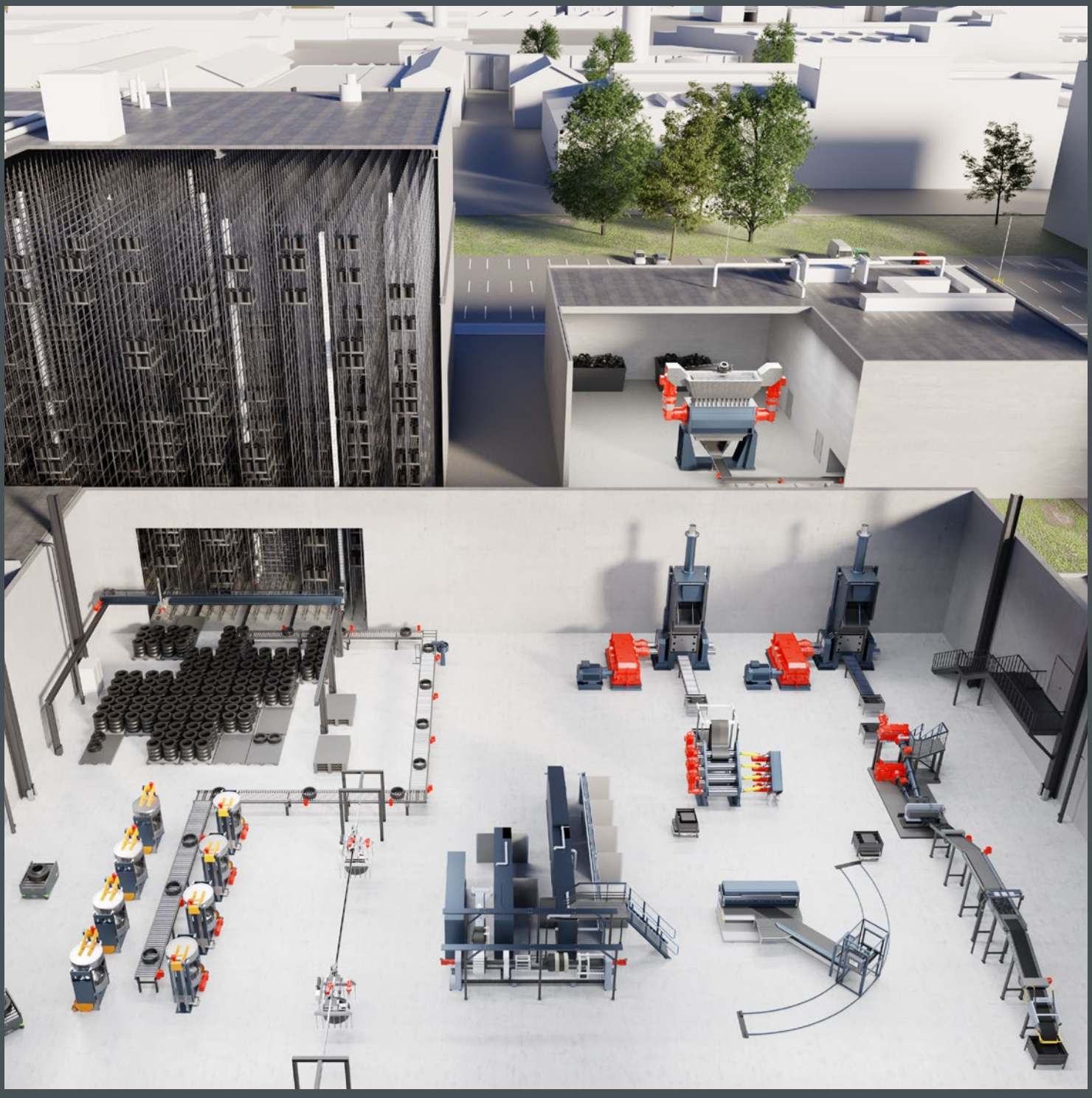
SEW EURODRIVE

Efficient drive solutions for tire industry

For an industry with grip



Tailor-made drive solutions for your application

Maximum performance and reliability for tire industry
SEW-EURODRIVE drives the industry.

Tires are the only connection between a vehicle or aircraft and the road and are of fundamental importance for safety. The structure of a tire and the production process are correspondingly elaborate and complex. Robust and intelligent drive solutions are used to ensure that production runs safely and reliably.

We understand the importance of quality, reliability and efficiency in tire manufacturing and have the right drive and control technology for this. We therefore offer you future-proof automation from a single source.

We think and act holistically.

- As an owner-managed family business that takes quality and responsibility personally.
- As an innovation driver that leads the way with pioneering ideas and plays a key role in shaping the future of drive technology.
- And no matter what your wishes and requirements are: we are at your side with extensive consultation and services.

We are your reliable partner and always close to you.

55 countries

> 22 000 employees

110 000 active customers

20 million spare parts/month at > 100 locations

525 600 minutes a year available for you

Solutions for many different industries

Great challenges require great ideas

The demand for tires is unbroken. However, the automotive world is in a transition and this is also having an impact on the tire industry.

Sustainability, digitalization, electric mobility and new product concepts are increasingly coming into focus. The industry has to meet several trends in order to fulfill customer requirements and remain competitive.

Ecology and sustainability

Politicians are calling for a significant reduction in CO_2 emissions and are reacting with stricter regulations. Tires should be durable and have low rolling resistance and abrasion. They should also be manufactured from sustainable, ethically sourced materials in an energy and resource-efficient manner. The circular economy for retread tires and end-of-life tire recycling is also playing an increasingly important role.

SEW-EURODRIVE knows the requirements and is working to minimize the CO_2 footprint and increase energy efficiency.

Digitalization and condition monitoring

Automated processes supported by smart digital applications are the driver of innovation and enable companies to produce high-quality tires in connected, automated factories against the background of increasing variant diversity and high quality standards. However, tires themselves are also becoming smart and their integration into IoT systems is giving rise to new business models based on data-driven services.

Our hardware and software packages are perfectly tuned to each other for this case.

Electric mobility

Changes in mobility behavior also result in new requirements for tires. The main focus here is on rolling resistance and noise. At the same time, tires are being stressed by higher torques and weights as well as increased vehicle utilization.

With our products and solutions, we also support you with new challenges.

New product concepts

Future-oriented concepts are in demand and the tire itself is rethought. Tire manufacturers are testing and implementing new materials and production processes, such as additive manufacturing. The aim is to achieve greater sustainability and series production readiness, e.g. of airless tires with high puncture protection and the best driving characteristics.

SEW-EURODRIVE is your partner for innovations and new production processes.

