Materials for tomorrow

Enhanced performance through advanced materials, surface engineering and polymer processing
Attractive markets

Every day, we are getting smarter in how we use resources. We demand that the objects that surround us, the cars we drive, the airplanes we fly, even the clothes we wear, perform better and help us achieve more with less. What makes this possible are new and better materials, and new ways to shape them and give them purpose.

Unique competences

This is what Oerlikon does. We engineer and process materials and surfaces to give products improved and more desirable functions. We help cars and airplanes use less fuel, make tools last longer, and improve the manufacture of textiles. Our technologies enable manufacturers to do things they simply could not do before and advance industrial innovation.

Forward-looking strategy

Oerlikon is a market leader in advanced materials, surface engineering and polymer processing. Our solutions encompass materials, coating equipment, coating services, and the engineering of entire plants. We build our business on unique technology competences, the widest global reach and trusted customer relations in highly demanding industries such as aerospace, automotive, energy, tooling and textiles. Every day, we develop on new materials, new surface technologies, new applications, components and textile manufacturing solutions to empower our customers to create and innovate better products.

Increased customer value

More profitable
More efficient
More sustainable
More durable
More productive
Positioned in long-term growth markets

Oerlikon focuses its activities on strategic growth markets with long-term potential. Thanks to innovative solutions with forward-thinking technologies, Oerlikon’s customers generate measurable added value in these markets.

Markets we serve:

- Aerospace
- Automotive
- Energy
- Tooling industry
- Medical industry
- General industries
- Manmade fibers

Markets we serve:

- Aerospace
- Automotive
- Energy
- Tooling industry
- Medical industry
- General industries
- Manmade fibers
Making aerospace safer, more powerful and more efficient

All major aero engine manufacturers today use Oerlikon advanced materials, functional coatings or process technologies to boost performance, improve safety and fuel efficiency, and control emissions.

**EBC (Environmental Barrier Coatings)** for turbine components manufactured from SiC-based CMCs (Ceramic Matrix Composites) ensure excellent thermal expansion and provide protection against vapor and other environmental attacks. Hard erosion- and corrosion-resistant coatings for compressors are 40× more resistant than steel.

Turbine components such as airfoils, honeycomb seals and compressor vane assemblies ensure enhanced sealing and cooling of the turbine and improve engine efficiency.

**Maximum protection**

PVD Coatings of pump and valve components in fuel and hydraulic systems reduce friction, protect against wear to increase component lifetime.

**5%**

Thermal spray abradable coatings applied as clearance control solutions increase engine safety and boost efficiency by up to 5%.

TBCs (Thermal Barrier Coatings) provide outstanding thermal protection for turbine engines and enable higher combustion temperatures permitting better fuel and engine efficiency.

PVD Coatings protect compressor blades against erosion and corrosion resulting in improved fuel efficiency and part durability.
A coating that would work inside a live volcano …

The interior of a jet engine can exceed 2000 °C – hotter than molten lava. To protect the engine’s turbine blades in such extreme operating temperatures, we developed a special thermal barrier coating. The coating is up to 250 µm thick and ensures a longer life cycle, improved performance and increased safety.

… making turbines more effective

Our materials, coatings and turbine components increase the efficiency of the aero engine and protect a wide range of operational-critical parts, including clearance control systems, air seal components, compressor blades, vanes, impellers and IBRs (Integrally Bladed Rotors). By preventing problems caused by fretting, abrasion, particle erosion and other surface mechanisms, the coatings maximize turbine efficiency, optimize design point performance and improve thermal efficiency.

Enabling aircraft operators to save millions of liters of fuel every day

Aerospace is one of the fastest-growing markets worldwide. In the last five years, passenger volume increased by a third – far faster than the International Air Transport Association’s (IATA) estimate. Today, 3.8 billion passengers fly each year. That’s the equivalent of over half the earth’s population. And still, demand accelerates. In response, aerospace companies are developing next-generation airplanes. At the same time, they must increase efficiency and sustainability.

To successfully address both challenges, some components – the jet engine, for example – need to change. They must become both lighter and more resilient to higher operating temperatures, fretting, sliding wear and corrosion. Engines and many other critical components have to be developed further in order to reduce fuel consumption, and CO₂, NOₓ and CH₄ emissions. But manufacturers cannot achieve these goals alone.

Oerlikon provides significant added value with vital expertise in advanced materials and process technologies. We create new materials and coatings to improve performance across the aerospace industry. Additionally, we develop new textiles to ensure passenger safety. Many aircraft are already benefitting. For example, our coatings protect turbine components and combustors from extreme temperatures to achieve class-leading gains in operating efficiency. As a result, all next-generation aircraft engines make extensive use of these coatings.
Advancing productivity, sustainability and profitability in the automotive industry

Over half of the world’s largest car manufacturers trust Oerlikon advanced materials, functional coatings or process technologies to improve component durability and engine efficiency.

