



Tesmec Rail Business Unit

Solutions for catenary installation and maintenance & diagnostic of infrastructure



- **Rail business unit**
- Solutions for catenary installations and maintenance
- Diagnostic solutions for railway infrastructure
- Experience in USA

Profile

The rail business unit of Tesmec Group is active in the **designs, trial and production** of technological solutions for:

- > **Railway electrification**
- > **Maintenance of railway lines**
- > **Diagnostics of the railway infrastructure**

Tesmec multipurpose working vehicles are designed in compliance with the latest international safety Standards to provide operations in a safer, more efficient and faster way.

Diagnostic vehicles with integrated diagnostic systems for unmanned diagnostic and data management platform meet the increasing demand of safety and smart mobility.

The subsidiary Tesmec Rail was developed with a goal to create **a research center for the development of high technological projects** in the industry.

Certified Company

In compliance with the Standards:

- ISO 9001:2015 - **Certified Quality system**
- ISO 14001:2015 - **Certified Environment system**
- ISO 45001:2018 - **Certified Health & Safety system**
- EN 15085-2 - **Welding certification**
- AAR-M1003 - **Quality Certification**



Tesmec Rail
Monopoli-Bari
Italy



Tesmec Spa
Grassobbio - Bergamo
Italy



Tesmec USA
Alvarado - Texas
Italy

The path to provide **Safety & Reliability** for the railway infrastructure

EQUIPMENT SUPPLIER

Design and production of railway solutions keeping the core competence in the catenary installation

TECHNOLOGICAL PROVIDER

Certified & connected rail vehicles and services for electrification and maintenance of railway lines

SYSTEM INTEGRATOR with TECHNOLOGICAL PARTNERSHIPS

Solutions for **unmanned diagnostic and data management platform**

... **Hydraulic equipment**

Digital solutions

Automated & cloud connected systems

MERGE OF HIGH KNOW HOW IN RAILWAY ROLLING STOCKS FIELD & EXPERTISE IN CATENARY

Catenary construction and maintenance & special application

FROM STRINGING TO RAILWAY

Application of the tension stringing technology to the construction of railway catenary

NEW PREMISE IN MONOPOLI ACCORDING TO INVESTMENT PROGRAMS FINANCED BY REGIONE PUGLIA

To **enhance** the activity in the **railway business: product line extension** from the construction to the **diagnostics** of the railway infrastructure

AMG BUSINESS LEASE: DESIGN & DEVELOPMENT OF DIAGNOSTIC SYSTEMS

CENTRE OF EXCELLENCE FOR THE DEVELOPMENT OF MAINTENANCE & DIAGNOSTIC VEHICLES

Market need: improving transport **safety** and **reliability** in the railway industry
National investments program to support local economy



As the inventor and leader of tensioning stringing technology, Tesmec has gained an unparalleled **experience from 60 years** of researching, manufacturing and jobsite applications.



Design of innovative railcars with electrical traction

- Tunnels
- Metro
- City stations working area



Diagnostic solutions for the infrastructure Diagnostic vehicles and platform



Solutions according to EN 14033:

Design of vehicles for catenary installation and maintenance with AMIS certification for EU market



Solutions according to US Standards: opening in USA of a new production site of vehicles



Stringing Technology Integration + Catenary Maintenance: acquisition of a company specialized in producing special vehicles (AMC2)

Solutions for catenary tension stringing, know how arising from the leadership in the power line field



Safety of Railway Infrastructure - ITALY



Catenary maintenance - ITALY

88 Multipurpose railway vehicles
16 Revamping maintenance units
1 Constant tensions stringing unit
Full maintenance service



Snow removal - NORWAY

3 Snow removal vehicle
Maintenance unit operative at low temperatures



RER Catenary renewal - FRANCE

9 vehicles (n.6 different models)
Engineered to allow a correct execution of the works of catenary replacement



Stringing of 3 independent wires & recovery of 2 - RUSSIA

10 stringing units
Extreme temperature
Compliance with Russian Standards



Stringing and recovering wires-US

1 Work car + 1 Reel car with 6 reels
1 Catenary maintenance vehicle

Huge, top performing units
Designed according to US Standards



Electrification of new lines High speed - CHINA

> 30 stringing units
1,318 km BEIJING-SHANGHAI



Installation of the contact line and catenary maintenance "Eagle P3 Project" - USA