The right drive for tire industry

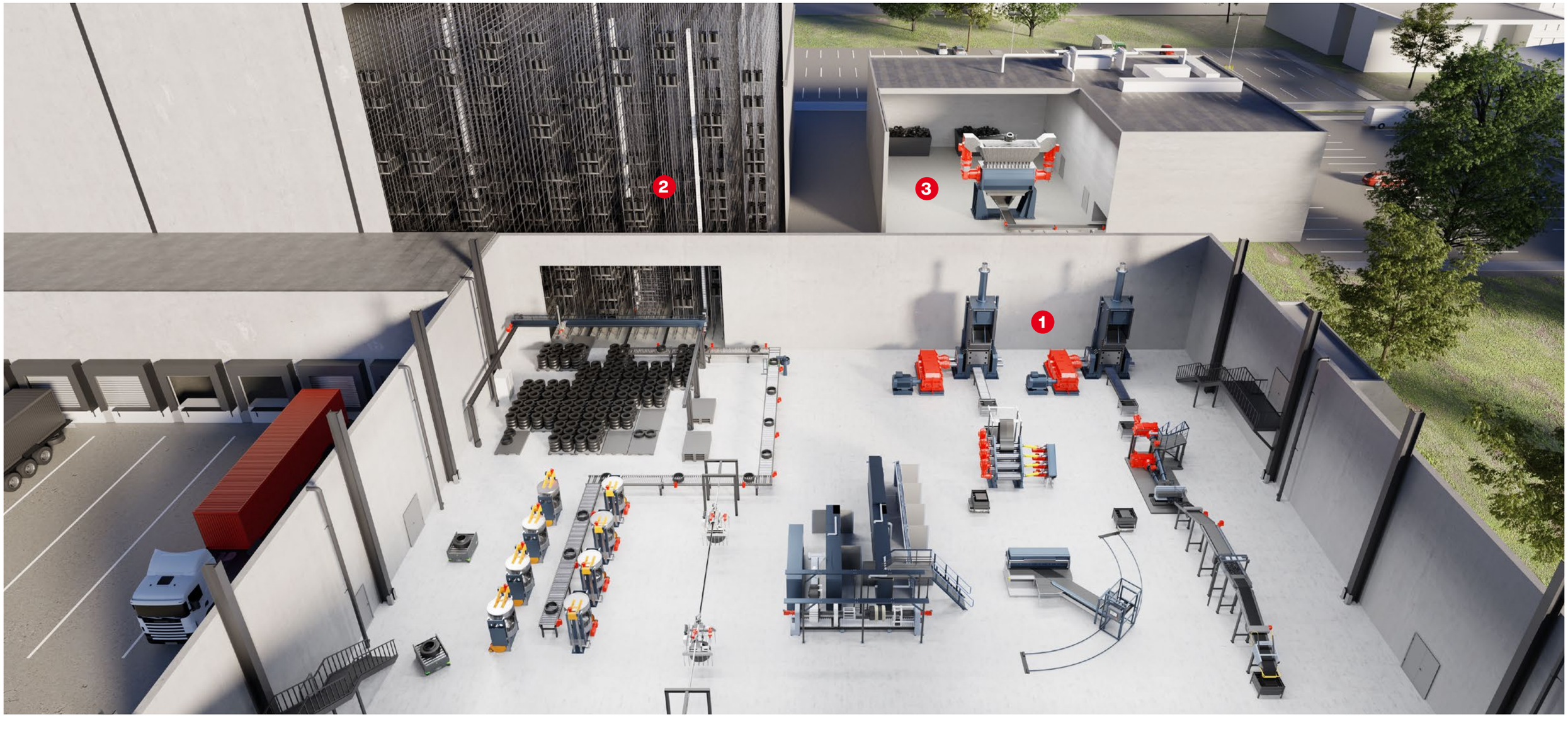
Convincing in all areas

From the production of compounds to the recycling of end-of-life tires

Drive technology from SEW-EURODRIVE for the modern processes of today and tomorrow: From gearmotors and large gear units to frequency inverters and customized solutions – with our experience, we create concepts for you for an efficient, sustainable and future-proof tire industry.

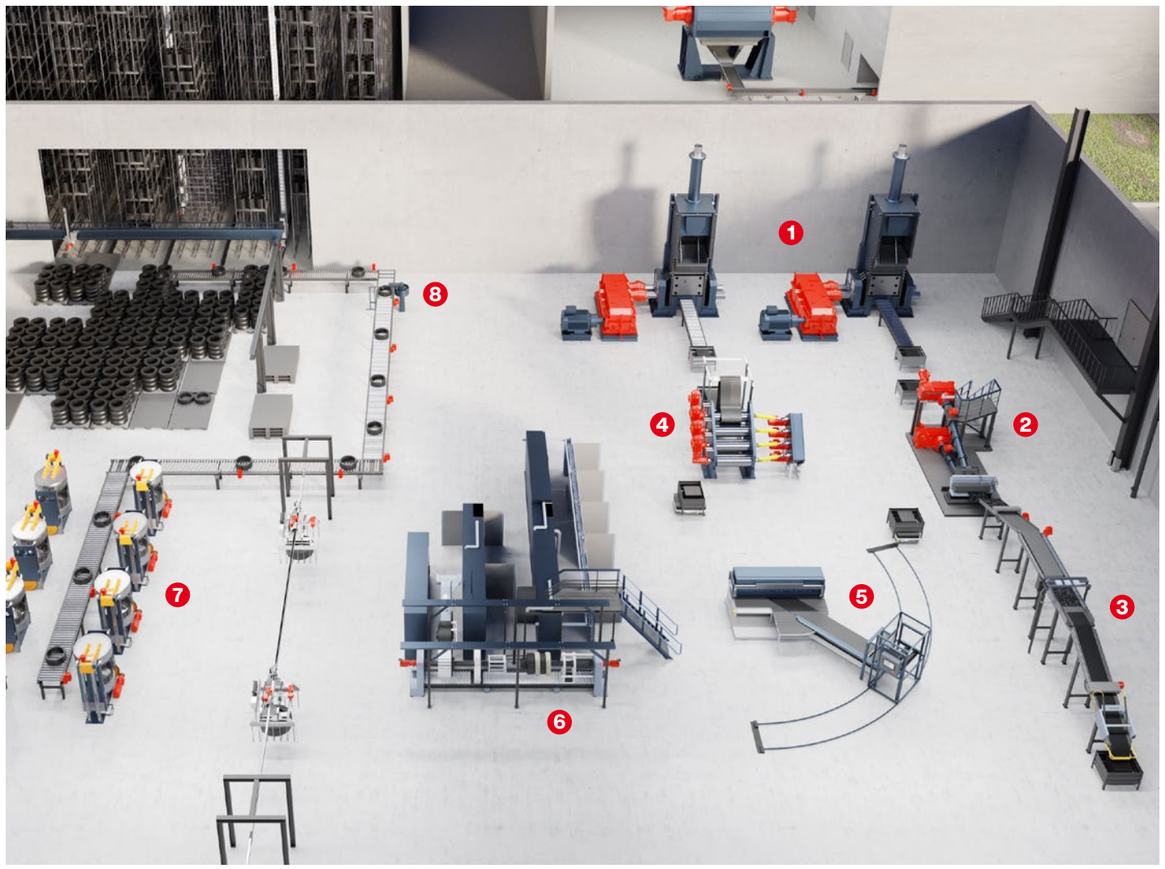
With our solutions, you can keep your grip and avoid skidding. From the production of rubber compounds and components, to tire building, vulcanization and the final finish, right through to end-of-life tire recycling – we have the matching solutions for every process step.