2% to 4% fuel saving

Coatings applied to cylinder bores result in low friction, low oil and fuel consumption, reduced wear and increased corrosion resistance.

Improved resistance

Coatings for steering and suspension components guarantee increased surface hardness, wear and corrosion protection, and a longer lifespan.

Environmentally friendly

ePD coated (embedded PVD) parts are recyclable and employ an environmentally friendly metallization technique. No harmful agents such as hexavalent chromium or other non-REACH-compliant materials are used in the process. It enables plastic parts to be coated with metallic effect in automobiles as important interior and exterior design elements.

40%

Up to 40% friction reduction through wear and corrosion-preventive surface solutions.

Reduced emissions

Brake disc coatings protect against wear and corrosion, reduce brake dust emissions and increase disc lifetime.

Increased engine performance

Coated piston pins and injector nozzles in turbochargers withstand the higher pressure and temperatures needed to improve performance while curbing emissions.

Improved resistance

Coatings for steering and suspension components guarantee increased surface hardness, wear and corrosion protection, and a longer lifespan.

Reduced emissions

Brake disc coatings protect against wear and corrosion, reduce brake dust emissions and increase disc lifetime.

Over half of the world’s largest car manufacturers trust Oerlikon advanced materials, functional coatings or process technologies to improve component durability and engine efficiency.

Advancing productivity, sustainability and profitability in the automotive industry

Increased engine performance

Coatings applied to cylinder bores result in low friction, low oil and fuel consumption, reduced wear and increased corrosion resistance.

Improved resistance

Coatings for steering and suspension components guarantee increased surface hardness, wear and corrosion protection, and a longer lifespan.

Environmentally friendly

ePD coated (embedded PVD) parts are recyclable and employ an environmentally friendly metallization technique. No harmful agents such as hexavalent chromium or other non-REACH-compliant materials are used in the process. It enables plastic parts to be coated with metallic effect in automobiles as important interior and exterior design elements.

40%

Up to 40% friction reduction through wear and corrosion-preventive surface solutions.

Reduced emissions

Brake disc coatings protect against wear and corrosion, reduce brake dust emissions and increase disc lifetime.

Over half of the world’s largest car manufacturers trust Oerlikon advanced materials, functional coatings or process technologies to improve component durability and engine efficiency.
Lighter, slicker, more effective

We produce advanced coatings for over 100 car parts that reduce corrosion, friction and wear. The resulting fuel efficiency and improved durability of light metals means manufacturers can build smaller engines. When manufacturers adopt a comprehensive approach to component coating, they can cut fuel consumption by 2% to 4%, reduce oil consumption by 30%, and cut engine block weight by 12%.

Over 100 components per car

In today’s cars, over 100 components are coated and up to 30 kg of textiles are used.

Typical applications in the automotive sector

- Production tools
- Engines
- Valves
- Fuel injectors
- Exhaust systems
- Transmissions
- Gears
- Safety belts
- ESP/brake system
- Turbochargers
- Decorative elements
- Exterior decoration
- Interior elements
- Moldings
- Tires

Driving automotive improvements by reducing weight, fuel and emissions

The automotive industry is on the rise. “In 2015, 1.0 billion cars were on the road. Driven by the increasing global demand for mobility, that number will grow to over 2.4 billion by 2050.”* Vehicle manufacturers are faced with growing demands from regulators, customers and investors to increase manufacturing productivity, boost vehicle operating efficiency and reduce their environmental impact. To reduce fuel consumption, cars need to lose weight and gain engine efficiency. Yet safety concerns call for increased robustness and more onboard technology. Vehicle manufacturers are looking for new and innovative ways to address these challenges. New and advanced materials, improved performance of components or new ways of manufacturing components are all part of the solution.

Oerlikon’s innovative powertrain concepts reduce energy loss from the engine to the wheels. Our specialized coatings improve wear resistance and the life of key components. Advanced materials make designs more compact, reduce weight or friction losses in the engine, and make new design solutions possible. And our manmade fiber solutions improve passenger safety and comfort – from airbags and safety belts to seats and tires.

Improved engine reliability and performance

Injectors, valves, oil pumps, exhaust systems, cooling systems, turbochargers: Every part of an engine has to perform perfectly and reliably. Oerlikon coating technologies improve the performance and durability of engine components. The coatings significantly reduce friction and wear resulting in improved fuel and oil efficiency, lower emissions and longer component lifespan.

Smother-shifting transmissions

From cars to trucks to construction vehicles, Oerlikon offers comprehensive synchronizer and friction reduction technologies for modern transmission systems. Benefits include increased performance, excellent oil compatibility, enhanced comfort, extended life cycle, lower weight, improved wear resistance and reduced costs.

