

HENSCHEL

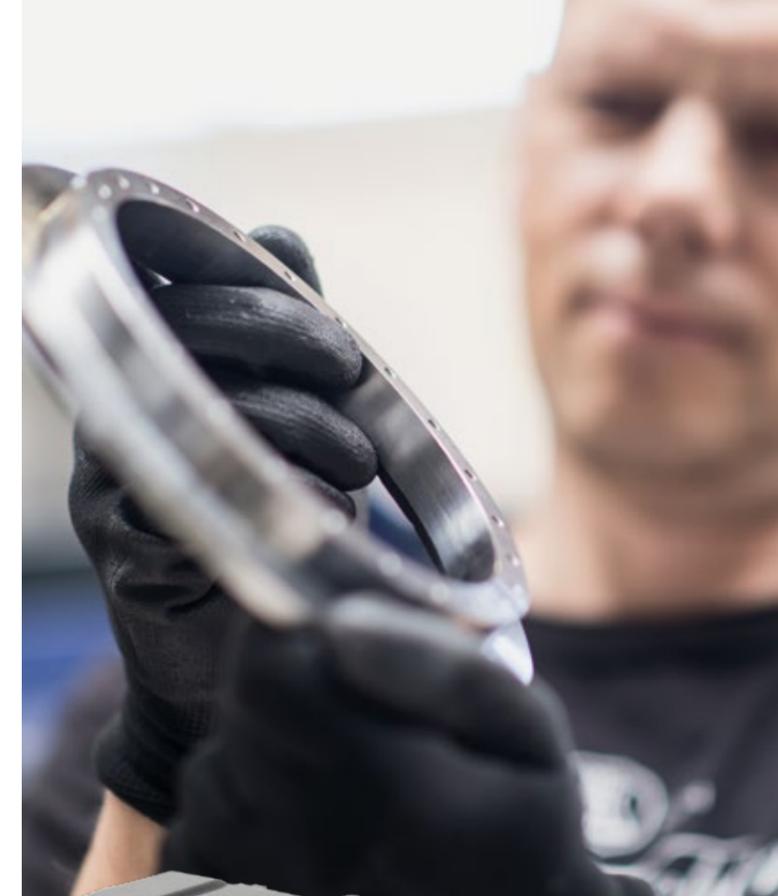


Pioneering



Railway Gears | Extrusion Gears | Special Gears | Melt Pumps | Couplings | Components | Service

Reliable | **Intelligent** | **Efficient**



Quality pays off



Only time can tell whether quality pays off. With more than 200 years of history to its name, Henschel has an unequivocal answer to that question: yes, quality does pay off if medium to long-term goals have been set.

The DHG 300 industrial locomotive is an impressive example of what Henschel gearboxes can achieve. The gearboxes were delivered in 1972 and haven't stopped working since. Only the roller bearings were renewed during the locomotive's 2007 overhaul. The gear teeth were in perfect condition even after running for millions of kilometres. So it stands to reason that these Henschel gearboxes will keep running smoothly in the decades to come.

This aspiration – to consistently make our products and solutions stronger, sounder and safer than required – lays the foundation of our superb reputation: "Quality made by Henschel". Henschel no longer builds locomotives and aircraft. Instead, the brand now stands for its core expertise in:

Powertrains, in particular the gearbox and its components.

Best Cost Efficiency, High Availability, Lifetime and Ease of Servicing.

Railway gears of Henschel are based on decades of experience in the design and production as well as actual market standards and developments. This niche market requires the necessary dedication and competence and that is what we at Henschel recognize and achieve.

Safety, reliability, accuracy, efficiency and costs of our engineered products are vital key factors for us. More than ever Henschel offers a total solution which is limited not only to the delivery of high-class gearboxes. We also take care during the whole lifetime to reach a minimization of

the total cost of our products. For this we can depend on our service department. Our competence contains decades of know-how in the development and offers with it the necessary experience in the project management as well as documentation and quality management.

Together we achieve the best solutions through our varied range of products.



“We develop individual solutions together with our partners and are dedicated to all challenges.”

