Railway infrastructure diagnostics
for safety and comfort

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MOBILE DIAGNOSTIC TOOLS

President
Vladimir Tarabrin

AO «Firma TVEMA», a private company, founded in 1989, is the world leader in the development, production and implementation of systems for the railway infrastructure diagnostics. The company is the only manufacturer in the world that has in its product range all types of tools for the track superstructure and overhead line diagnostics. It performs the full scope of work on the design, production and maintenance of these tools.

COMPANY ACTIVITIES

The company's headquarters, production and repair and training centers are located in Moscow, the branch offices operate in Fryazino and Irkutsk, and the regional offices are opened in Kiev, Beijing and New Delhi.

The company has more than 300 employees, almost half of whom are engineers of various specialties. The production and repair center with an area of more than 8 thousand square meters includes access tracks, repair and maintenance shops, office and laboratory facilities, indoor and outdoor sites. The center fully meets the requirements of international quality management systems — the general ISO 9001 and the industry-specific IRIS.

Nowadays, dozens of railway companies and subways worldwide operate approximately 400 mobile and over 4,000 hand-held and portable diagnostic tools manufactured by TVEMA. Our innovative products and technologies successfully operate in more than 30 world countries on five continents. The company's products can be found on the railways of Russia and Germany, Czech Republic and France, USA and Brazil, Canada and Slovakia, Finland and Bulgaria, Romania and Serbia, Israel and Hungary, Turkey and Mongolia, China and India, Guinea and Libya, Ukraine and Belarus, Kazakhstan and Kyrgyzstan, Turkmenistan and Armenia, Latvia and Estonia. Our products are used in Moscow, St. Petersburg, Novosibirsk, Nizhny Novgorod, Minsk, Almaty, Baku and Beijing subways, at industrial enterprises of large Russian companies: Gazprom Neft, LUKOIL, Severstal, Coal Company Severny Kuzbass, Metalloinvest Holding. Among our clients are the Baikonur and Plesetsk spaceports and even the children's railway in the city of Novosibirsk.

For about three decades, TVEMA has cooperated with Russian Railways. At the same time, the company made many of its developments in close cooperation with Russian Railways, and on the basis of its decisions made by the order of the Russian government. Products of the TVEMA brand make up three quarters of the all-Russian fleet of mobile diagnostic tools and more than 50% for the CIS countries. Non-production company activities worth special noting. For example, a certified "Center for Training of Specialists in Technical Diagnostics" is operating in Moscow. Since 2009, over 7,000 representatives of railways and subways of Russia and foreign countries have been trained here. The developed technical support service and its own personnel training center allow the company to ensure not only the quick commissioning of even the most sophisticated equipment, but also its further trouble-free operation.

By deciding to cooperate with us, you can be sure that the operation of your railway infrastructure facilities will become safer and more efficient.

MOBILE RAILWAY INFRASTRUCTURE DIAGNOSTIC AND MAINTENANCE TOOLS

Based on the diagnostic and inspection results, a comprehensive monitoring of the natural railway infrastructure element breakdown over the entire service life is provided, their condition is predicted, proposals are prepared for changing technical conditions, standards and instructions to optimize financial costs on the infrastructure maintenance.

With the growth of train speeds and freight traffic intensity, the requirements for the diagnostic and inspection tool operation also change. For example, in recent years, a comprehensive assessment of the infrastructure facilities condition has been carried out on the railway network of Russia and the world. The greatest attention in diagnostics and inspection is given to railway facilities as the most significant link in the infrastructure, condition of which significantly affects the train traffic safety. The introduction and integrated use of new mobile diagnostic and inspection tools will allow to improve the railway track monitoring quality and reliability, assess the actions of operators during the inspection.

The vast experience in the development of unique technical solutions for infrastructure inspection allowed TVEMA to create and implement about 400 mobile diagnostic and inspection tools based on various types of railway rolling stock for almost three decades. The use of such tools allowed to significantly reduce operating costs due to lower cost of inspections, increasing their frequency, and, as a result, timely flaw detection. Today we offer our customers various options of integrated solutions in the field of rail quality control.

