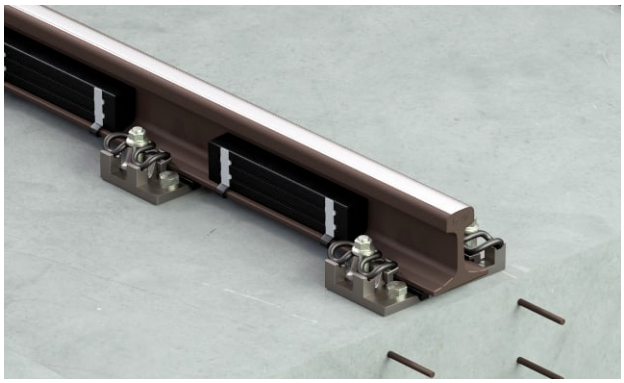
- Load distribution over a larger surface
- Elimination of load concentration and the resultant fatigue stresses
- Centering of loads on the supporting element
- Absorption of uneven contact surfaces between rail and support
- Reduction of noise and vibration
- Reduction of wear of the rail and its support

Zhejiang Tiantie offers certified rubber pads that are specifically designed for harsh-environment railway applications. Advantages include long service life, and resistance to abrasion and corrosion.

Rail Damper

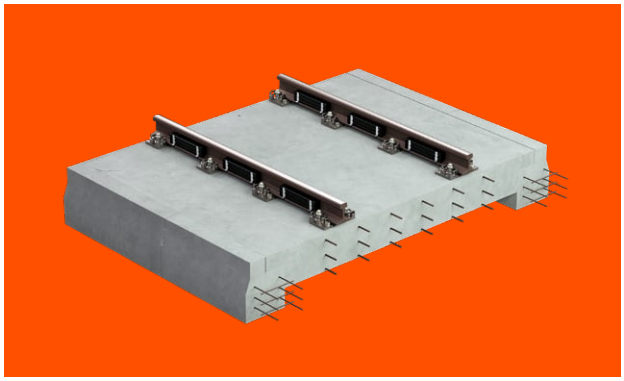


Rail Damper



Features and Benefits

- Noise Damping of approx. 3 dB
- Variable Tuning Frequencies
- Available for all Vignol Rails
- Robust
- Easy to install and replace

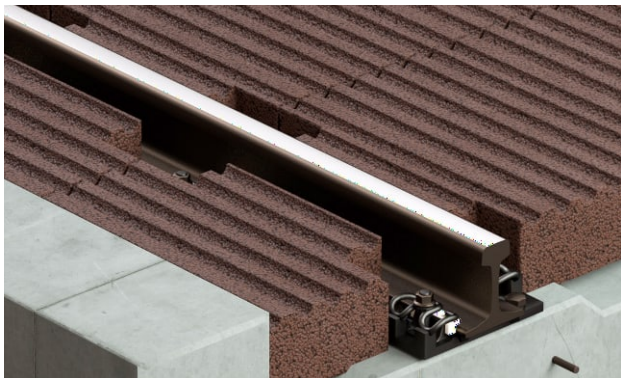


Sound-Absorbing Track Panels

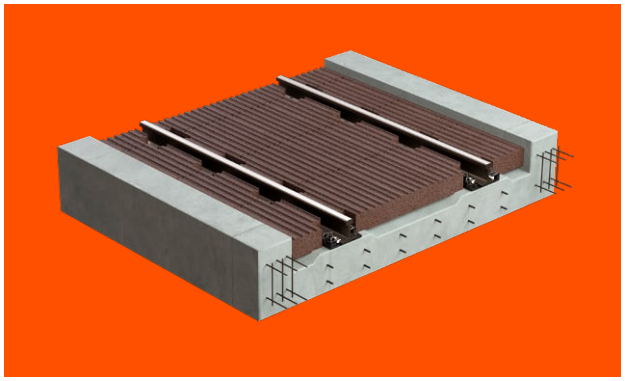
To reduce railway noise generated by friction between wheels and rails, engineers have developed flexible, porous track panels. Installed on the track between the rails, these panels have proven to be more effective than lining the walls of tunnels. The highly durable panels are made from non-combustible material, and are designed to withstand the high-impact world of track workers. Track panels can easily be cleaned, have a long service life, and provide high sound absorption. cleanability, and high sound absorption.