1 Stringing unit & 1 Catenary maintenance vehicle

A very fast rail wire installation



Customized solutions - POLAND

4 Stringing units
Tensioning system for railway wiring operations composed by working units mounted on ISO 20 size flat modules



- > Rail business unit
- > **Solutions for catenary installations and maintenance**
- > Diagnostic solutions for railway infrastructure
- > Experience in USA

CTS206 is a “semi-pilot” vehicle equipped with one driving cabin in which are installed **power, recovery and tension stringing controls.**

Vehicle compliant to EN 14033



**INCORPORATED
RECOVERY UNIT**

PATENTED

**DOUBLE USE
POSITIONER
(CRANE + MAST)**

**AUTOMATIC
TRAIN CONTROL
SYSTEM**

PATENTED

**UNIFIED
REMOTE CONTROL
SYSTEM**

**SEMI-PILOT SYSTEM &
SELF POWERED SYSTEM**



✓ EFFICIENT
JOB SITE

✓ SMART
JOB SITE

✓ HIGH
MOBILITY

✓ CONNECTED
UNITS



TIME
SAVING

1,5 km in less
than 2 HOURS



FLEET
REDUCTION

4 UNITS



CUT IN
STAFFING

ONLY 12
OPERATORS

Tesmec wiring units are specifically designed for **stringing cables in construction and maintenance of railway lines electrification or refurbishment.**

Tensioning systems (stringing systems upper structure) for railway wiring operations composed by working units mounted on flat (s), **to be installed on existing railway wagon provided by customer or mounted on truck.**

These wiring units can be easily coupled to the customer own flat chassis by using the same “Twist Lock” container connections.

MAIN BENEFITS

✓ Extra accuracy of stringing force

Thanks to the automatic control of stringing cable tension forces as pre-set the stringing force is extremely accurate

✓ Capability to string independently from 1 to 4 cables

Each cable can be strung by a couple of adherence wheel

✓ Capability to simultaneously string cables

Up to 4 cables can be strung at the same time at constant tension force(s)



The proposed system is composed by:

- 1 independent twin puller-tensioner
- 2 motorized reel stands
- 1 power unit
- 1 supporting flat
- 1 centralized control system
- Wire guiding rollers on the platform
- Wire guiding telescopic adjustable top rollers

PULLER TENSIONER' PERFORMANCES

Max. tension	20 kN *
	(both in tension and pull-back mode)
Max. tensioning speed	5 km/h
Max. recovering speed	1 km/h

* different max pull available on request

MOTORIZED REEL STAND

Max. tension	2.5 kN
Max. tensioning speed	5 km/h
Max. recovering speed	1.3 km/h (min int. diameter 650 mm)
External diameter	1.600 mm
Width	1.000 mm
Total mass	3.000 kg



POWER UNIT

Diesel Engine	48 kW at 2600 rpm
Cooling system	Antifreeze liquid
Electrical system	24 V



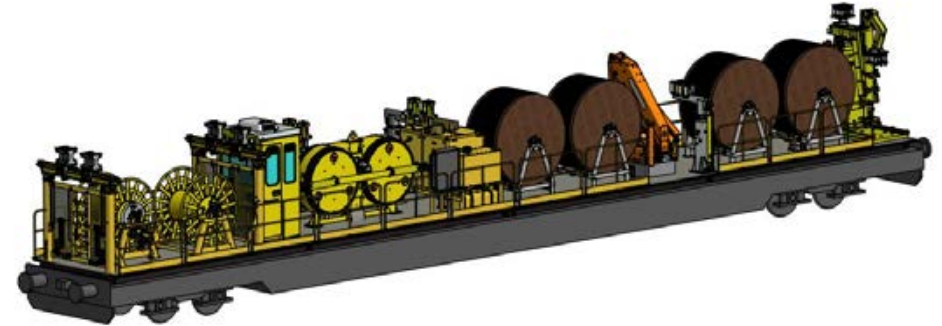
SOLUTION

The system is able to string **up to 2 catenary and contact wire simultaneously**, under different tensions (min of 5 kN to not less than 25 kN) with independent controls, in two working directions.

Tensioning system for railway wiring operations composed by working units mounted on 4 flats, to be installed on one existing railway wagon provided by customer.

MAIN TECHNICAL FEATURES

Max. tension (both in tension and pull-back mode)	25 kN
Max. tensioning speed	5 km/h
Max. recovering speed	1 km/h
Total mass	30.000 kg



SOLUTION

These multipurpose vehicles are self-propelled units designed for **catenary maintenance, refurbishment and installation of new catenary lines**, by means of the special tools installed on board.