Gerd Bonte
Director Sales Railway, Henschel Antriebstechnik, Kassel

Your Demand – Our Solution. Railway Gearboxes from Henschel.

| Noise

Since 2013, Inter alia the European Railway Agency (ERA), has periodically discussed new norms for noise reduction of rail vehicles. Now more than ever the specified noise levels have become a very serious challenge during the development phase of our gearboxes. Henschel has invested in equipment, knowledge and studies to fulfill the required explicit standards for sound power as well as for sound pressure noise levels. Recent case studies and active projects in Henschel have shown significant improvements. In cooperation with specialised partners, we recently fulfilled very challenging noise requirements. For Henschel it is a clear target to continually improve our capabilities in order to fulfill the requirements on the market and specifically for noise levels.

| Quality Standards

Henschel products fulfill the Norms and Standards as demanded in the mechanical industry and as required and specified by our customers. Throughout the years, we have

learned to work with several quality norms and standards that vary upon the region or continent in which our products will be active in.

Next to the known regular standards, we are also able to handle customised standards required and specified by our customers. Using decades of experience our customers have gathered a lot of information and lessons learned. Many of our customers are following closely the development of regulations and documents drafted by the European Railway Agency. This results in quality specifications with rail product specific quality requirements, which are interpreted by Henschel as rules to follow and challenges to take.

| Advanced Maintenance

At Henschel, we offer our advanced maintenance expertise to improve process performance and reduce long-term costs. Together with our customers we establish ourselves to create the best management strategy to help the cus-

tomers maximise product availability and reliability, whilst minimising the total cost of ownership throughout the life cycle of the equipment. The implementation of RAMS (acronym for Reliability, Availability, Maintainability and Safety) and Life Cycle Costing (LCC) in the rail gearbox industry is of vital importance.

RAMS and LCC are methods used to quantify performance and different cost categories such as initial costs, maintenance costs and operational costs. Henschel understands that these two concepts are a very important indicator for the future Life Cycle Assessments that will be arranged by our customers and operators.

| Service

Henschel offers aftermarket services in order to minimize any stand-still in the field and to avoid further damage on the equipment. In cooperation with our rail design and development engineers we strive to shorten trouble shooting and problem solving times. Due to vast

experience and expertise, Henschels' aftermarket services are not limited to their own designed products. A wide range of references and examples built up over the past years prove this capability. Logically within this aftermarket activity, we also foresee the availability of spare parts, assembly- and test training for our customers' maintenance teams.

| Certifications

As any other respectful company on the rail market, Henschel is ISO-certified. On a regular basis we undergo audits that do not only renew our certification; it also helps Henschel to grow further to achieve a better quality level. Henschel is also a Deutsche Bahn-certified company and possesses also a calibration certificate DIN EN ISO/IEC 17025, which allows us to calibrate measurement tools for the mechanical industry. We realise the value of our certificates and strongly declare that our products represent these values.



Urban

Efficient, low noise and reliable.

Urban rail vehicles for the passenger traffic are strongly influenced by comfort aspects and cost aspects, for example – life cycle costs, power to weight ratio, high flexibility in the use with low noise issues.

Henschel offers individualized system solutions for the urban local traffic on streets, underground and monorails through unique proven track records.



| 100% Low-floor trams

Modern trams are characterized by maximum comfort, high safety standards and an optimal space. These requirements are implemented ideally by 100% low-floor trams. Henschel has proven, in terms of technical specifications, 100% low-floor drives through novel approaches with limited installation space.

| 60%-70% Low-floor trams

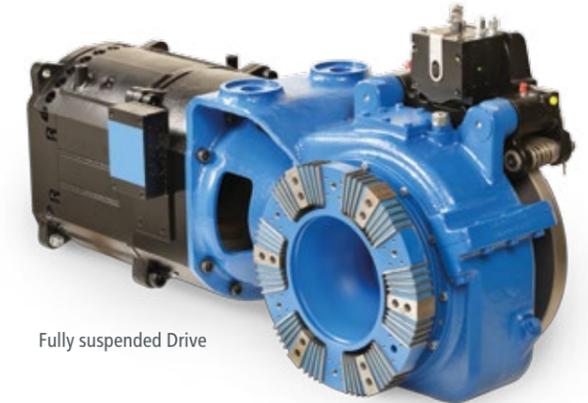
Today the largest share have tram vehicles with 60% - 70% low floor. Due to the existing infrastructure, vehicles of this type are often still needed. Throughout history, Henschel has supplied different transmission solutions for such applications. They are robust and durable with low maintenance.