1 Production process
2 Intralogistics
3 Recycling



Production process

1. Mixer
2. Extruder
3. Extruder cooling line/downstream
4. Calender
5. Cutting machine
6. Tire building machine
7. Curing press
8. Inspection systems



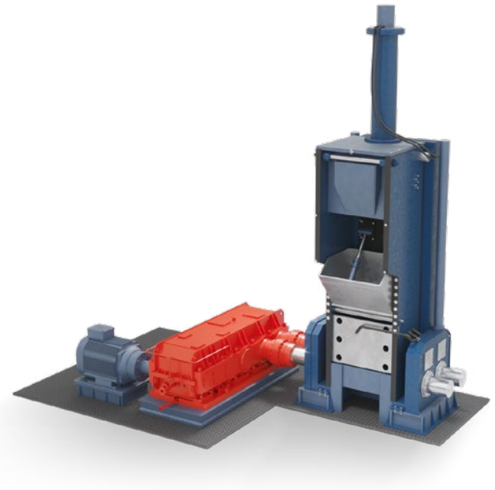
Compound production

From rubber to the finished tire: A number of raw materials are required for the production process. Various sectors supply the tire industry so that the necessary compounds can be produced from a mix of chemicals and natural rubber.

1 Mixer

As the numerous tire types have to meet special requirements, a wide variety of rubber compounds are used.

In addition to natural and synthetic rubber, these contain numerous other materials and additives, which are combined in the mixer under pressure and temperature.



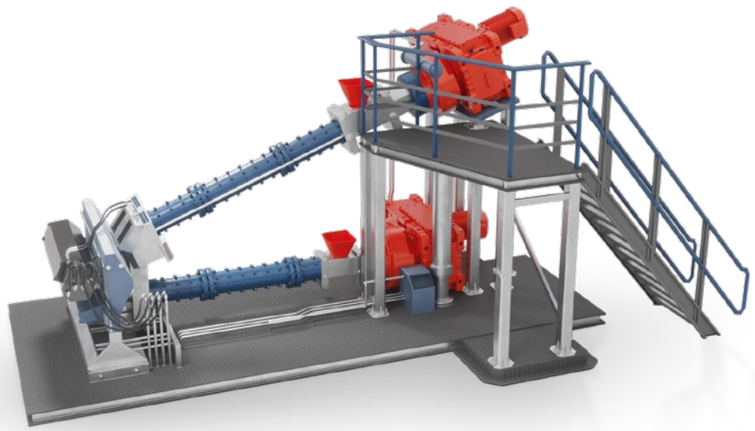
Your requirements	– Compact and robust solutions – Low-noise running behavior – Variety of options and flexibility – Avoidance of downtimes – Reduction in maintenance costs
Our solutions	**Planetary and helical special gear units** – Quality and reliability thanks to high level of our own value creation and our many years of experience – Short delivery times thanks to in-house production and optimized processes – Individual solution, tailored to your application **DriveRadar® IoT Suite – Condition monitoring and maintenance forecasting** – Avoid downtime thanks to transparent and predictable gear unit status – Reduced maintenance costs thanks to condition-based action planning – Targeted fault elimination thanks to precise localization of faults and corresponding recommendations

Component manufacturing
Production process

This process step reveals the complexity of a tire. Various applications are used, as many different materials are involved, without which no good tire is possible: steel and textile cord, tread, steel bead, sidewall and inner liner.

❷ Extruder

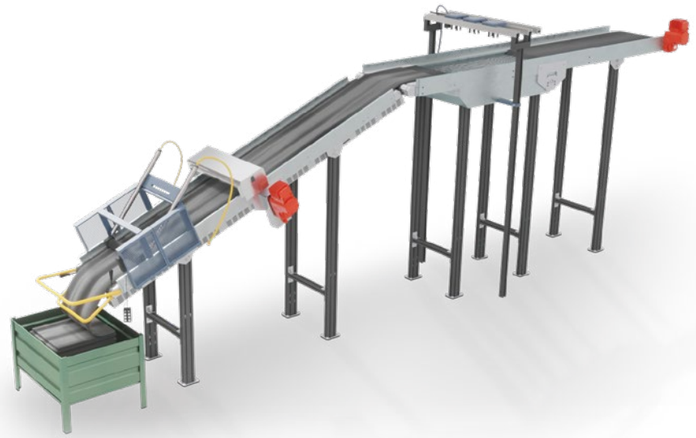
To produce the tread strip, the rubber material, which comes out of the mixer in a plastic state, is drawn through a screw press in an extruder and formed into a continuous strip.



Your requirements	– Drop-in gear units for system modernizations – Robust and power-dense solutions – Customized gear unit interfaces to the machine – Avoidance of downtimes – Reduction in maintenance costs
Our solutions	**Helical / bevel-helical gear units X.e** – Reduce variants thanks to reversible housing – Safe operation thanks to robust housing, low-noise gearing and effective cooling systems – Lower operating costs thanks to extensive customization options **Helical special gear unit** – Quality and reliability thanks to high level of our own value creation and our many years of experience – Short delivery times thanks to in-house production and optimized processes – Individual solution, tailored to your application **Asynchronous motors DRN..** – Future-proof by supporting global standards and norms – Cost-optimized solution with integrated built-in encoders and brakes – Flexibility thanks to power ratings from 0.09 – 375 kW in efficiency class IE3 **DriveRadar® IoT Suite – Condition monitoring and maintenance forecasting** – Avoid downtime thanks to transparent and predictable gear unit status

❸ Extruder cooling line/downstream

In the extruder cooling line, the warm tread is cooled in an immersion bath and the so-called meter weight is checked.



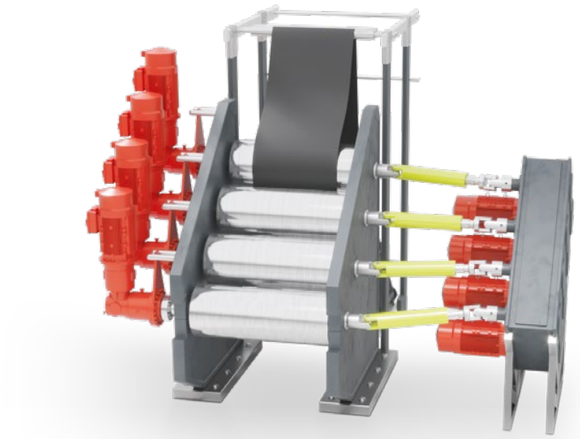
Your requirements	– Highest energy efficiency – Decentralized solution without control cabinet – Significant reduction in variants
Our solutions	**Drive unit MOVIGEAR® performance** – Compact and quiet, with motor, gear unit and inverter in one housing and fanless convection cooling – Variant reduction thanks to wide speed range and high overload capacity – Efficiency thanks to IE5 motor and up to 50% lower system power loss than IES2

Component manufacturing
Production process

4 Calender

To reinforce the tire, steel and textile cords are embedded in one or more layers of rubber in the calender.