Both the vehicle are made up by a main frame with **two cabins**, while the equipment may change according to the model: crane basket, crane with hook, working platform.

These units can be equipped with a range of accessories to complete the Work Car and make it suitable to the needs of working teams.

This model could be equipped with the Automatic Train Control System (STB -Baseline3) to provide high safety levels of travel phase.



**UNIFIED
REMOTE CONTROL
SYSTEM**

**SMOOTH SPEED
CONTROL**

**AUTOMATIC
TRAIN CONTROL
SYSTEM**

MAIN TECHNICAL FEATURES

Track gauge	1.435 mm
Max length including buffers	14.230 mm
Max width	3.160 mm
Max height	4.051 mm
Mass at full load	39.900 kg
Diesel engines	515 kW @ 1.800 rpm
Max speed on flat & straight track	120 km/h
Max speed in train formation	120 km/h



CRANE BASKET MAIN TECHNICAL FEATURES

Max load (n 2 workers + tools)	240 kg
Crane basket max height (floor from t.o.r.)	14.500 mm
Crane basket min height (for under bridge operations)	- 3.500 mm

LOADING CRANE MAIN TECHNICAL FEATURES

Max lifting capacity	16 ton m
Max hydraulic outreach	780 kg @11,6 m

STATIONARY VEHICLE: CRANE WITH BASKET AND CRANE



MAIN TECHNICAL FEATURES

Track gauge	1.435 mm
Max length including buffers	21.840 mm
Max width	3.184 mm
Max height	4.171 mm
Mass at full load	84.500 kg
Diesel engines	1.030 kW @ 1.800 rpm
Speed in transfer mode	140 km/h
Max speed in train formation	140 km/h

PLATFORM MAIN TECHNICAL FEATURES

Dimensions	4.200 x 1.500 mm
Main platform max height (floor from t.o.r)	8.400 mm
Secondary platform max height (floor from t.o.r)	10.400 mm
Max load on main platform (n°3 workers + tools)	540 kg
Max load on secondary platform (n°2 workers + tools)	240 kg

CRANE BASKET MAIN TECHNICAL FEATURES

Max load (n°2 workers + tools)	240 kg
Crane basket max height (floor from t.o.r)	14.500 mm
Crane basket min height (for under bridge operations)	- 3.500 mm



- > Rail business unit
- > Solutions for catenary installations and maintenance
- > **Diagnostic solutions for railway infrastructure**
- > Experience in USA

DIAGNOSTIC DEVICES

Catenary geometry & wear system

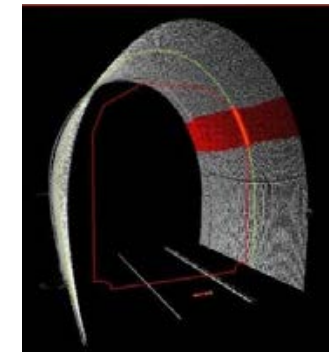
Tunnel Inspection system

Data localization system GNSS

Switches diagnostic system

Track geometry system

Data localization system



DIAGNOSTIC VEHICLES

Falco 1 & Falco 2 equipped with redundant systems of Track Geometry and Catenary Geometry and Wear, are in the RFI diagnostic fleet and run through the entire rail network measuring the main parameters of the infrastructure.



DIAGNOSTIC PLATFORM

Platform on cloud for centralized diagnostic for the maintenance and diagnostic of railway lines enabling a new way to perform diagnostic activities.



START / STOP Acquisition



Diagnostic Vehicle «FALCO»

Data transmission



Centralized Server



DOWNLOAD



DEFECTS UPDATE



UI Defects Management



Remote Operator

- > Rail business unit
- > Solutions for catenary installations and maintenance
- > Diagnostic solutions for railway infrastructure
- > **Experience in USA**

Maintenance vehicles, Model OCPC501 - USA

Multipurpose vehicle self-propelled unit designed for catenary maintenance, refurbishment and installation of new catenary lines, by means of the special tools installed on board. It is made up of a main frame with a cabin, a loading bed, a platform, a crane equipped with a working basket and wire positioner. This unit can be equipped with a range of accessories to complete the equipment and make it suitable to the needs of working teams