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RAPID AND HIGH-SPEED INFRASTRUCTURE DIAGNOSTIC SOLUTIONS

The latest TVEMA diagnostic solutions allow to use them as part of passenger trains to perform a comprehensive railway infrastructure inspection at high speeds within one run.

PRODUCT PURPOSE AND COMPOSITION

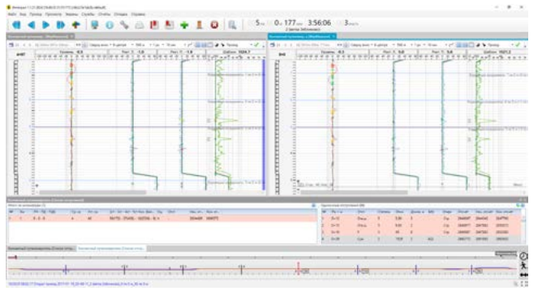
INTEGRAL diagnostic train

In 2007, the INTEGRAL diagnostic train entered the Russian railways, for the first time providing inspection of all railway infrastructure facilities in the speed range from 0 to 100 km/h. The versatile diagnostics integrated into a single solution made it possible not only to improve the quality of the infrastructure condition inspections, but also save the resources required for it. Nowadays, two trains are operated on the Moscow and Far Eastern railways of Russia.

SPRINTER-INTEGRAL high-speed infrastructure diagnostic vehicle

In 2017, the SPRINTER-INTEGRAL vehicle designed for comprehensive railway infrastructure diagnostics at high speeds as part of passenger trains was created on the basis of the SPRINTER high-speed flaw detector complex, which makes it possible to perform rail ultrasonic testing at speeds up to 140 km/h.

SPRINTER-INTEGRAL is a multifunctional diagnostic tool and is based on one vehicle. It combines many different inspection subsystems, which make it possible to measure approximately 200 parameters for assessing the condition of various facilities in the railway infrastructure — tracks and structures, railway automation and telemechanics, electrification and power supply, communication networks. Many of the solution's systems have no counterparts in Russia and abroad. The SPRINTER-INTEGRAL is operated on the East-Siberian and West-Siberian railways of Russia and the railways of Kazakhstan.



SOFTWARE

The operation of all diagnostic systems of the car is integrated by INTEGRAL software. This ensures the data synchronization for these systems and the combination of their visualizations at one workstation. Diagnostic results are transferred to the Unified Corporate Automated Infrastructure Management System of OAO Russian Railways on-line. This made it possible to conduct a comprehensive multivariate analysis of diagnostic results using technological devices — the automated system for combinatorial data analysis CASCADE and the automated data evaluation module ASTRA. Subsequent data processing in the CASCADE hardware and software allows to move from recording already occurred failures (defective rails) to planning the necessary repair and maintenance work.

SCOPE OF APPLICATION

The network of railways.

ADVANTAGES

- Allow to perform high-speed integrated infrastructure diagnostics.
- All systems are united by a single software solution.
- Ability to use data from technological systems.
- Allow to save financial and human resources.
- Optimize train schedules.

VD-UMT-2 FLAW DETECTION CARS

The new generation of cars for a comprehensive inspection and assessment of the railway infrastructure technical facilities condition is equipped with an extensive set of diagnostic equipment to ensure reliable monitoring in full compliance with EN and TSI standards.

PRODUCT PURPOSE AND COMPOSITION

The VD-UMT-2 flaw detection car is designed for comprehensive railway infrastructure facility diagnostics by ultrasonic, magnetic, visual-measuring and optical non-destructive testing methods.

The car is equipped with:

— modernized multichannel flaw detector ECHO-COMPLEX-2;

— high-speed rail profile and track geometry measurement system SOKOL-2.3;

— visual flaw detection system SVOD-2.

The car is equipped with a MARS reinforced magnetizing system with a magnetic flux one and a half times higher than all similar systems available on the railways of Russia and the CIS and capable of operating in a wide range of temperatures.

Distinctive features of the VD-UMT-2 are the presence of:

— NDT bogie of new design;

— non-contact magnetic centering system, providing accurate positioning of the ultrasonic system;

— magnetizing system providing magnetic test by the applied field method;

— linear video cameras with backlight, allowing to monitor the track superstructure elements condition;

— rail intersection recognition;

— ASTRA module for automated evaluation of data from flaw detection tools.