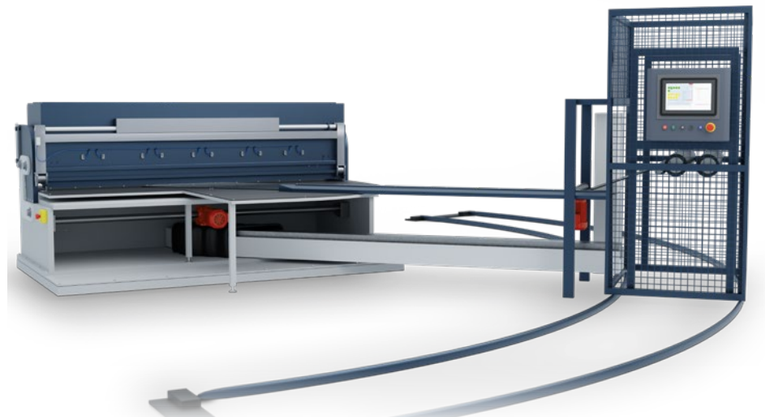
To do this, the cords are unwound using special winding devices and fed through several rollers together with the rubber.



Your requirements	– Bring rollers to a standstill as quickly as possible, even at maximum speed – Direct mounting of compact solo gearmotors possible – Customer-specific gear unit interfaces to the machine – Avoidance of downtimes – Reduction in maintenance costs
Our solutions	**Helical / bevel-helical gear units X.e** – Reduce variants thanks to reversible housing – Safe operation thanks to robust housing, low-noise gearing and effective cooling systems – Lower operating costs thanks to extensive customization options **Planetary gear unit with primary bevel-helical gear unit P-X.e** – Space saving due to a more compact design – High operational reliability through a robust gear unit design and bending-resistant housing design – Reduced costs thanks to the high thermal gear performance **Asynchronous motors DRN..** – Future-proof by supporting global standards and norms – Cost-optimized solution with integrated built-in encoders and brakes – Flexibility thanks to power ratings from 0.09 – 375 kW in efficiency class IE3 **DriveRadar® IoT Suite – Condition monitoring and maintenance forecasting** – Avoid downtime thanks to transparent and predictable gear unit status

5 Cutting machine

Depending on the tire size and type, the individual components such as treads or sidewalls are cut to specific lengths.



Your requirements	– Reliable and robust drive solution for 24/7 operation – Protection of the operator to safely implement knife settings – Reduction of mains load and energy consumption during vertical knife stroke
Our solutions	**Application inverter MOVIDRIVE® technology** – Simplified startup and diagnostics thanks to electronic nameplate and MOVIKIT® software modules – Flexibility thanks to scalable functional safety – Cost reduction, e.g. through energy-saving functions **Asynchronous servo motors DR2L..** – Safe control due to higher inherent mass inertia – High speed quality and overload capacity in a compact unit consisting of gear unit and asynchronous servo motor – High accuracy by reducing the circumferential backlash **Power and energy management system Power and Energy Solutions** – Scalability thanks to distributed DC and AC infrastructure in any combination – Cost reduction thanks to greatly reduced peak power requirements and energy savings due to storage capacitors in the DC link – Reliability thanks to uninterrupted system operation in the event of a power failure and reduced harmonic load in the supply system

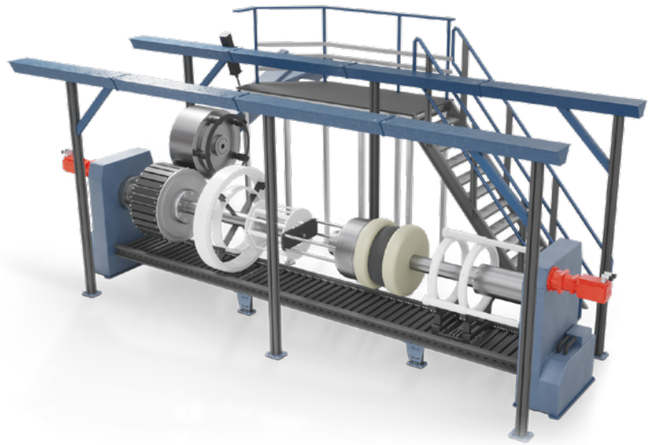
Tire building
Production process

Once the compounds and components have been manufactured, tire building can begin. This process involves two phases: First, the necessary semi-finished products are prepared and then a green tire is formed from them.

6 Tire building machine

The structure of a tire with its numerous components made from a wide variety of materials is complex. However, this is necessary to ensure certain running properties and stability.

The semi-finished products, such as carcasses or treads, are joined together in the tire building machine to form a green tire.



Your requirements	– Highest dynamics, precise positioning and compactness – Utilization of regenerative energy – 48 V and 400 V solutions with the same look and feel
Our solutions	**MOVI-C® CONTROLLER** – High flexibility thanks to the connection to common control systems – Scalability thanks to a flexible machine and system topology **Multi-axis inverter MOVIDRIVE® modular** – Design flexibility with up to 30 drives on one power supply module – Flexibility thanks to scalable functional safety **Software modules MOVIKIT® Positioning and MOVIKIT® Gearing** – Economical by parameterizing instead of programming – Flexible thanks to simple drive and complex motion control functions **Planetary servo gearmotors PxG®CM3C..** – Space saving, thanks to short design, with higher power density at the same time – Safe torque and speed transmission thanks to continuous form fit **Compact extra-low voltage drive MOVIMOT® performance ELV** – Maximum communication thanks to integrated Ethernet-based interface – Extremely compact and energy-efficient thanks to DC energy recovery **Power and energy management system Power and Energy Solutions** – Reliability thanks to uninterrupted system operation in the event of a power failure

Vulcanization
Production process

Through the chemical process of sulphur vulcanization, natural rubber is converted into materials of varying hardness, elasticity and mechanical resistance by heating it with sulphur or sulphur-containing substances. This vulcanized rubber is not only used to make tires, but also other technical rubber products such as hoses and conveyor belts.

7 Curing press

In the curing press, the green tire is vulcanized into a finished tire under the influence of heat, pressure and time.

The plastic raw rubber is converted into elastic rubber and molds in the curing press give the tire its profile and sidewall markings.