MAIN TECHNICAL FEATURES

Track gauge	1.435 mm
Max length including couplers	14200 mm
Total engine power	400 kW @ 2100 rpm
Max speed on flat and straight track	100 km/h
Max height above rail level	4330 mm
Full load weight	35 ton



*Denver Transit Partners (DTP), the concessionaire for the Eagle P3 Project, acquired a unique rail-mounted machine that allows crews to install overhead wires while under tension. Normally, crews drape wiring over the mountings and pull it taut afterward. But the wire train, made by Tesmec S.p.A. of Grassobbio, Italy, installs the wires under tension and **makes the work go four times as quickly.***

http://www.rtd-fastracks.com/print_105?corridor=ep3



The wire train strings the overhead catenary wire on the East Rail Line, near 56th Avenue, in February 2014.

All Aboard the Wire Train, Eagle's High-Flying Stringing Machine

- When is constant tension a good thing on the job? When the job calls for installing high-voltage overhead wire for our commuter rail system.
- Denver Transit Partners (DTP), the concessionaire for the Eagle P3 Project, acquired a unique rail-mounted machine that allows crews to install overhead wires while under tension. Normally, crews drape wiring over the mountings and pull it taut afterward.
- But the wire train, made by Tesmec S.p.A. of Grassobbio, Italy, installs the wires under tension and makes the work go four times as quickly.
- The official name of the machine is constant tension stringing unit (CTSU). The brightly-colored train has attracted a lot of attention from the public since it began installing power lines on the East Rail Line's Peña Boulevard segment in February. You'll be seeing it throughout the year as it installs wiring from the airport to Wheat Ridge.
- Here are some fast facts about the CTSU:
- The Eagle P3 Project is the first transit project in the United States to use the CTSU to install an overhead catenary system (OCS).
 - The \$1.9 million CTSU simultaneously installs the two wires that make up the electrified OCS to full tension, greatly increasing the efficiency and safety of OCS installation.
 - The CTSU can install up to 4,600 feet of OCS wire in a single day. Using traditional methods, it would take up to four days to install the same length of wire.
 - When outfitted to string wire, the track-mounted CTSU stretches out to 140 feet in length and weighs in at 153,000 pounds.
 - A team of Italian engineers from Tesmec traveled to Denver with the vehicle to commission it and to train crews on how to operate it.
 - When it is done stringing the OCS on the Eagle P3 Project, the CTSU will assist in completing other tasks on the commuter rail system thanks to its practical, multi-functional design.

Constant Tension Stringing Unit, Model CTSU204 - USA



This Constant Tension Stringing Unit has been designed for stringing cables in construction and for the maintenance of railways line electrification or refurbishment.

MAIN TECHNICAL FEATURES

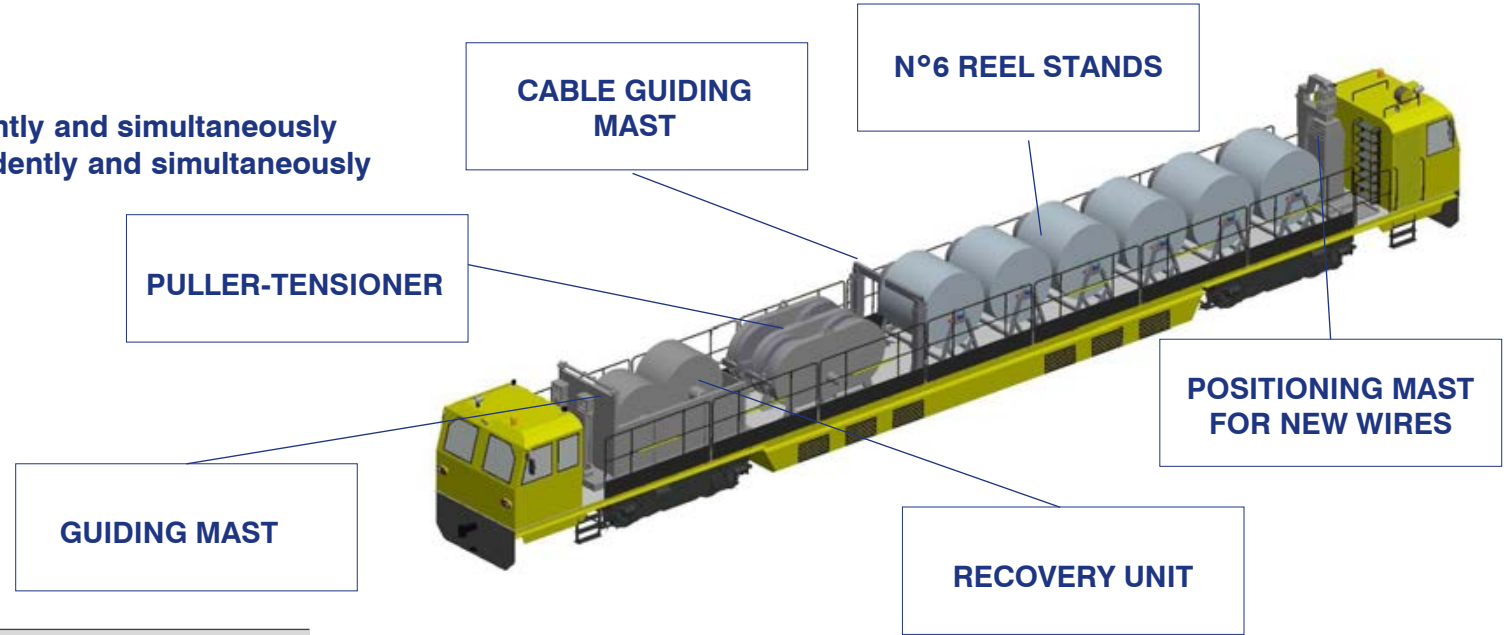
Number of cables	2 independent
Max pull	15 kN
Max speed	5 km/h
Capstan diameter	1500 mm
Power	82 kW
Dimensions	21.4 x 3.0 x 3.1 m