SOFTWARE

The INTEGRAL software and recording solution ensure the recording of diagnostic data, current track coordinate and the vehicle speed, as well as the archiving and storage of inspection data for all diagnostic systems.

The ASTRA module for automated evaluation of data from flaw detection tools allows automated rail flaw evaluation and the infrastructure facility condition monitoring under operating conditions. Subsequent data processing in the CASCADE hardware and software allows to move from recording already occurred failures (defective rails) to planning the necessary repair and maintenance work.

SCOPE OF APPLICATION

The network of railways.

ADVANTAGES

— Allows to perform rapid comprehensive infrastructure diagnostics.

— All systems are united by a single software solution.

— Ability to use data from additional technological systems.

— Allows to predict the pre-failure rail condition.

— Operation in a wide range of temperatures.

DECART DIAGNOSTIC CARS

DECART is based on one vehicle and combines various inspection subsystems, allowing to measure and process many parameters of the condition of various railway infrastructure facilities at high speeds and in one run.

PRODUCT PURPOSE AND COMPOSITION

DECART diagnostic car is designed for continuous comprehensive railway infrastructure diagnostics during the movement.

All diagnostic systems used in the DECART car are developed on the basis of innovative digital technologies and can improve the forecast calculation accuracy. Many of these systems have no counterparts in Russia and abroad.

DECART was designed and made with due consideration of modern requirements for ergonomics, functionality and safety. It is made on the basis of a four-axle all-steel compartment car manufactured by OAO TVZ and differs from the previous generation of VD series diagnostic cars in more comfortable conditions for the crew work and rest. The car is equipped with a modern heating and air conditioning system, an autonomous power supply system, fire safety system and other life support systems that fully comply with international standards of heat, vibration and noise insulation, which makes it ideal for long-term crew accommodation in autonomous conditions. The car can be used as part of diagnostic and passenger trains, as well as with a separate locomotive.

SOFTWARE

All diagnostic systems are controlled by the INTEGRAL software, a unique tool for conducting effective measurements and data processing. Unified storage and hardware synchronization of devices and data provide operators with access to functionality that significantly increases productivity.

SCOPE OF APPLICATION

The network of railways.

ADVANTAGES

- Allows to perform rapid comprehensive infrastructure diagnostics.
- All systems are united by a single software solution.
- Ability to use data from technological systems.
- Allows to predict the pre-failure rail condition.
- Operation in a wide range of temperatures.

VIKS-T LABORATORY CARS FOR THE OVERHEAD LINE TESTING

Since 2014, TVEMA has mastered the production of new generation laboratory cars for high-speed testing of the railway overhead line.

PRODUCT PURPOSE AND COMPOSITION

The VIKS-T laboratory car allows to monitor the main and additional parameters of the overhead line, and perform thermal imaging inspection of its elements along with the ultraviolet diagnostics of insulators. The overhead geometry is measured by non-contact method, with both raised and lowered current collector. The signals recorded by the sensors are processed by the laboratory computer system during the movement. The inspection can be carried out from two or more operator workstations, one of which is located in the laboratory car instrument room, and the other is in the observation tower (if available). An observation tower with windows equipped with heating and a cleaning system provides the operator with an all-round view at any time of the year or day, and armored windows protect the operator in the event of a current collector breakdown.

The VIKS-T laboratory is equipped with a modern heating and air conditioning system, an autonomous power supply system, a fire safety system and other life support systems that provide the crew with all the conditions for comfortable and safe work and long-term autonomous accommodation. The laboratory car can be used both as part of a conventional train, and with a separate locomotive. This allows to flexibly adapt to the needs of a particular railway and not violate the train schedule.

SOFTWARE

The operation of all of the laboratory car diagnostic systems is synchronized by the integrated INTEGRAL software, which provides a high level of data processing automation. Its' use increases the crew efficiency and reduces labor costs. Scoring and report generation are performed automatically, and the operator only has to check the program results.

SCOPE OF APPLICATION

The network of railways.