Innovative, chrome look design parts with functionality

Now, door handles, mirrors, push buttons, switch covers, gear shifters, frames and many more parts can look like chrome without the non-REACH-compliant chromium (Cr VI) plating process. Oerlikon’s PVD and ePD technologies offer environmentally friendly, chrome look plastic metallization. Manufacturers can offer their customers the aesthetics they want and please regulators and nature at the same time.

Further improving passenger safety

Brake discs, safety belts, airbags and tires are all key to vehicle and passenger safety. The reliability and quality of the materials used are essential if every single part has to work to perfection every time. Oerlikon technologies such as brake disc coatings and manmade fiber solutions equip manufacturers with technologies that further increase vehicle safety.

* International Transportation Forum (ITF)
Enabling the way to effectively generate energy

The world’s largest producers of power generation equipment build on Oerlikon advanced materials, functional coatings or process technologies to improve performance and cut the environmental impact of energy generation systems.

Corrosion- and erosion-protective coatings applied to hydropower turbine components extend service life, increase turbine efficiency and decrease maintenance costs.

Coatings protect gas turbine components from oxidation, hot-gas corrosion, erosion and wear. Combined with specialized turbine components, they maximize operational efficiency and reliability with less environmental impact.

Surface solutions increase wear resistance, improve component performance and extend the time between maintenance cycles of gears, roller bearings, hydraulics and structural parts required for reliable wind power.

Tailored materials and coatings protect ball valves used in the oil and gas industry from galling, abrasion and erosion resulting in smooth, reliable operation and preventing unintentional valve backflow or leakage.

Abradable sealing coatings for steam turbines result in increased power output and efficiency, while reducing fuel consumption which lowers CO₂ emissions.

Coatings protect centrifugal injection pumps used for hydraulics applications from abrasion, erosion and corrosion and extend the pump time to failure by a factor of over three.
Hydro turbines
Hydropower is the primary renewable energy source used to generate electricity. Corrosion and erosion cause efficiency losses that are worsened by the amount of entrained silt, sand and gravel in the water. Oerlikon materials and coating technologies for hydropower turbine components reduce material erosion by a factor of up to 50 and increase the service life of components three to five times compared to uncoated components.

Wind turbines
Wind power installations have to work in sun, rain, snow and wind. Those located offshore must also contend with salt, which poses a constant threat of corrosion. A standstill incurs enormous costs. So our dedicated materials and surface solutions guard against wear, corrosion and fatigue. One example is transmission gears, which are subjected to up to 144 million revolutions of the rotor shaft, or 15 billion revolutions of the generator shaft, during their service life.

Gas and steam turbines
Parts in the turbofan, compressor, combustor, turbine and exhaust section all benefit from Oerlikon technologies: everything from blades, vanes and shrouds to shafts, disks, bearings and nozzles. For example, PVD-coated compressor blades last twice as long as uncoated versions. Abladable coatings for clearance control increase efficiency by up to 5%. Thermal barrier coatings protect against heat. And Oerlikon-manufactured turbine components enhance sealing and cooling.

Oil and gas
Some of the harshest stresses and strains are found in the world of oil and gas exploration: abrasive wear, erosion, corrosion, fatigue, high fluid pressure, vibrations, impact loads, extreme torque and many more. To protect vital components, Oerlikon developed tailored materials combined with thin-film and thick-layer surface solutions. These advanced coatings extend the lifetime of downhole tools, pump parts, valves, drill bits, stabilizers, artificial lift components and mud rotors by up to ten times and reduce malfunctions and downtime.

Increasing power plant productivity to cover the ever-rising demand for energy
Energy. Every day you use it, consciously or unconsciously. When you watch TV. When you work on your computer. When you turn on a light. When you charge your phone. By 2030, global primary energy consumption is expected to rise by up to 40%. Propelled by this growth, the energy sector will continue to expand.

The spiraling demand for energy and the threat of climate change, combined with decreasing costs of renewable energy sources, are transforming the energy sector. Energy companies are racing to meet demand, but also to improve the efficiency of non-renewable technologies like oil and gas and to promote renewable energy technologies like solar and wind turbines.

The industry needs new materials to achieve these goals. Oerlikon has the answers. For example, equipped and treated with our technologies, turbines last longer and perform more efficiently and reliably. Recently, our products improved the wear resistance of steam turbine components by a factor of 25. But we still have more to achieve. Collaborating with hundreds of researchers and universities around the world, we are working to create advanced solutions for a new energy future and opportunities to provide products with superior functionalities.
Providing sharper, stronger and more durable tools

Many of the world’s leading tool manufacturers apply Oerlikon’s surface solutions to improve tool strength, service life, lower manufacturing costs and enhance corrosion protection.