The Self-drive Constant Tension Stringing Wagon with Old Cable Removal System “Reel Car” is a special-purpose equipment specifically designed and manufactured for **stringing and recovering wires and cables** on the Overhead Catenary System in construction and maintenance of railways lines electrification or refurbishment.

The equipment is suitable for:

- **Stringing up to 3 cables independently and simultaneously**
- **Recovering up to 2 cables independently and simultaneously**



MAIN TECHNICAL FEATURES

Track gauge	1.435 mm
Frame length	27.000 mm
Total engine power	447 kW @ 2100 rpm
Speed max self-propelled	90 km/h
Speed max in train formation	100 km/h
Full load weight	112 ton

MAIN TECHNICAL FEATURES

Max force per cable	30 kN
Max stringing speed	8 km/h
Max pulling back speed	8 km/h
Max number of recovering cables	2
Max force per cable	5 -13 kN

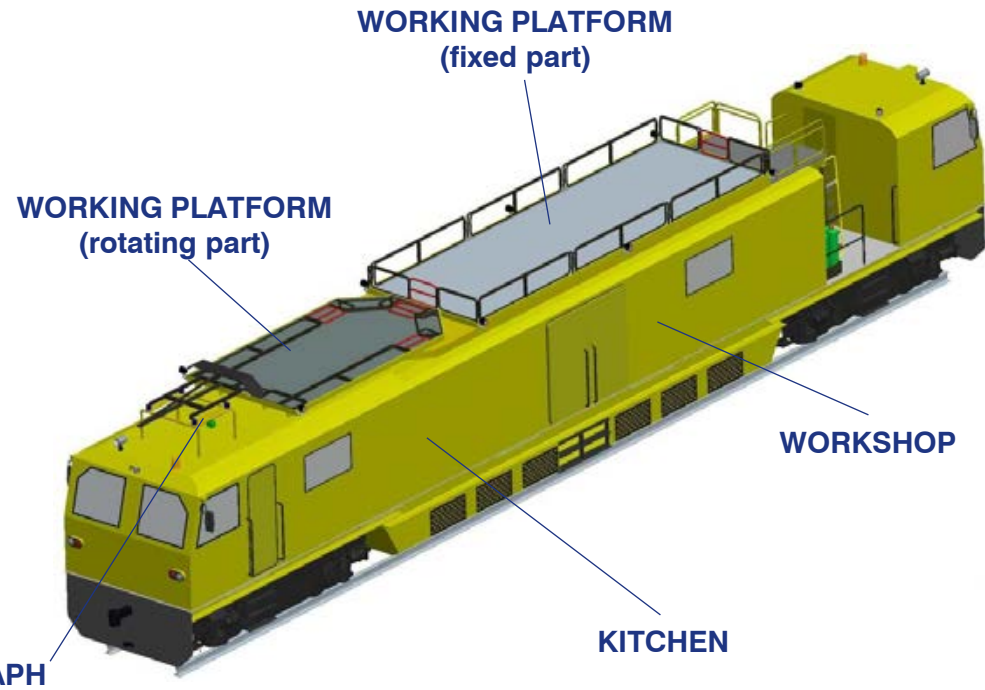


The Work Car is a self-propelled vehicle equipped with the following main components:

MAIN TECHNICAL FEATURES

Track gauge	1.435 mm
Total engine power	447 kW @ 2100 rpm
Speed max self-propelled	90 km/h
Speed max in train formation	100 km/h
Max working speed	8 km/h
Full load weight	70 ton

Designed according to the relevant US standards for CMV (AREMA and FRA)



Maintenance vehicles, Model OWSC601 - USA

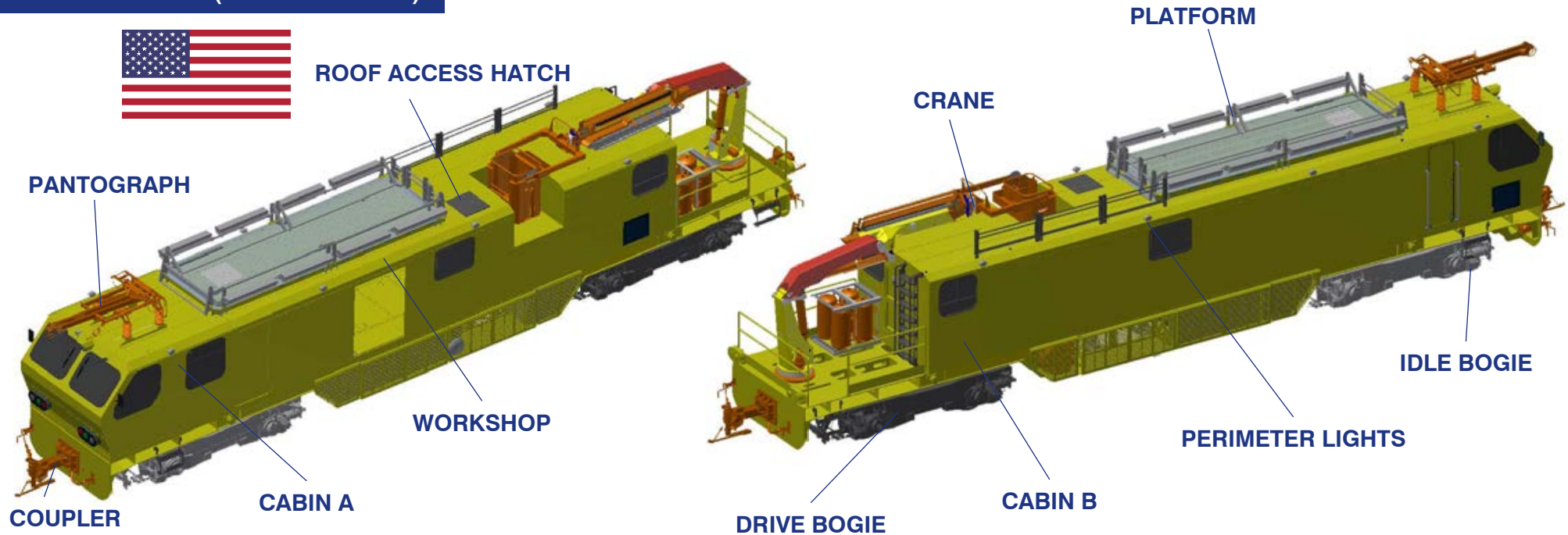
The Work Car is a self-propelled vehicle equipped with the following main components:

MAIN TECHNICAL FEATURES

Track gauge	1.435 mm
Total engine power	515 kW @ 1800 rpm
Max width	3.105 mm
Max height from rail level	4.395 mm
Max length (on couplers)	19.438 mm
Speed max self-propelled	90 km/h
Speed max in train formation	100 km/h
Max working speed	8 km/h
Full load weight	65 ton



Designed according to the relevant US standards for CMV (AREMA and FRA)





TESMEC USA, Inc. - Sales and Manufacturing facilities
12520 East. FM 917 Alvarado, TX, USA 76009
Tel. +1.817.4732233 - Toll free (only inside USA): 800.8515102
Fax +1.817.4739742
www.tesmec.com