| Subway

Metro-systems run underground to increase mobility without increasing the traffic in the city. Specific challenges by the development of such drive solutions for subway application arise to the one hand from the speed in combination with constant acceleration and braking and on the other hand by changed temperature and atmospheric pressure terms in the subsoil. Exactly here Henschel has been successful during the past years with the most innovative developments.



100% Low-floor Drive



Fully suspended Drive

| Subway Fully suspended

Fully suspended gearboxes increase the comfort conditions of the vehicle in combination with the suspension systems. Our fully suspended gearboxes are successfully integrated in different subway applications.

| Subway Semi suspended

Henschel delivers Semi suspended gearboxes for all drive systems and railway applications. The gearbox is mounted on the wheel axle and assembled to the bogie frame with suspension elements.

| Monorail

Monorails are used on closed short distances in city centers or on public areas. The vehicles run on a single rail. The central driving unit has a special direct gearbox and will be designed by our experts for your individual demands.



Suburban

Our drives ensure reliable connections between cities.

With the increasing importance of metropolitan areas in the whole world, it's essential to have efficient connection by suitable suburban transport systems. In the foreground are extremely short passenger change times at high accelerations and top speeds up to 200 km/h.

Such applications will not only be driven by convenience and cost aspects, but distinguished by best noise emissions and power to weight ratio. These qualities are complemented with characteristics through high reliability and low maintenance costs.

All of this can be found by Henschel-Development expectations.



EMU Drives



| Suburban

InterCity trains and regional trains run between stops in major cities or connect closely spaced cities. The operating speed of the trains depends on the length of the route.

| EMU Drives

Environmental aspects and energy efficiency will require more than ever individualized system solutions. Electrical Multiple Units – EMU are a response to these requirements, which has proven itself.

Henschel develops and delivers solutions that meet these requirements. Together with our customers we develop platform solutions for every application and always comply with the requirements relating to the environment, weight, noise and maintenance.

| DMU Drives

Diesel Multiple Units – DMU operate on routes without overhead contact lines. Just like an EMU, a DMU requires no separate locomotive, as the engines are incorporated into one or more of the carriages.

In this market Henschel has convinced for decades the end users and the OEM customers with different drive solutions.

| Gearboxes for High-speed Trains

High-speed trains are designed for long-distances between countries, states or provinces and operate at speeds that can vary between 200 km/h and 400 km/h.

Because of Henschel's precision and distinct quality awareness in this segment of the market, we are able to achieve the high requirements in terms of convincing quality and availability.



Locomotives

A Henschel gearbox is the answer to your power and energy efficiency requirements.

Decades of experience in the development and production of heavy locomotive drives enable Henschel to deliver solutions for the most extreme conditions. The challenge is to integrate all of the power in accordance with the technical specifications in a locomotive.



| Nose suspended

When we refer to the support of the traction motor in a suspension bearing on the axle shaft, we speak of a cannon box drive or unsprung drive. The motor-gear unit is attached by means of a torque arm on the bogie. Henschel meets the requirements for the delivery of transmissions for „Nose suspended“ systems.

| Fully suspended

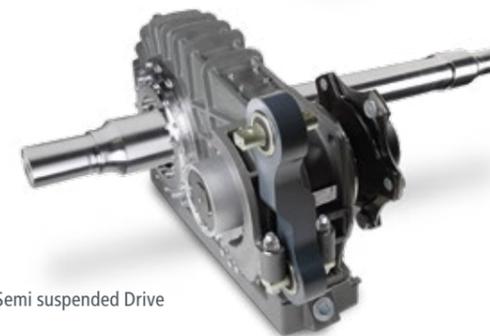
Fully suspended systems reduces the unsprung mass and increases the comfort conditions. Our fully suspended gears have been successfully integrated in different locomotive applications.

| Semi suspended

Henschel delivers Semi suspended gearboxes for all possible types of rail vehicles and railway applications. Solutions of this type are for locomotive drives a very economical form of propulsion.