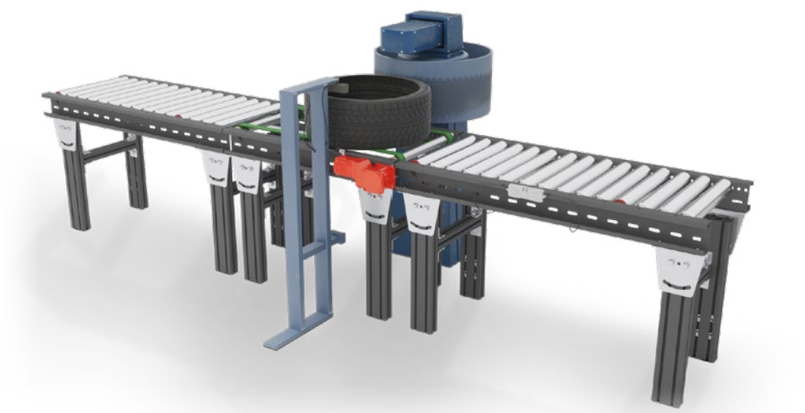
Your requirements	– Electromechanical solution concepts – Robust and energy-efficient drive technology – Variety of options and flexibility
Our solutions	**Worm special gear unit** – Quality and reliability thanks to high level of our own value creation and our many years of experience – Short delivery times thanks to in-house production and optimized processes – Individual solution, tailored to your application **Synchronous servomotors CMP..** – Highest dynamic characteristics over the entire speed range – Precise positioning thanks to the high-performance rotor – Powerful braking systems, including scalable braking torques and manual brake release

Quality control
Production process

In order to meet high safety requirements, quality control is continuous and affects every step of production. As a rule, it is a multi-stage process in which tires are inspected visually, physically and technically, according to strict criteria.

8 Inspection systems

Each tire undergoes different quality checks. First, experts check the tires for visible defects before properties such as concentricity and evenness as well as non-visible areas of the tires are checked by machine.



Your requirements	– Compact and efficient – Flexible and simple solution concept – Functional safety
Our solutions	**Standard inverter MOVITRAC® advanced** – Fast unit replacement thanks to portable memory module – Connection to common control systems by supporting various fieldbus protocols – Flexible thanks to configurable functional safety **Asynchronous motors DRN..** – Future-proof by supporting global standards and norms – Cost-optimized solution with integrated built-in encoders and brakes – Flexibility thanks to power ratings from 0.09 – 375 kW in efficiency class IE3

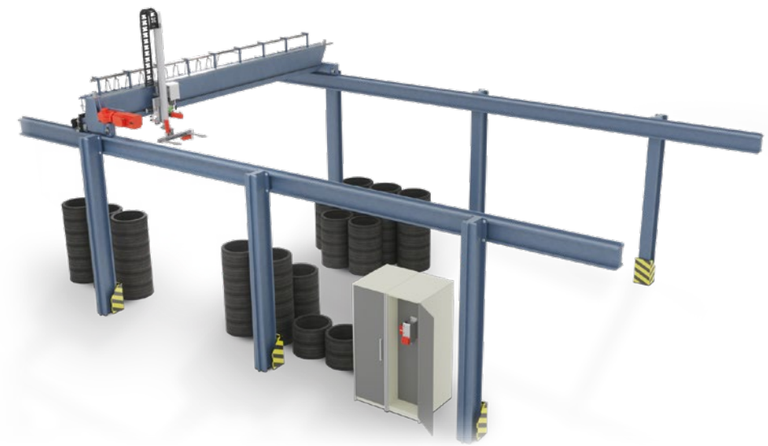
Intralogistics

1 Gantry robots
2 Storage/retrieval system
3 Connecting conveying technology
4 Electrified monorail systems
5 Mobile transport systems

Smaller batch sizes and an increasing number of variants require more flexibility in tire manufacturing. The automation of workflows and processes in intralogistics offers great potential for optimization.

1 Gantry robots

Before the finished tires are stored, they are sorted and stacked. Gantry robots are often used for this purpose.

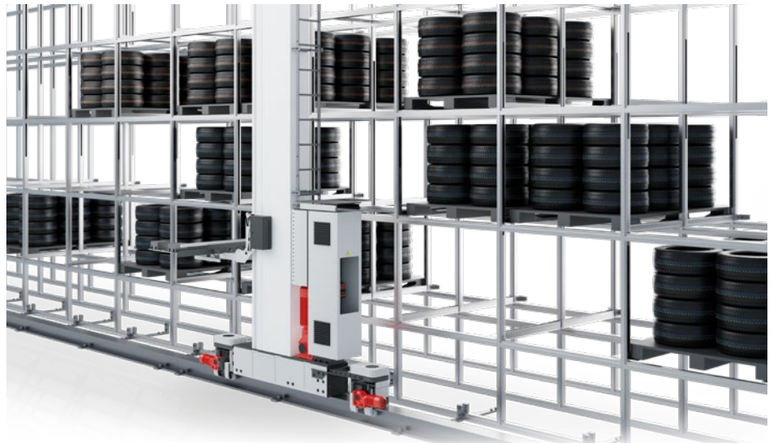


Your requirements	– Complete machine automation from a single source – Avoidance of skewing and slipping – Maximum dynamics and precise positioning
Our solutions	**MOVI-C® CONTROLLER** – High flexibility thanks to the connection to common control systems – Time saving thanks to quick and easy commissioning – Scalability thanks to a flexible machine and system topology **Multi-axis inverter MOVIDRIVE® modular** – Design flexibility with up to 30 drives on one power supply module – Flexibility thanks to scalable functional safety – Cost reduction, e.g. through energy-saving functions **Software modules MOVIKIT® Positioning and MOVIKIT® Gearing** – Economical by parameterizing instead of programming – User-friendly thanks to hardware-independent operation – Flexible thanks to simple drive and complex motion control functions **Planetary servo gearmotors PxG®CM3C..** – Space saving, thanks to short design, with higher power density at the same time – Safe torque and speed transmission thanks to continuous form fit – Simple and quick assembly/disassembly thanks to the innovative interface

Intralogistics

❷ Storage/retrieval system

Stacker cranes support the automated storage and retrieval of finished tires in the high-bay warehouse and of green tires in the buffer store.