Tools coated with Oerlikon technology operate at 30% higher cutting speeds for the production of gearboxes than standard coatings, resulting in shorter machining time and reduced manufacturing costs.

50x

Coated punch and die tools to produce safety belt latches have an extended lifetime of up to 50 times longer and provide perceptibly better surface and cut quality than non-coated tools.

Tools, such as drills, can be reconditioned up to three times, leading to a 50% cost saving for new tool purchases.

Coated tools allow more than 350 holes to be drilled with the same tool compared to only 60 holes with uncoated tools. This leads to higher efficiency in the production process.

Chemical stability coatings protect cutting tools from corrosion by chemical/electromechanical reaction between a metal and a substance with which it comes into contact.

Chemical stability

Coated threaded cores for the production of bottle caps lead to trouble-free production and productivity gains of up to 20%.

Tools, such as drills, can be reconditioned up to three times, leading to a 50% cost saving for new tool purchases.

Chemical stability coatings protect cutting tools from corrosion by chemical/electromechanical reaction between a metal and a substance with which it comes into contact.

Coated threaded cores for the production of bottle caps lead to trouble-free production and productivity gains of up to 20%.
Improving the performance from the smallest precision tools to largest tools for metal die casting

Efficient, reliable tools are at the core of all industrial production. And more are needed with every passing day. When vehicle manufacturers produce cars, aircraft manufacturers fabricate airplanes or construction engineers build new energy systems, they all depend on manufacturing tools to perform effectively. In fact, tool performance is primarily responsible for the quality, cost and overall factory output of any product.

For optimum performance and service life, modern machine tools need to withstand higher temperatures and pressures, as well as increased wear and friction. Coatings and heat treatments are among the most effective ways to improve tool performance. This in turn leads to greater productivity and quality of metalworking and plastics processing.

In close partnership with our toolmaking customers, we are developing the right solutions for every tool in the manufacturing process. The results are impressive: longer service life, lower manufacturing costs, higher production reliability, and enhanced corrosion and adhesion protection.

**Over 20% increase in cutting performance**

Cutting tools in particular must provide high precision, fast cutting rates, long lifetimes and low production costs. Whether turning, milling, drilling, reaming, threading or gear cutting, tools are exposed to extremely high temperatures.

In plastics processing, such as injection moulding and extrusion forming, tools play a key role for productivity and process reliability. In particular, the mold surface plays a crucial role. The better the tool quality, the greater the productivity and efficiency of the manufacturing process.

When forming stainless steel, untreated tools quickly approach their limits. In production, punching, stamping and forming, tools are exposed to extreme forces and subject to wear.

Challenges in die casting production processes are tolerance and production cycle times. An essential factor for the success of metal die casting is the quality of the mold surface. It must withstand high temperatures, erosion, oxidation and other harmful effects.

Specialized coatings with low friction coefficients and a low tendency to adhere facilitate the machining of difficult materials such as titanium, stainless and Inconel alloys, as well as high-strength steels.

Coated forming tools provide excellent protection against corrosion and reduce friction and wear. Dieklin, as the technology leader in hard coatings, provides the benchmark in plastic processing.

Its latest wear protection solutions push the performance of molds. The results are longer tool life, less scrap, improved part quality and lower production costs.

Metal-forming tools require long-lasting, high-quality, reliable and robust processes to ensure high productivity. Economic efficiency and precision are key goals of all stamping processes.

Surface scoring, pickup, galling, burns and other surface defects on the parts create rework or scrap and add to the cost. Dieklin provides optimal protection solutions to minimize wear for punching and forming tools that can save up to 80% of the costs.

An untreated mold can quickly fail, leading to high costs. To prevent this, Dieklin developed exceptionally hard, extremely erosion- and wear-resistant coatings that prevent mold erosion, abrasion, melt-sticking and oxidation, as well as alloying and premature heat checking.

The results are lower tool costs due to significantly prolonged tool service life, increased productivity and production reliability.

**Cutting tools: Coatings extend tool life and tolerate higher cutting speeds and feeds, reducing machining time and costs.**

**Metal forming tools: Tools combined with a surface treatment boost quality and productivity of metal-forming applications.**

**Plastic processing: Coatings protect forming tools against corrosion, reduce friction and wear, and increase productivity of the manufacturing process.**

---

**Table: Industry: Tooling**

- **Cutting tools:**
  - Drilling
  - Milling
  - Gear cutting
  - Broaching
  - Turning
  - Reaming
  - Threading
  - Design

- **Metal forming tools:** Tools combined with a surface treatment boost quality and productivity of metal-forming applications.
  - Draw and forming steel
  - Draw rings
  - Roll forming
  - Punches and die buttons
  - Monoblock cast iron and cast steel dies

- **Plastic processing:** Coating protect forming tools against corrosion, reduce friction and wear, and increase productivity of the manufacturing process.
  - Inserting
  - Blow molding
  - Extrusion
  - Injection molding
  - Machine parts

- **Die casting:** Exceptionally hard, extremely erosion- and wear-resistant coatings protect molds ensuring product quality and greater productivity.
  - Molds
  - Cores
  - Inserts
Improving performance and longevity of medical devices

Medical device manufacturers have relied on Oerlikon’s expertise and high-quality products for decades.