Nose suspended Drive



Semi suspended Drive



Diesel Electric Drive



| Diesel Electric

A diesel engine drives an electrical generator that produces electric energy to drive electric traction motors. Henschel provides gearboxes that transfer the torque from these motors to the wheels. Henschel has repeatedly demonstrated the capability to provide transmissions that meet these technical requirements.

| Hybrid

Also in the locomotive industry, focus is aimed at environmental issues such as global warming and energy efficiency challenges in which Henschel has its solutions. Hybrid locomotives are designed to reduce energy consumption, noise and exhaust emissions. For this application, we are the right partner.

| Shifting

If your application requires a gearshift to switch between different ratios or driving directions, we have the knowledge, experience and references, to develop such a transmission for you.



Infrastructure maintenance vehicles

Customised – with or without gearshift.

For grinding, milling and maintenance of rail tracks and for the development of new tracks are drive systems with special requirements needed for example switching and reversing gears, required in small quantities.



Axle Drive



Manual Drive



Generator Drive

| Maintenance vehicles

Infrastructure maintenance vehicles are required, with a relatively high speed to get to the operating site and carry out the repair work there with very low speed. The repair includes all work, such as grinding the rails, roadbed work, rail laying, renovation of railway infrastructure. Henschel has the capability to provide the necessary know how in the development and production of such special gearboxes.

| Generator Drive

On railway lines, which are not electrified, axle-riding generator gearboxes are used per coach which covers the necessary power requirements. Henschel has successfully developed and supplied generator drives for this market.



“Service from Henschel ensures maximum availability of your equipment and at the shortest reaction time.”

Dirk Hempeler

Plantmanager, Henschel Antriebstechnik, Kassel



Service from Henschel – based on a passion for reliability and technological durability.

The experienced and globally networked Henschel Service team inspects, replaces and repairs components and systems used in numerous industrial applications. We organise complete service chains, from cleaning to refurbishing. Each customer is given a personalised service package for effective minimisation of downtimes.

Henschel Service is a one-stop supplier. From individual items to components, we have what you're looking for, even components and systems from other manufacturers.

We define service as world-wide mobility and speed. We will repair your components and systems on site as required. That eliminates long transport and transfer processes. The workflow is transparent at all times.

We are also happy to repair and restore rare and individual one-off pieces, even if they are no longer complete. We owe that to our Henschel tradition. And you might be amazed at how much we can still learn from solutions of over a century ago, because we keep them in our archive, together with all of their constructional backgrounds.

At your service worldwide



China

Henschel, Shanghai
Phone: +86 21 6469 7696
chn@henschelgroup.de

Egypt

Henschel, Giza
Phone: +20 233 88 20 00
egy@henschelgroup.de

Germany

Henschel, Kassel
Phone: +49 561 801 6118
antriebstechnik@henschel.de

Henschel, Heilbad Heiligenstadt
Phone: +49 3606 60736 0
fertigungstechnik@henschel.de

Great Britain

Henschel, Nottingham
Phone: +44 115 9753655
gbr@henschelgroup.de

India

Henschel, Ahmedabad
Phone: +91 79 25620953
ind@henschelgroup.de

Henschel, New Delhi
Phone: +91 11 47637300
ind@henschelgroup.de

Italy

Henschel, Milan
Phone: +39 02 48952242
ita@henschelgroup.de

North America

Henschel, Akron, OH
Phone: +1 330 174 0075
usa@henschelgroup.de

South Korea

Henschel, Seoul
Phone: +82 31 4730453
kor@henschelgroup.de

Taiwan

Henschel, Taipei
Phone: +886 2 27731885
tw@henschelgroup.de

HENSCHEL

Henschel GmbH
Henschelplatz 1, 34127 Kassel, Germany
Phone: +49 561 801 5960
henschel@henschel.de



www.henschel.de