Your requirements	– Economical and time-optimized storage and retrieval – Low energy consumption and reduced peak power requirements – High operational reliability, even in the event of a fault – Fast and simple commissioning
Our solutions	**MOVI-C® CONTROLLER** – High flexibility thanks to the connection to common control systems – Time saving thanks to quick and easy commissioning – Scalability thanks to a flexible machine and system topology **Multi-axis inverter MOVIDRIVE® modular** – Design flexibility with up to 30 drives on one power supply module – Flexibility thanks to scalable functional safety – Cost reduction, e.g. through energy-saving functions **Software modules MOVIKIT® MultiAxisController, MOVIKIT® StackerCrane effiDRIVE and MOVIKIT® AntiSway** – Economical by parameterizing instead of programming – User-friendly thanks to hardware-independent operation – Flexible thanks to simple drive and complex motion control functions **Power and energy management system Power and Energy Solutions** – Scalability thanks to distributed DC and AC infrastructure in any combination – Cost reduction thanks to greatly reduced peak power requirements and energy savings due to storage capacitors in the DC link – Reliability thanks to uninterrupted system operation in the event of a power failure and reduced harmonic load in the supply system

❸ Connecting conveying technology

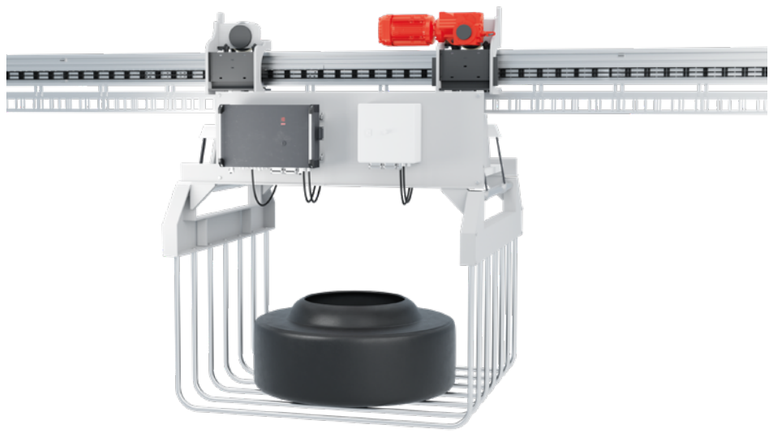
Various conveyors connect the processing stations and storage areas with each other. Depending on whether green tires or finished tires are being transported, there are different requirements for the conveying technology.

Your requirements	– Maximum energy efficiency – Scalable, modular and decentralized solution with few variants – Avoidance of dents and impressions on green tires
Our solutions	**Drive unit MOVIGEAR® performance** – Compact and quiet, with motor, gear unit and inverter in one housing and fanless convection cooling – Variant reduction thanks to wide speed range and high overload capacity – Efficiency thanks to IE5 motor and up to 50% lower system power loss than IES2 **Drive unit MOVIMOT® advanced** – Flexible, as it can be combined with IE3 asynchronous or IE5 synchronous motors and any standard gear unit **Decentralized inverter MOVIMOT® flexible** – Simple installation close to the motor with standardized hybrid cable for power supply and data connection **DC drive system for light-duty materials handling technology ECDriveS®** – Simple implementation of positioning tasks thanks to integrated encoder – Software module for transporting green tires – Free choice of control for intelligent, zero pressure accumulation conveying

Intralogistics

4 Electrified monorail system

High-speed electrified monorail systems are an alternative to conventional conveying technology to ensure that green tires reach the curing presses for vulcanization as quickly as possible.



Your requirements	– High acceleration, travel and lifting speeds – Stable communication – Contactless energy supply due to harsh environmental conditions – High utilization rate and low maintenance requirements
Our solutions	**Light-duty EMS with WiFi communication EMS Advanced** – Powerful MOVIPRO® PHE advanced drive and application controller with integrated 1.5 kW frequency inverter for the travel axis and connection for additional decentralized drive – Simple diagnostics via 7-segment display and 16 status LEDs as well as parameter module for fast startup and unit replacement – Slotted waveguide technology for WiFi communication from the vehicle to the stationary segment controller – Optional MOVITRANS® inductive energy supply – contactless, quiet, wear-free and low-maintenance – Speed and distance monitoring to EMS carriers in front through position detection with DataMatrix code tape, 2D camera system and optional MOVISAFE® UCS safety monitor – Smooth-running, low-noise and space-saving HW/HK EMS drives for permissible wheel loads up to 40 000 N and safe switching via clutch in gearbox output stage – MAXOLUTION® connected software modules

5 Mobile transport systems

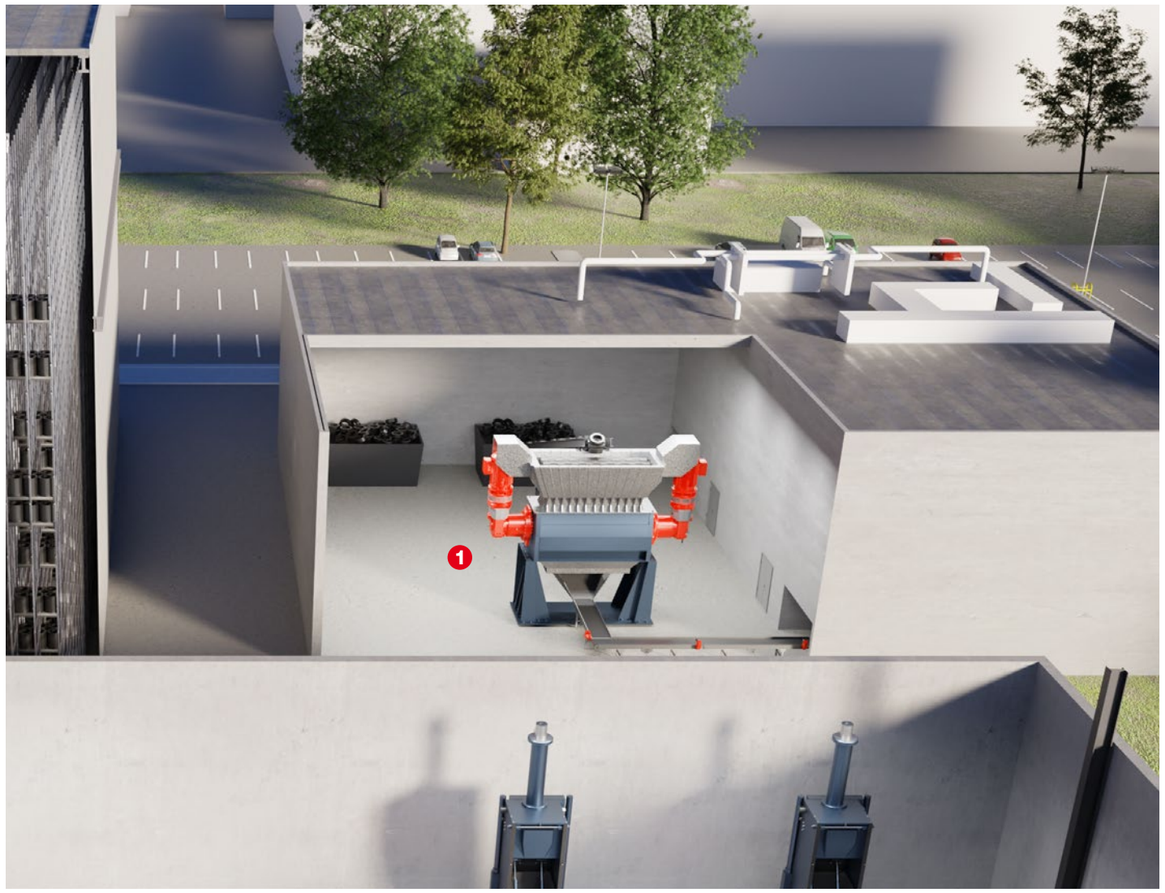
Driverless transport vehicles enable new concepts in production and intralogistics, for example the decoupling of individual process stations.