Coated medical components ensure biocompatibility of implants, increase the survival and success rates of surgical implant treatments and reduce infections.

Certified quality

All Oerlikon coating centers are ISO 9001 certified; selected sites in EU and US also hold ISO 13485 certification. In addition, the BALIMED coating range by Oerlikon Balzers meet highest standards and are certified according to ISO 10993.

Oerlikon’s specialized thin film and thermal spray coating systems ensure consistent and highest-quality coatings for implants, instruments and other medical devices.

Single source of supply for total knee implant including femoral components, tibia tray and insert, patellas, stem extensions and trials.

>35

Over 35 years of experience and expertise in the development of medical application-specific solutions, based on long-standing cooperation with medical experts, universities, university clinics and industry leaders.

Implants and surgical fixtures coated with titanium or hydroxyapatite fit perfectly thanks to an improved porous structure that supports bone growth.
Helping doctors to achieve better outcomes for their patients

The healthcare sector is among the most important and fastest growing industries worldwide. Key growth drivers are demographic trends (population growth and aging), medical progress and the resulting innovations, rising prosperity (especially in emerging markets) and improved access to medical products and services. In addition, there is a great need for new therapies for a steadily increasing number of diseases. Innovation in products, services and business models are key in this ever-growing sector.

Oerlikon maintains over 35 years of experience and expertise in the development of medical application-specific solutions. The know-how is based on long-term cooperation and partnerships with medical experts, universities, university clinics and industry leaders. The solutions greatly improve patient outcomes and add economic value to healthcare products.

We simplify and accelerate our customers’ production processes by providing additive and conventional manufacturing solutions, as well as coating solutions and services, and raw materials. A streamlined supply chain drives innovation, while delivering cost savings and efficiency.

Metal additive manufacturing, commonly known as 3-D printing, is a game changer in medical treatment. In addition to manufacturing surgical implant and instrument systems, Oerlikon provides feedback on Design for Manufacturing (DFM) for additive and conventional manufacturing for the orthopedic and spine markets.

Oerlikon’s materials, coating solutions and services are used on implants, instruments and other medical devices to help prevent infection and assist surgeons by improving the precision of their surgical instruments and making them easier to use.

With our global network of ISO 9001 and ISO 13485 certified sites combined with our consistent procedures we are ready to integrate into existing global quality and supply chains.

“Oerlikon’s products and services help doctors achieve better outcomes, thereby improving the quality of life for millions of patients.”

Supply from head to toe

Supply chains in the medical field can be long, complex and expensive. Oerlikon offers a prescription for the medical device industry: a single supplier to support product development and to supply materials, thermal spray and thin film coating manufacturing, specialized processes such as additive manufacturing and PVD coating services, as well as complete medical devices. What would have required three or more suppliers can now be done by one, resulting in cost savings to the customer and improved efficiencies.

Typical applications in the medical sector

- **Face masks**: High-quality nonwoven for sterile health face masks made with Oerlikon nonwoven stand-alone machines and full production plants.
- **Hip joint prostheses**: Bioactive or bio-reactive titanium or hydroxyapatite coatings greatly improve the integration between bone and implant to last for decades.
- **Microsurgical forceps**: Bone punches with wear-resistant cutting edges and black DLC antiglare coating.
- **Bone drills and reamers**: Wear-resistant ceramic coatings provide long-term cutting edge sharpness.
- **Dental abutments and screws**: Coatings enable stable anchoring, are highly wear-resistant, provide improved screw adjustability for an overall better and aesthetic dental implant handling.
- **Spine implants**: Additive manufacturing promotes living ingrowth and fixation as well as complex and cost-effective geometries that could not be made previously.
- **Knee implants**: Titanium or cobalt-based materials applied as thermal spray coatings have excellent biocompatibility properties and corrosion resistance.
- **Toe implants**: Specific areas of toe implants are coated with biocompatible and bioactive titanium material to encourage osteointegration.

Key technologies for medical applications

- **Advanced materials**
  - Titanium, Titanium-, Nickel- and Cobalt-based Alloys, Stainless Steel, Hydroxyapatite, LUFFMPE XPE, E Plus, PEEK, Radel, Ultim, Calcon
- **Coating processes**
  - Thin film (PVD)
  - Thermal spray
  - Laser cladding
  - Surface finishing, cleaning and polishing
- **Manufacturing processes**
  - Laser and electron beam additive manufacturing
  - CNC machining, wire EDM, heat treatment, hot isostatic pressing, manual milling, laser marking
  - Nonwoven production technologies
Enhancing product capabilities to improve performance

Companies across all industrial sectors count on Oerlikon advanced materials and functional coatings to improve performance, meet regulatory compliance or improve consumer goods.