ADVANTAGES

- High accuracy of parameter measurement.
- Allows to perform rapid diagnostics of the overhead line parameters being part of the passenger train.
- Comprehensive measurement of the overhead line geometry parameters.
- All systems are united by a single software.
- Operation in a wide range of temperatures.

MODEL 61-919 LABORATORY CARS FOR VARIOUS PURPOSES

Being one of the leading diagnostic equipment manufacturers and suppliers for the railways of Russia and the CIS countries, TVEMA also successfully develops the production of laboratory cars for the needs of various railway services and industrial enterprises.

PRODUCT PURPOSE AND COMPOSITION

Model 61-919 laboratory cars have many design options and are designed to carry out a variety of the railway infrastructure facility research and testing in the field conditions. The laboratories are equipped on the basis of compartment passenger cars manufactured by OAO TVZ, and their standard internal configuration consists of a working compartment, a kitchen compartment, a crew compartment, a service module with a workshop, a diesel generator unit room and sanitary facilities equipped with modern equipment.

Outside, depending on the purpose, the laboratory may differ from a regular car by the presence of inspection windows (on the sides of the working compartment — for track monitoring; on the roof — for the overhead line suspension monitoring), video cameras and searchlights, various diagnostic equipment located in the undercarriage space. All laboratory cars produced by TVEMA are equipped with modern life support systems, an autonomous power supply system, fire safety system and other systems that fully comply with international standards for heat, vibration and noise insulation, which makes these cars ideal for comfortable and safe work and long-term crew accommodation in autonomous conditions. They are equipped with a combined heating system that allows the use of various energy sources — coal, diesel fuel and electricity. Workplaces in the car are designed with due consideration of modern ergonomics, functionality and safety requirements, and their equipping with modern measuring systems, computer equipment and a wide range of adjustment and repair tools allows to perform work of any level of complexity in the field conditions.

SOFTWARE

Presence of special software with a high level of data processing automation increases the crew work efficiency and reduces labor costs. Report generation is made automatically, and the operator only has to check the program results.

SCOPE OF APPLICATION

The network of railways.

ADVANTAGES

- Car modernization is carried out according to the Customer individual request.
- Cars are equipped with modern life support systems and other systems that fully comply with international standards.
- All systems are united by a single software solution.
- Operation in a wide range of temperatures.

CARS AND SERVICE AND TECHNICAL MODULES FOR THE LARGE-CAPACITY REFRIGERATED CONTAINER GROUP POWER SUPPLY

A joint project of TVEMA with the Ministry of Transport of Russia, the Ministry of Industry and Trade with the participation of MK REFTRANS LLC, was implemented in 2017.

PRODUCT PURPOSE AND COMPOSITION

Special cars and service and technical modules for the large-capacity refrigerated container group power supply are designed for operation as part of freight and service trains, as well as with a separate locomotive.

The product performs the following tasks:

— support of refrigerated containers as part of freight trains;

— electricity provision to external consumers in the train on the route and in the parking lot;

— placement of fuel for the diesel generator unit (DGU) operation;

— staff accommodation and work support.

The cars and modules are equipped with combined heating system, allowing to maintain comfortable working conditions in personnel rooms at low ambient temperatures. The system allows to use coal, diesel fuel and electricity as an energy source. The diesel generator unit capacity is from 120 to 500 kW.

The parallel operation of the car diesel generator units allows to:

— balance the running hours to obtain an equal number at both DGUs with their alternating operation;

— significantly save fuel during load changes due to the operation of only one DGU.

The fuel supply in the car provides a long period of continuous operation of DGUs.

At the customer request, for the power supply of external consumers in the train en route, there are options for the production of service and technical modules based on 40 and 45 foot sea containers, which can be operated both autonomously and with the participation of staff on a special railway platform.

SOFTWARE

The software provides data processing with a high level of automation, increases crew efficiency and reduces labor costs. Automated car movement parameter recorder allows to perform:

— collection of data on each container;

— real-time monitoring of fuel consumption metering and DGU telemetry;

— packet data transfer over the radio channel to the consumer server;

— determination of the location geographical coordinates by GLONNAS/GPS channels.