Logistical processes in production lines can be significantly optimized with our mobile systems, including contactless energy supply. In tire manufacturing, for example, they can be used to transport cassettes with semi-finished products or green tires to the curing presses.

Your requirements	– Break up rigid processes in production and intralogistics – Customized configuration for easy process integration – Application-specific functions – Scalable hardware and software solutions
Our solutions	**Logistics assistants** – Various vehicle designs, e.g. for rack transport or process interlinking with integrated conveyor – Bi- or omnidirectional driving mode – Contactless charging in the process – Free contour navigation with parking function – Interoperable communication interface VDA 5050 – Safe load detection – MAXOLUTION® connected software modules, including fleet management system

Recycling

1 Shredder

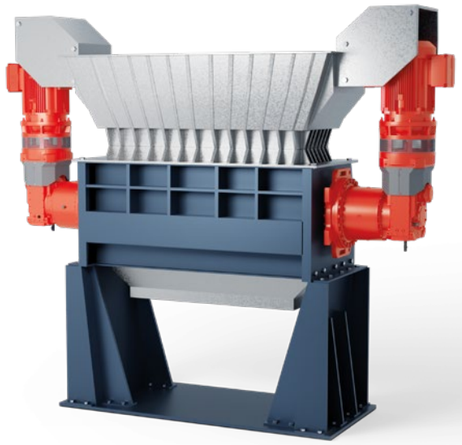


In order to achieve its own sustainability goals, the tire industry is focusing on establishing a circular economy in addition to the already established tire retreading for truck tires.

A key component here is the recycling of end-of-life tires to recover raw materials such as steel, oil or carbon black, which can be used to manufacture new products (including new tires).

1 Pre-Chopper/shredder for end-of-life tires recycling

Before an end-of-life tire can be separated into its components using various processes such as pyrolysis, it must be shredded and granulated in the pre-chopper/shredder.



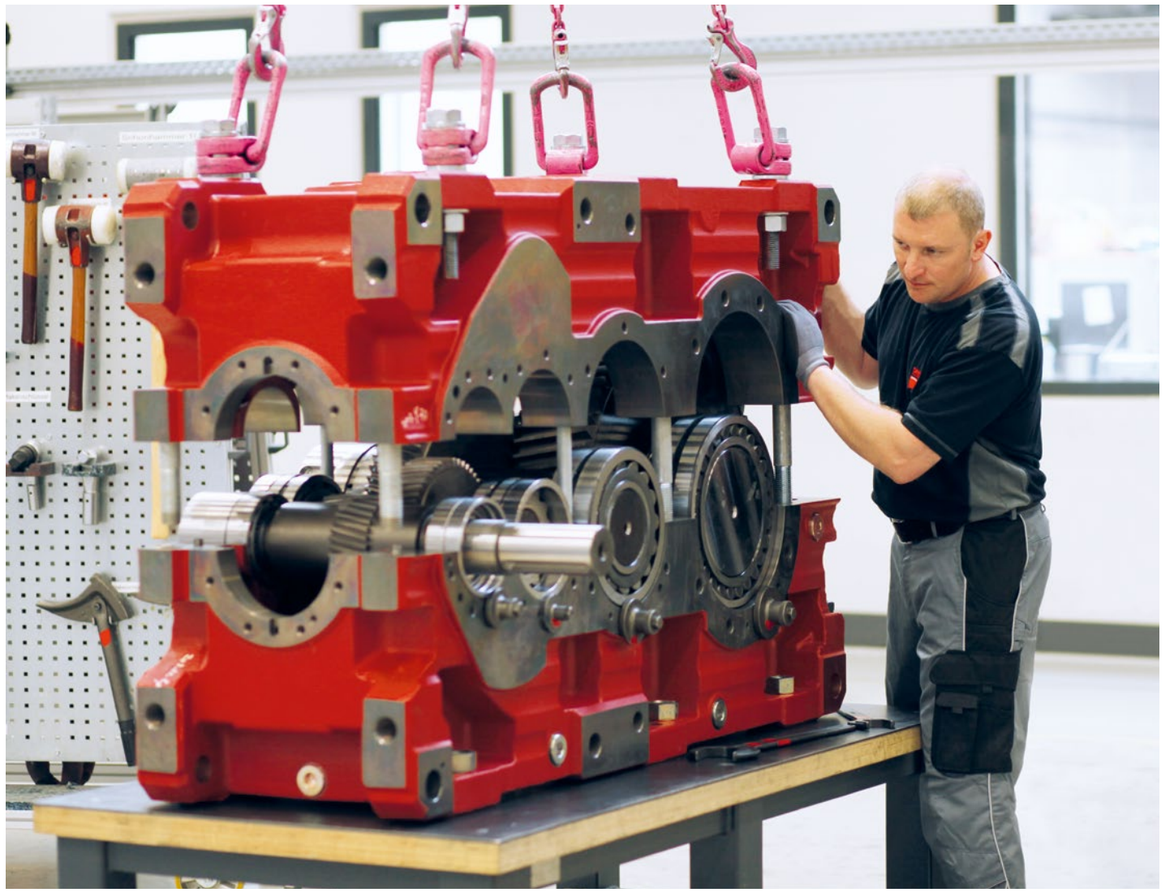
Your requirements	– Efficient gear units, motors and inverters from a single source – Replacement of hydraulic solutions – Operation with clockwise and counter-clockwise rotation to solve blockages
Our solutions	**Planetary gear unit with primary bevel-helical gear unit P-X.e** – Space saving due to a more compact design – High operational reliability through a robust gear unit design and bending-resistant housing design – Reduced costs thanks to the high thermal gear performance **Asynchronous motors DRN..** – Future-proof by supporting global standards and norms – Cost-optimized solution with integrated built-in encoders and brakes – Flexibility thanks to power ratings from 0.09 – 375 kW in efficiency class IE3 **Standard inverter MOVITRAC® advanced** – Fast unit replacement thanks to portable memory module – Connection to common control systems by supporting various fieldbus protocols – Flexible thanks to configurable functional safety

Services for tire industry at a glance

From the initial consultation to the maintenance and modernization of your machines and system

We would like to support you wherever you are currently. This is done with the appropriate services and tools as well supporting options. Due to the required torques, numerous large gear units are used in tire plants.

We will therefore present selected offers from our service portfolio for large gear units in more detail below.



Industrial gear units to go delivery time program

The scope of this service includes extremely short delivery times for both standard drives and drive packages with special options.