Features and Benefits

- Designed to reduce railway noise
- Stand-offs at bottom of panels create air gaps, which elevate the acoustic performance further
- Raised panel platform benefits workers
- Excellent sound absorption characteristics
- Rugged and durable material
- Easy to install and clean
- Custom sizes available



Sound absorbing Track Panels

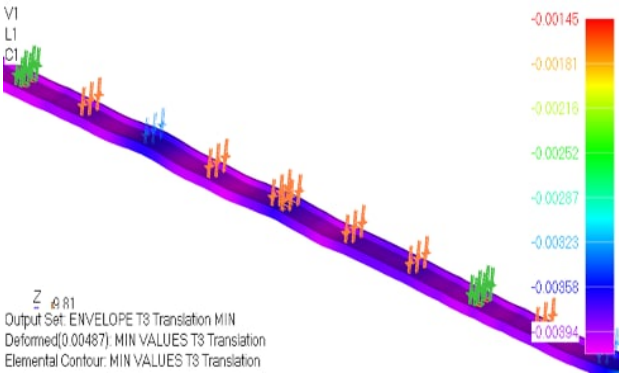


Technical Product Information

Detailed engineering and technical information is available with corresponding Specification sheets.

Engineering Services

To ensure optimum product performance, Tiantie uses specialized computer-and predictive modelling software in the design process, taking into account parameters such as track dynamics and rail deflection under various loads.
In addition to Tiantie's wide range of noise and vibration mitigation products, the company also provides expert installation services and/or supervision. Experienced engineers are available for installation and commissioning of all our products, including on-site monitoring and adjustments, Installation reports confirming "as-built" characteristics can also be provided.



Dynamic analysis of a railway track

Installation of Track Mats

New product development is the essence of Tiantie's corporate philosophy. Our engineering experts are actively participating in national and international committees. Tiantie's commitment to innovation, along with close collaboration with universities, design consultants and end-users, provide a solid basis for the development of next generation state-of-the-art products.

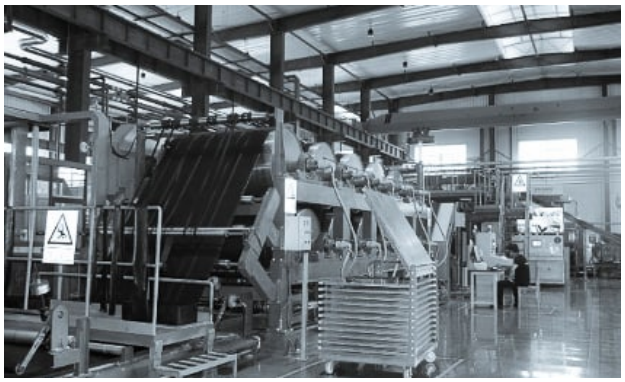
Continuously changing market conditions, evolving technology and new technical requirements demand timely responses and action. Tiantie's extensive in-house laboratories and testing facilities are well equipped to perform application testing or performance verification testing quickly and effectively.

Tiantie In-house testing

Tiantie on-site testing

Production Plants and Annual Capacity

Wholly-owned Zhejiang Tiantie production plants are large scale manufacturing facilities. Intelligent state-of-the-art production equipment and processes ensure highest quality products that meet customer needs, as well as regulatory requirements for environmental protection.



Production Plant

Production Plant

Quality Control

Global markets require compliance with a variety of different standards. Tiantie's Quality Management System ensures that product and process standards are consistent and in compliance, and documented in accordance with standards. Test reports, certifications and customer testimonials are available on request.

ENVIRONMENTAL MANAGEMENT SYSTEMS CERTIFICATION

Certificate No. : 17323E20429R1M

This is to certify that

Zhejiang Tiantie Science & Technology Co., Ltd.