Heavy duty additively manufactured die-cast tooling reduces cycle times with conformal cooling channels. End-to-end solutions from powder production to printing and post-processing enable drastically reduced lead times.

Coatings for antennas are applied to non- or poorly conductive materials to enhance electrical conductivity.

Plasma-sprayed chromium oxide coatings on anilox rolls ensure successful laser engraving of the ink-metering cells and protect the anilox roll from the corrosive effects of the ink.

Coatings with very smooth as-sprayed finishes applied to corrugating rolls for the paper industry significantly lower post-coat machining costs and extend the useful life of the roll.

Coatings that prevent surface fatigue of roller bearings reduce mechanical stress, lead to an extended lifetime and increase the durability of components.

Additively manufactured heat exchangers improve heating and cooling efficiencies on industrial pumps, vehicles and aircraft. New designs are enabled with reduced part count and complex geometries.
Empowering products to achieve better results

Heavy machinery key components are exposed to harsh conditions and must continuously operate at peak efficiency. Hygiene and safety are of the utmost importance for the food processing industries. Away from the pressures of harsh environments and food hygiene, manufacturers of household appliances, consumer electronics and sports equipment develop their products with components that are either crucial decorative elements or important for a better product service life.

In the general industry sector, performance and durability of the components are of key importance. This applies from simple mechanical applications to high-end semiconductor engineering and electronics. Oerlikon provides a wide range of materials, precision and high-quality coatings with properties to protect or enhance the performance of components or entire processes.

Our hardworking materials and coating solutions provide reliable protection against corrosion and wear for the most stressed heavy machinery parts. Additive Manufacturing provides design freedom to create better and lighter weight parts for general industrial applications. In consumer goods, coatings mean components can be smaller and lighter. Our decorative coatings deliver unbeaten wear resistance and designer finishes. In engineering, they significantly improve the performance and durability of parts.

### Heavy machinery and equipment
- Consumer goods
- Food and packaging
- Engineering and electronics
- Challenges
- Solutions

#### Consumer goods
- Watches
- Windows
- Shavers
- Sanitary fittings
- Automotive interiors/exteriors
- Pans and office tools

#### Food and packaging
- Bottles and liquid containers
- Water and wastewater
- Paper production
- Chemical processing
- Biopolis
- Water and wastewater applications

#### Engineering and electronics
- Labels
- Paper production
- Chemical processing
- Biopolis
- Water and wastewater applications
- Components for electronic device manufacturing

#### Challenges
- Productivity and reliability are driving factors in this market. Machines are expected to run at maximum performance and reliable, and harsh operating environments. This leads to over strained components, break downs and added costs. Equipment manufacturers are also under pressure to build greener vehicles that meet tighter emission regulations.

- Hygiene, productivity and reliability are critical factors in food processing and packaging. Most importantly, food must never become contaminated in the processing environment. Machines and equipment must be easy to clean and have to withstand corrosive conditions caused by, for example, fruit acids or cleaning agents.

- Engineering applications need to perform to the highest standards, day in, day out. Whether mobile phones, Wi-Fi equipment or highly sensitive semiconductors, they are all manufactured using the latest engineering technology.

#### Solutions
- Materials and coating solutions from Oerlikon improve performance, extend service life and protect key components such as buckles, shafts, crushers, hydraulic cylinders, blades etc., against wear and corrosion. Coatings for engine components reduce fuel and oil consumption, and help meet tighter emission regulations.

- Coatings from Oerlikon help maintain hygiene, reduce wear, extend the service life and thereby significantly improve the manufacturing process. The results are safer processes and substantial cost savings.

- But mechanically engineered components often operate under extreme conditions such as high loads, rapid sliding speeds or poor lubrication. Coatings from Oerlikon minimize friction, wear and corrosion, and enhance the reliability, service life and performance of such components. And, specialist, precisely tailored coatings for semiconductors improve satisfy the stringent requirements of the industry.
Allowing customized solutions, new designs and faster time to market

Major industrial companies from all over the world apply Oerlikon AM (Additive Manufacturing) services to optimize product design, accelerate innovation cycles, improve product performance and eliminate product steps.

Aerospace

Typical aerospace applications are complex engine parts, structural components and replacement parts. Additive Manufacturing enables the production of such parts at lower weight and significantly reduced costs.

Automotive

Additive Manufacturing allows our customers the design freedom to consolidate several parts into one to reduce weight and supplier count. Reducing weight allows car companies to meet new legislation targets for fuel efficiency.