SCOPE OF APPLICATION

The network of railways and industrial enterprises.

ADVANTAGES

— Has no counterparts in Russia and the CIS countries.

— Operation in a wide range of temperatures.

— Long service life before overhaul.

SEVER PROJECT MULTIPURPOSE RAILCARS

In 2009, for the high-quality and efficient maintenance of railway infrastructure facilities, TVEMA developed and produced the first multipurpose railcar of the SEVER project.

PRODUCT PURPOSE AND COMPOSITION

One of the main purposes of the SEVER project multipurpose railcar is being a platform for placing various-purpose systems for railway infrastructure diagnostics. The SEVER railcar can also act as a vehicle for inspections and as a means of track crew delivery to the work place at railway infrastructure facilities.

The SEVER railcar is equipped with a modern heating and air conditioning system, an autonomous power supply system, fire safety system and other life support systems that fully comply with international standards of heat, vibration and noise insulation, which makes it ideal for long-term crew accommodation in autonomous conditions. The railcar is equipped with a MTU Power Pack power plant, which ensures its movement by rail at a speed of 120 km/h and the operation of all its energy consumers.

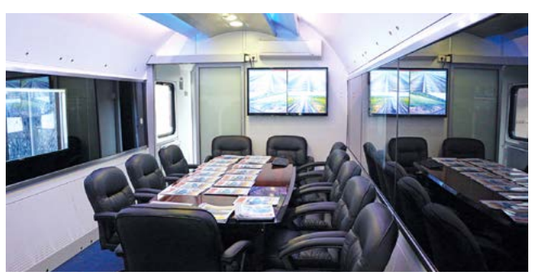
The railcar modification series includes:

— Multifunctional self-propelled diagnostic solution for comprehensive railway infrastructure diagnostics. Various inspection and diagnostic systems can be installed on it at the customer request.

— Inspection railcar for inspection by the managers of railway companies, equipped with video surveillance and inspection systems and other necessary equipment.

— Passenger and freight railcar for comfortable transportation of track crews to the work place at infrastructure facilities. The railcar is equipped with utility equipment for eating, clothes drying and carrying out hygienic procedures, has a storage for the necessary tools and a room for track crew accommodation.

Interior configuration options allow the customer to choose the railcar configuration for specific task. Nowadays, the SEVER project railcars of various modifications are operated on 11 railways of Russia.



SOFTWARE

The special INTEGRAL software synchronizes the operation of all diagnostic systems of the railcar, records and processes their signals and allows centralized monitoring and control of the operation of all jointly operating subsystems. Such unparalleled methodology provides a high degree of coordination and integration of actions of all monitoring elements.

SCOPE OF APPLICATION

The network of railways.

ADVANTAGES

— Versatility.

— All systems are united by a single software.

— Operation in a wide range of temperatures.

PIONEER-INTEGRAL PROJECT MULTIPURPOSE RAILCARS

The PIONEER-INTEGRAL project two-section multipurpose diesel railcar was developed by TVEMA based on the technical requirements of Russian Railways.

PRODUCT PURPOSE AND COMPOSITION

The railcar can act as a platform for placing various-purpose systems for the railway infrastructure diagnostics, and as a vehicle for inspections. The railcar is a coupling of two sections (A — traction and B — diagnostic) with an electromechanical transmission.

The motor section A standard configuration includes:

— control cab;

— two diesel generator compartments;

— sanitary room;

— shower room;

— 2-bunk compartments for rest.

The section B standard configuration includes:

— control cab;

— kitchen;

— sanitary room;

— utility space;

— working compartment or inspector compartment.

The railcar is equipped with a modern heating and air conditioning system, an autonomous power supply system, a fire safety system and other life support systems that fully comply with international standards, which makes it an ideal place for long-term crew accommodation in autonomous conditions. The railcar diesel generator provides its movement by rail at a speed of up to 120 km/h, and the power supply of equipment, tools and the railcar own needs.

The railcar modification series includes:

— Multifunctional self-propelled diagnostic solution for comprehensive railway infrastructure diagnostics.

— Inspection car for inspections by managers of railway companies.