Repair

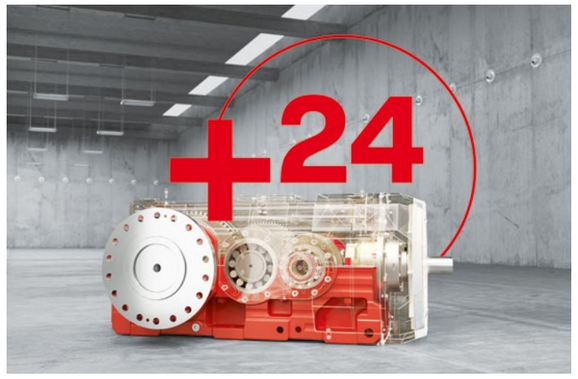
SEW-EURODRIVE is responsible for repairs as new with 24 months of liability for defects on the entire drive. We replace defective components as part of a functional repair or carry out only the most necessary for emergency repairs so that everything runs again quickly – always reliably, transparently and in high quality.

Retrofit

If you want to modernize your systems, we offer tailored solutions to meet your requirements in terms of installation space, energy efficiency and ease of maintenance.

In-house lubricant

The high-quality GearOil by SEW-EURODRIVE ensures optimum lubrication of your machines and systems to extend their service life.

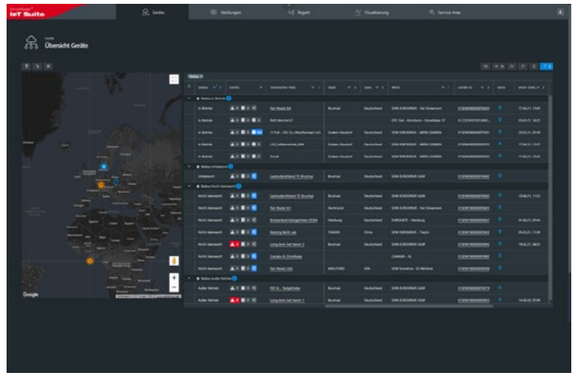


Optional extension of the product warranty by 24 months

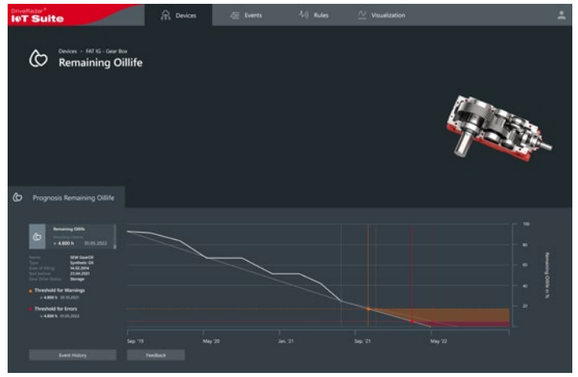
GearOil by SEW-EURODRIVE

Predictive maintenance with DriveRadar® IoT Suite

As a competent and reliable partner, SEW-EURODRIVE supports you with its innovative DriveRadar® IoT Suite concept. This makes it possible to reliably predict the behavior of the drives, plan maintenance and repair measures in advance so that unplanned repairs and even downtimes can be avoided.

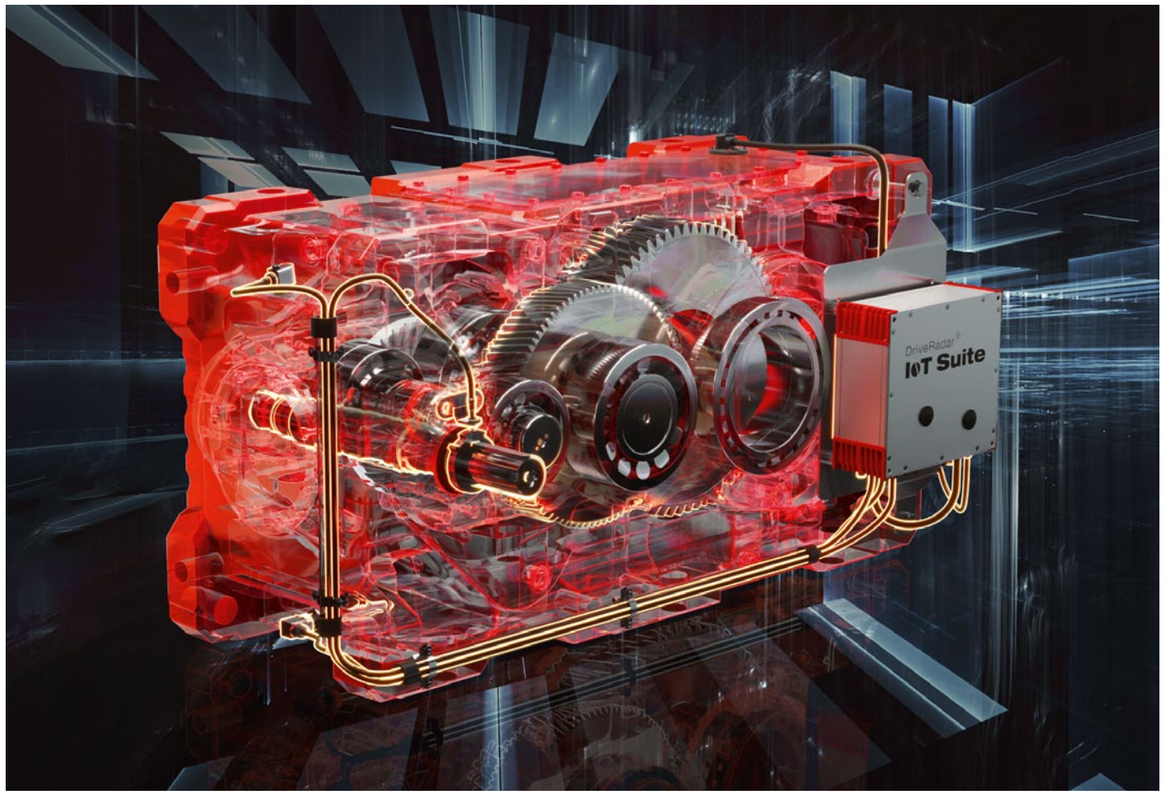


DriveRadar® IoT Suite: Device list



DriveRadar® IoT Suite: Prediction of the remaining oil service life and oil change

DriveRadar® for large gear units: Condition monitoring and maintenance forecasts



Data analysis and visualization

All measured value results are combined and visualized in the DriveRadar® IoT Suite. This provides you with a quick online overview of the condition of your gear unit and all components: Device list, measured value overview and forecasts, as well as trend trends for various damage patterns.

Data connection

By implementing an OPC UA interface as standard, the local measurement data can also be integrated directly into your customer system. The color change of a higher-level traffic light in yellow or red (“Overall Health Status”) lets you know when you should take a look at your DriveRadar® IoT Suite.

Data acquisition

A standardized, specially selected and coordinated sensor package records the operating parameters of the large gear unit and forwards them to the EdgeProcessingUnit. The measuring technology includes speed, acceleration, oil level, oil temperature and ambient temperature sensors.

Data connection

The EdgeProcessingUnit records all sensor data and sends the collected measured values encrypted to the SEW-EURODRIVE data center.

Notes

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Further information at
www.sew-eurodrive.de/industries/tire-industry

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