Energy

Additive Manufacturing enables the production of highly complex fluid-flow and corrosion-resistant components from superalloys that can operate in demanding environments. Our customers benefit from our ability to manufacture and coat these complex components.

Tooling

The use of Additive Manufacturing to produce tools and tooling components reduces lead times and costs. Additionally, it improves part functionality and provides design freedom to customize products.

General industries

From prototype applications to on-demand parts, manufacture of small batches or mass customization, Additive Manufacturing allows companies from all industries to design products in a way that perfectly meet their needs.

Medical

Since every patient is unique, Additive Manufacturing opens up new possibilities for medical treatments as it allows rapid customization of medical devices such as implants, instruments and models with fast, high quality and high precision.
Cutting development times to build more complex and efficient products

From metal powder atomization to advanced component production and assembly, Oerlikon provides AM (Additive Manufacturing) services for industrial companies all over the world.

We provide focused support to solve specific customer challenges in R&D, material supply, design/ engineering, testing and manufacturing of their AM products.

The result? Customers can reduce time to market, shorten their supply chains and increase the performance of their components.

We are experts in atomized metal powders. We have extensive expertise in the engineering and manufacturing of industrial components. And we know the AM challenges and needs of our customers’ industries.

Engineering and design  
Materials  
Additive production  
Post-processing

Mastering functional design

Choosing the right materials

Knowing advanced manufacturing

Enhancing surface functions

Requirements

Manufacturers create designs using CAD to make a 3-D model of the product. To take full advantage of the design freedom AM offers, they need in-depth technical and domain-related knowledge, and expertise in materials, application design and the setting of process parameters.

Oerlikon has industry-leading expertise in the design and engineering of industrial components and the related process chain. We support our global customers in their needs for AM R&D, design, testing and engineering.

Oerlikon has over 80 years experience in developing and manufacturing materials for critical industrial applications. We offer a market-leading material portfolio serving processes such as thermal spray, laser cladding, brazing, weld hardfacing and more. It spans metals and alloys, wires, carbides, ceramics and abrasives, including fully AM-certified materials.

Oerlikon has long-standing and leading know-how in manufacturing high-performance industrial components. We are a leader in the design, development and engineering of aerospace and industrial gas turbine components.

Oerlikon is the technology and market leader in surface engineering (coating) and offers the full range of post-processing applications. These range from hot isostatic pressing to heat treatment, machining, surface treatment and final quality inspection, provided through an established global service network.

Antenna bracket for Sentinel satellites – certified for use in outer space

Project management, design optimization and testing by RUAG, advanced component production by Oerlikon.

Aerospace project
antenna bracket Sentinel satellite

Challenge

■ Optimize antenna design for strength and weight
■ Every single gram saves significant fuel cost for the ascent to space exploration

Solution

■ Consolidated antenna into a robust single-part design
■ Antenna produced by metal additive manufacturing
■ Weight reduced by 40%

Optimized design and high complexity

AM allows development of highly complex designs in new geometries and materials

New business models

Parts or entire products can be built on demand, which have enormous implications for the way manufacturers design, build and sell their goods

Shorter innovation cycles

Innovations are designed, developed and tested more rapidly, eliminating the need for expensive and time-consuming part tooling and prototype fabrication

Faster time to market

AM provides a fast track from concept to production, where complex objects can be manufactured in a single process step

Perfect for mass customization

Its flexibility and customization at low unit costs make AM optimal for small production batches and mass customization of components and parts

Performance enhancement

Additively manufactured parts can be designed with new properties, features and materials to improve performance...
Improved energy efficiency
Reduction in energy consumption is becoming increasingly important for textile manufacturers. In the development of new components, machines and systems, Oerlikon is constantly optimizing the efficient utilization of the energy consumed. Thanks to Oerlikon’s knowledge, it is possible to achieve energy savings of up to 50%.

Use of sustainable technologies and recyclable products
Profitable, sustainable growth for all stakeholders is the goal at Oerlikon. The company is thus making its contribution to securing the future. Performance, quality, sustainability and passion are the factors that enable Oerlikon to face the challenges of the future day by day.

Compact machine design and efficient use of space
The influence of ergonomically designed components and machinery is often underestimated. In addition to rational considerations, ergonomic knowledge also forms the basis for space-saving machine designs with clearly structured and easy-to-grasp operating and control elements that embrace Industry 4.0 solutions.

Low production costs and machine downtimes
Optimally designed equipment supports the ecological balance in many ways: Labor costs and downtimes for maintenance are dramatically reduced, and consistent quality and efficient production are ensured.

Highly reliable processes
Oerlikon engineers look back on decades of experience in the production of polyester, nylon and polypropylene. The tried-and-true technologies are used in nearly every manmade fiber production plant worldwide. With a conversion rate of more than 99%, Oerlikon guarantees reliable processes for industrial production.