Interior configuration options allow the customer to choose the railcar configuration for specific task.

SOFTWARE

The INTEGRAL software provides processing of the measurement data obtained during the operation, synchronizes the operation of all of the railcar diagnostic systems, records and processes their data, provides accumulation, storage, processing and display of measurement results and implements on-line export of operation results to the railway service units.

SCOPE OF APPLICATION

The network of railways.

ADVANTAGES

— Versatility.

— All systems are united by a single software.

— Operation in a wide range of temperatures.

RAIL LUBRICATION CARS (LUBRICATORS)

The new generation rail lubrication car is designed for rail lubrication in curves (in the long run and on straight sections) on main tracks with high freight traffic intensity.

PRODUCT PURPOSE AND COMPOSITION

The car is equipped with a modern heating and air conditioning system, an autonomous power supply system, fire safety system and other life support systems that fully comply with international standards of heat, vibration and noise insulation, which makes it ideal for long-term crew accommodation in autonomous conditions. The product is made on the basis of four-axle all-steel compartment cars manufactured by OAO TVZ.

A unique lubrication system has been created to lubricate the rail head. It operates in accordance with route data generated on the basis of data sheet databases. The rail lubricating unit has two types of lubricant supply: the main — hydraulic and backup — pneumatic.

The unit includes:

— refilling system;

— two lubricant supply tanks;

— compressor with receiver;

— automatic system for the lubricant supply to the nozzle with the ability to control from GLONASS/GPS or a gyroscopic sensor (as a backup);

— nodes of lubricant supply to rails, with external pipeline and nozzle heating system.

The car is equipped with a video surveillance system for the lubricant application to the rails. The lubricant tank capacity is 1200 l, and two loading modules provide loading of lubricant barrels with a total capacity of two m³. The car turn-around distance with a single refueling with lubricant is up to 5000 km, and the specific lubricant consumption per 1 km of lubricated rail is 0.15–0.35 l.

A modified lubricator with additional diagnostic functionality is also being operated, retrofitted with an innovative eddy-current flaw detector and the SVOD-2 visual flaw detection system.

SOFTWARE

Presence of special software with a high level of data processing automation increases the crew work efficiency and reduces labor costs. The reports are created automatically.

SCOPE OF APPLICATION

The network of railways.

ADVANTAGES

— Has no counterparts in Russia and the world.

— Special software.

— Operation in a wide range of temperatures.

— Ability to install diagnostic systems.

— Reduction of operating costs on lubrication.

OTHER CARS AND SOLUTIONS

For about three decades, the company has been closely cooperating with Russian Railways, particularly through joint developments that are made on the basis of decisions of the management of Russian Railways, made by the order of the government of the Russian Federation.

PRODUCT PURPOSE AND COMPOSITION

Many of the projects that were planned at Russian Railways, have been successfully implemented at the company production base. Here are some of these projects:

— Mobile exhibition and lecture complex (MELC). This most important social project, which is unparalleled in the history of Russia, was implemented in 2011. The first in the country mobile museum was created in the shortest possible time, it regularly demonstrates the latest solutions used in the deep modernization of Russian railways. Since then, the MELC has passed over 500 thousand km, and the exhibition was visited by more than a million people in 892 cities.

— Cars for VIP passengers and inspectors. At the customer request, at the company production and repair base, the cars can be equipped with separate bedrooms or an office with a berth, conference room, kitchen, toilet room with shower, automatic doors, as well as air conditioning systems, modern television, video and music equipment. In their manufacture, the most modern data visualization technologies and highly effective resource-saving technologies for all car system monitoring and control are used.

— Special rolling stock escort cars. They were developed on the basis of the refrigerator section and are designed to escort and protect special railway vehicles (such as hopper dispensers, dump cars, etc.) as part of special and freight trains. The escort cars fully comply with all accepted international standards, which makes them ideal for comfortable autonomous crew accommodation. Interior configuration options allow the customer to choose the car configuration for specific task.

In implementing its projects, TVEMA collaborates with dozens of high-tech companies around the world. This fact, coupled with its own high scientific and engineering potential, allows the company to use innovative technical solutions in production, quickly implement breakthrough ideas and offer customers the best-in-class products. These factors make TVEMA an attractive partner for the world's leading railway companies in the implementation of significant industry projects.