Unified social credit code: 91331000757095033XC

Registered address: No. 928, Renmin East Road, Tiantai County, Taizhou, Zhejiang

Operating address: No. 928, Renmin East Road, Tiantai County, Taizhou, Zhejiang

Production address: No.12 Hexin Road, Hongyan Functional Zone, Sunhe Town, Tiantai County, Taizhou City, Zhejiang Province

is in conformity with

GB/T 24001-2016/ISO 14001:2015 standard

for the scope of

Design, production, and sales of railway rubber products (damper pad, crossing plates, boots, rubber pad, rubber spring floating plates, rail absorbers, polyester pads, rubber flange grooves), rubber conveyor belts, rubber sealing products (O-shaped rubber sealing rings, waterstops/strips, rubber elastic sealing pads), steel spring floating plates, seismic supports and hangers, waste tire mechanical crushing production lines, building vibration reduction/isolation rubber products; Steel joint (Rebar adapter) fireproof materials (magnesium bleach-bead high-crystal composite duct and plate) for buildings And office-related environmental management activities

Issue Date:Jul.08, 2020 Reissue Date:Feb.13, 2025 Valid Until:Jul.07, 2026

IAF CNAS 中国认可 国际互认 管理体系 MANAGEMENT SYSTEM CNAS C173-M

Beijing Zhongjiaoyuanhang Certification Co., Ltd.

Environmental Management System according to ISO 14001

QUALITY MANAGEMENT SYSTEMS CERTIFICATION

Certificate No. : 17323Q20806R1M

This is to certify that

Zhejiang Tiantie Science & Technology Co., Ltd.

Unified social credit code: 91331000757095033XC

Registered address: No. 928, Renmin East Road, Tiantai County, Taizhou, Zhejiang

Operating address: No. 928, Renmin East Road, Tiantai County, Taizhou, Zhejiang

Production address: No.12 Hexin Road, Hongyan Functional Zone, Sunhe Town, Tiantai County, Taizhou City, Zhejiang Province

is in conformity with

GB/T 19001-2016/ISO 9001:2015 standard

for the scope of

Design, production, and sales of railway rubber products (damper pad, crossing plates, boots, rubber pad, rubber spring floating plates, rail absorbers, polyester pads, rubber flange grooves), rubber conveyor belts, rubber sealing products (O-shaped rubber sealing rings, waterstops/strips, rubber elastic sealing pads), steel spring floating plates, seismic supports and hangers, waste tire mechanical crushing production lines, building vibration reduction/isolation rubber products; Steel joint (Rebar adapter) fireproof materials (magnesium bleach-bead high-crystal composite duct and plate) for buildings

Issue Date:Jul.08, 2020 Reissue Date:Feb.13, 2025 Valid Until:Jul.7, 2026

IAF CNAS 中国认可 国际互认 管理体系 MANAGEMENT SYSTEM CNAS C173-M

Beijing Zhongjiaoyuanhang Certification Co., Ltd.

Quality Management System according to ISO 9001

OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEMS CERTIFICATION

Certificate No. : 17323S20412R1M

This is to certify that

Zhejiang Tiantie Science & Technology Co., Ltd.

Unified social credit code: 91331000757095033XC

Registered address: No. 928, Renmin East Road, Tiantai County, Taizhou, Zhejiang

Operating address: No. 928, Renmin East Road, Tiantai County, Taizhou, Zhejiang

Production address: No.12 Hexin Road, Hongyan Functional Zone, Sunhe Town, Tiantai County, Taizhou City, Zhejiang Province

is in conformity with

GB/T45001-2020/ISO45001:2018 standard

for the scope of

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IAF CNAS 中国认可 国际互认 管理体系 MANAGEMENT SYSTEM CNAS C173-M

Beijing Zhongjiaoyuanhang Certification Co., Ltd.

Occupational Health and Safety System according to ISO 45001

References

Zhejiang Tiantie is a market leader in the development and manufacturing of noise and vibration mitigation products for High-Speed Rail, Main, Commuter and Metro lines. The company's commitment to innovation, quality, reliability and favorable pricing is reflected in the long list of successfully installed and commissioned projects.

Length of completed installations:

Track Mats	1046 km	Rubber Sleeper Boots	1680 km
FST on Rubber Bearings	46 km	Rail Pads	390 km
FST on Steel Springs	19 km	Rail Dampers	78 km

Ballast Mat: Wuhan Metro

FST on Rubber Bearings: Ningbo Fengshua Line

Rail Dampers: Nanjing Metro Line 4

FST on Helical Steel Springs: Kunming Metro

Zhejiang Tiantie Science & Technology Co., Ltd.

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