High-quality output
Each year, millions of tons of polyester, nylon and polypropylene are produced on tens of thousands of Oerlikon machines, which is why the quality and the characteristics of the razor-thin filaments and yarns must always be the same – if they are not, the final fabric will eventually show the differences.

Serving the growing need for better functional fibers and apparel
The world’s largest textile manufacturers apply Oerlikon filament spinning, texturing, BCF carpet yarn, staple fiber and nonwoven machine solutions to enhance energy efficiency, increase sustainability, and reduce production costs.
From Melt to Yarn, Fibers and Nonwovens – Oerlikon offers solutions along the entire value chain.

Packaging
Polymer processing creates a large number of potential applications for the production, handling and packaging of food and goods. From bottling to insulation to foils that protect food from external effects, yarns are designed to perform specific functions.

Transportation
Aerospace textiles, automotive applications such as tires, safety belts, airbags, sails, and much more are manufactured using industrial yarns.

Textiles and apparel
Filament yarns are largely used for textiles and apparel. Today, polyester, nylon and polypropylene yarns are the primary materials to manufacture clothing. From the finest suits to heavy-duty applications, modern clothing is building on yarns and fibers to perform.

Infrastructure
The applications are as diverse as they are specific: from fibers for geotextiles to roofing and agricultural applications as well as windbreak netting.

Flooring and textile
Textile flooring applications, such as carpets and various home textiles in diverse shapes and colors, are manufactured with manmade fibers. Those applications need a highly resistant material. And that is exactly what Oerlikon materials can provide.

Medical and filters
Yarns are also used for a wide range of filter applications. They provide specific functions such as absorbency, liquid repellency, resilience, stretch, softness, strength, flame retardancy, washability, cushioning, thermal insulation, acoustic insulation, filtration, microbial barrier and sterility.

Functional wear
Yarns are the starting material for a wide range of fabrics – from fashion, sports and home textiles to specialty functions such as bulletproof vests and fire protection gear.

The global need for textiles from markets such as clothing, functional wear, packaging, medical, infrastructure and transportation is growing rapidly.

Apparel, functional wear, carpets, automotive tires, safety belts, airbags, geotextiles for construction, ropes, conveyor belts, sails and filters to clean water and air all rely on fibers. But natural fibers use too many resources, for example water, for their production, or cannot offer the functionality needed. Industrial yarns are the solution – they form the basis for almost all technical textiles.

Ever since manmade fibers were created, the goal has been to give the smooth, synthetic filament a natural fiber-like character and specific functions such as elasticity and increased heat retention. Oerlikon is the world market leader for systems used in the manufacture of manmade fibers. We offer technologies from Melt to Yarn, Fibers and Nonwovens. Oerlikon’s large-scale filament spinning and texturing plant solutions are designed to manufacture and process polyester, polyamide and nylon. This material can also be manufactured on high-tech production systems for carpet yarns, synthetic staple fibers and nonwovens.

From textile machines to turnkey plant engineering
Leading and widest-ranging portfolio of surface technologies, advanced materials, coating equipment and services.

Innovation: Over 1,000 engineers are dedicated to the research and development of new technologies, applications and solutions for our customers.

More than 95 years of materials, surface engineering and polymer processing expertise.

Technologies for tomorrow

We are giving freedom to innovate your products of tomorrow

>95
More than 95 years of materials, surface engineering and polymer processing expertise.

Innovation: Over 1,000 engineers are dedicated to the research and development of new technologies, applications and solutions for our customers.

No.1
Leading and widest-ranging portfolio of surface technologies, advanced materials, coating equipment and services.

>100
In 2019, over 100 patents filed and 4.9% of total sales allocated in R&D.

Partner of more than 50 institutes worldwide.

>49
49 centers dedicated to materials, surface engineering and polymer processing research & development.
Forward-thinking technologies

We are a global, high-tech engineering group dedicated to share our unique competences and technologies to enhance the performance, productivity and durability of our customers’ products and solutions. Our solutions encompass materials, equipment and services including the engineering of entire plants.

We build on our leading, wide-ranging technology portfolio, the widest global reach and trusted customer relations in highly demanding industries such as aerospace, automotive, energy, tooling and textiles.

We have a proven track record in innovation, quality and reliability. Our employees are committed professionals with an expert understanding of technology and industry-driven innovation.

We continually expand our industry-leading portfolio with the latest technologies and solutions. Customers who already use our technologies have rapidly expanded their application range.
Serving our customers locally

- 182 Sites globally
- >11100 Employees worldwide
- 37 Countries
- ~2600 Sales in million CHF
- 165 Surface solution sites
- >30000 Customers

Contact us now!
oerlikon.com