SCOPE OF APPLICATION

The network of railways.

ADVANTAGES

— Versatility.

— Efficiency.

— Project customization.

— Operation in a wide range of temperatures.

SERVICE MAINTENANCE AND OVERHAUL

TVEMA provides comprehensive support to consumers of its products throughout the entire period of their operation, and performs orders for the car repair and renovation.

SERVICE MAINTENANCE

The company provides high-quality operational warranty and post-warranty maintenance of its systems and equipment. Within the framework of this service, delivery of equipment and spare parts to service centers or specialist visit for equipment maintenance and repair, and for the software update are performed. For the customer convenience, Russia has a program for the spare part and equipment supply through ROSZHELDORSNAB.

Our service centers provide services in Moscow and Irkutsk. The high consumer properties of our products are confirmed by the company certification in two international quality management systems — the general ISO 9001 and the industry-specific IRIS.

CAR OVERHAUL AND REFIT

The company carries out overhaul, refit, rearrangement and retrofitting of service and technical vehicles for special purposes of both own and third-party production.

Following the modern world design and ergonomics requirements and relying on their own experience, TVEMA designs and manufactures almost any interiors that provide comfortable conditions for work and rest, both for the crews of special rolling stock and for the railway managing staff. The company's own production base with an area of over 8000 square meters allows to make any turn-key interior on request. In addition to the industrial complex (including furniture, composition, sewing, mechanical, electrical, welding and assembly sections), there are also office premises for the engineering and technical staff. Nowadays, the company production collective consists of more than 300 people of various specialties.

Since 2011, more than 450 units of mobile diagnostic tools and more than 2,200 units of portable ones have received various types of repairs at the company's production bases in Moscow and Irkutsk.

The regular customers of our services are Russian Railways, Moscow, St. Petersburg, Nizhny Novgorod and Baku subways, large industrial enterprises, including Gazprom Neft, LUKOIL, Severstal, Coal Company Severny Kuzbass, Metalloinvest Holding and many others.

ADVANTAGES

— Available branded maintenance system.

— Provision of regular customers with a number of discounts.

— An extensive network of service centers.

PRODUCT CERTIFICATION

Modern terms of trade have become the reason for the need to confirm the product safety and quality compliance with established norms and standards.

To confirm the product safety and compliance with valid regulations and standards, in accordance with the legislation of the Russian Federation and the Customs Union, all products of organizations must undergo a certification procedure. Its successful implementation guarantees a decent quality of the studied product, which is equally significant for both the manufacturer and the consumer.

The certification system for railway transport is aimed at ensuring the protection of transported goods and passengers, traffic safety, as well as compliance with regulations developed by the Federal Agency for Railway Transport. In accordance with this, all TVEMA products undergo the necessary procedures during the production, including the whole range of preliminary and acceptance tests (running, strength, dynamic, brake, on the track impact, static, functional, etc.). The safety of each mobile infrastructure diagnostic and maintenance tool produced by the company is confirmed by certificates of compliance with the requirements of the technical regulation of the Customs Union “On rolling stock safety”. All diagnostic and inspection systems, as well as portable diagnostic tools, undergo a voluntary certification procedure.

The company conducts tests on the mandatory confirmation of its product conformity in independent testing centers included in the Unified Register of Certification Bodies and Testing Laboratories (Centers) of the Customs Union. The mandatory confirmation of the product conformity allows TVEMA to operate its products without making additional requirements on the territory of both the member countries of the Commonwealth of Independent States and the Baltic countries, and the member countries of the Eurasian Economic Union.

IRIS Certification

CERTIFICATE

awarded to

Firma TVEMA JSC
1 Ugreshsky proezd, home, 24, 26, 28
115088, Moscow
Russian Federation

DQS GmbH

confirms, as an IRIS Certification™ approved certification body, that the Management System of the above organization has been assessed and found to be in accordance with the

IRIS Certification™ rules:2017
and based on
ISO/TS 22163:2017

for the activities of Design and Development and Manufacturing and Maintenance for the scope of certification: 17 (Rolling stock) of special diagnostic railway machines.

Certificate valid from: 13/07/2018 Certificate valid until: 26/12/2021*

Current date: 08/10/2018
Certificate-Register-No: 492028

* Providing that the subsequent surveillance audits are successful before the validity date of the previous audit.
Certification body address: August-Schanz-Straße 21, 60433 Frankfurt am Main, Germany

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СЕРТИФИКАТ

настоящим удостоверяет, что предприятие

АО «Фирма «ТВЕМА»
1-й Угрешский проезд, д. 24, 26, 28
115088 г. Москва
Российская Федерация

в перечисленных в приложении территориальных подразделениях

внедрило и использует
Систему Менеджмента Качества.

Область деятельности:
Проектирование, разработка, производство, ремонт и сервисное обслуживание вагонов, машин путевых, высокотехнологичного оборудования специального назначения, электронной аппаратуры, программно- математического обеспечения, приборов неразрушающего контроля, автоматизированных комплексов диагностики технических объектов инфраструктуры, связанных с обеспечением безопасности движения поездов, систем промышленного телевидения, систем позиционирования на базе GPS.

Посредством аудиторской проверки, задокументированной в отчете, было получено подтверждение о том, что эта система менеджмента отвечает требованиям следующего стандарта:

ISO 9001 : 2015

Регистрационный номер сертификата	492028 QM15
Действителен с	2018-08-27
Действителен до	2021-08-26
Дата сертификации	2018-08-27

DQS GmbH

Stefan Heinloth
Генеральный директор

Accredited Body: DQS GmbH, August-Schanz-Straße 21, 60433 Frankfurt am Main, Germany
Administrative Office: OOO SSU DEKUES, Respublikanskaya str. 3, 150003 Yaroslavl, Russian Federation 1 / 2

IQNet
THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

DQS Holding GmbH has issued an IQNet recognized certificate that the organization

Firma TVEMA JSC
1 Ugreshsky proezd, home, 24, 26, 28
115088 Moscow
Russian Federation

with the organizational units/sites as listed in the annex

has implemented and maintains a **Quality Management System**.

Scope:
Design, development, production, repairs and maintenance of wagons, track machines, hi-tech special-purpose equipment, electronic equipment, software, equipment for non-destructive testing, automated complexes for testing of infrastructure technical objects related to train safety control, CCTV, GPS based positioning systems.
Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

ISO 9001 : 2015

Issued on: 2018-08-27
Expires on: 2021-08-26

This attestation is directly linked to the IQNet Partner’s original certificate and shall not be used as a stand-alone document.

Registration number: DE-492028 QM15

Alex Stoichitoiu
President of IQNet

Michael Drechsel
Managing Director of DQS Holding GmbH

IQNet Partners*:
AENOR *Spain* AFNOR Certification *France* APCER *Portugal* CCC *Cyprus* CISQ *Italy*
CQC *China* CQM *China* CQS *Czech Republic* Cro Cert *Croatia* DQS Holding GmbH *Germany* FCAV *Brazil*
FONDONORMA *Venezuela* ICONTEC *Colombia* Inspecta Sertifiointi Oy *Finland* INTECO *Costa Rica*
IRAM *Argentina* JQA *Japan* KFQ *Korea* MIRTEC *Greece* MSZT *Hungary* Nemko AS *Norway* NSAI *Ireland*
NYCE-SIGE México PCBC *Poland* Quality Austria *Austria* RR *Russia* SII *Israel* SIQ *Slovenia*
SIRIM QAS International *Malaysia* SQS *Switzerland* SRAC *Romania* TEST St Petersburg *Russia* TSE *Turkey* YUQS *Serbia*
IQNet is represented in the USA by: AFNOR Certification, CISQ, DQS Holding GmbH and NSAI Inc.

* The list of IQNet partners is valid at the time of issue of this certificate. Updated information is available under www.iqnet-certification.com

CERTIFICATION OF QUALITY AND PRODUCTION MANAGEMENT

AO «Firma TVEMA» has confirmed the compliance of its products, services and development to the requirements of the international Quality Management System for the Rail Industry – IRIS.