

# Ulbrich of Austria Sustainability Efforts



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## SUSTAINABILITY REPORT

Ulbrich of Austria, located in Müllendorf, Austria, is a division of Ulbrich Stainless Steels & Special Metals, Inc. and one of the newest facilities in the Ulbrich Specialty Wire Group. Ulbrich is a family-owned company in its fourth generation of leadership.

Founded in 2007, Ulbrich of Austria transformed from a highly automated standard ribbon supplier for the Solar industry to a specialist in niche crystalline technologies. Our innovative and solutions engineered solar products include power-enhancing and special photovoltaic ribbon products as well as customized solutions.

In addition to Solar, this division develops and produces high-quality round and flat wire products for use in different industries including Automotive, Aerospace, Electronics, Power Generation, Medical, and Consumer. Ulbrich customizes precision wire products to customer specifications, and materials offered include non-ferrous metals like copper, aluminum, nickel and their alloys, as well as bi-metals and stainless steel.

Ulbrich of Austria was ISO 9001 certified in 2011 and has maintained environmental management certification ISO 14001 since 2015. From the beginning of its operations, Ulbrich has worked continuously to improve all processes in order to meet economic and ecological goals.



## SUSTAINABILITY STRATEGY

Ulbrich is a family business with almost 100 years of tradition, and preserving and creating value has always been a core topic in the company's history. Climate change is one of the most significant challenges of our time, and Ulbrich has prioritized preserving the environment for future generations. All locations have implemented sustainability measures to sufficiently use raw materials and energy, avoid waste as far as possible, and offer our employees and stakeholders a socially fair environment. We believe that a business model that emphasizes sustainability will only contribute to the long-term success of our company.



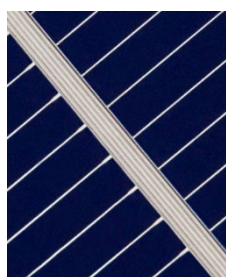
Ulbrich supports the Sustainable Development Goals

## PRODUCTS AND APPLICATIONS

### SOLAR / PHOTOVOLTAIC

Ulbrich produces wires and ribbons that interconnect and transmit current for crystalline solar cells and thin film. For decades, Ulbrich has supplied the **Solar Industry/Photovoltaic industry** with tinned flat copper wire, continually identifying emerging PV Ribbon technologies and engineering innovative solutions to **increase solar modules' electrical output and performance**. The goal is to help solar module manufacturers produce more efficient modules **using the same amount of resources**.

Our photovoltaic products consist of round or rolled copper wires with hot-dipped solder coating. Ulbrich of Austria has developed and offers a broad range of power-enhancing and **special PV products** like Light Capturing Ribbon (**LCR™**) and Multi-Tabbing Wire (**MTW**).



**LCR™** is a high-efficiency grooved solar cell interconnect wire that replaces traditional flat ribbon used to connect solar cells within a module. It was developed to increase the efficiency of a solar module by reflecting more light back onto the cell's surface. This innovative grooved interconnect wire steers the reflected light back to the glass/air interface allowing total internal reflection back onto the cell surface. Up to 80% of the incoming light that strikes the LCR™ ribbon is recovered significantly higher than the 5% recovery of traditional solar cell tabbing and interconnect wire.

**MTW** is the newest development for the multiple Bus-bar technology. Over the years, UST has leveraged experiences in product development, manufacturing, and marketing competencies to engineer a solder-coated copper round wire for cell interconnection. Ulbrich's Multi-Tabbing Wire offers the same high quality and product performance standards you are familiar with from all the other products we supply to the PV Industry.



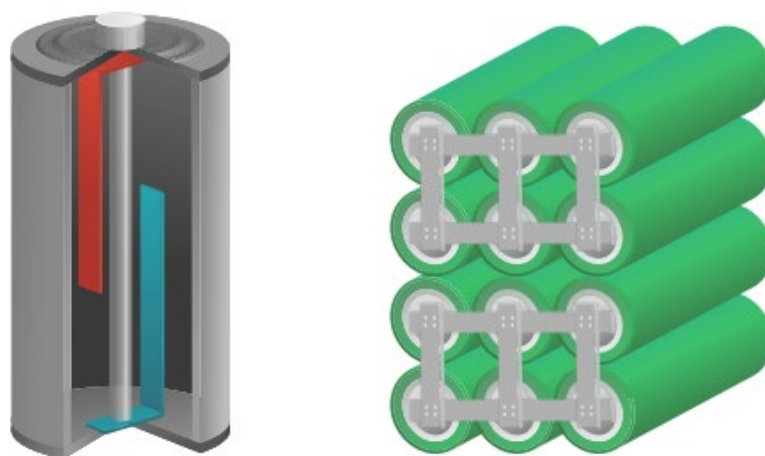
**Leaded alloys** such as SnPb and SnPbAg are still the standard solder alloys for the PV industry as the soldering process is much easier due to the lower soldering temperatures necessary to get a reliable solder joint. Until now, leaded solder coating alloys are in accordance with the EU-Regulation 2011/65/EU (RoHS). Article 2 par. 4 for fix installed PV Modules.

Newer stringing technologies like gluing and multi-wire concepts focus on **lead-free solder** coating alloys such as low melting alloys or silver coating.

Solar modules consist mainly of aluminum, glass, plastics, solar cells made of silicium and Ulbrich's copper connector products. All components are valuable raw materials worth recycling. Various companies have already specialized in recycling **complete modules**, either with mechanical treatment or using chemical processes, or working with light techniques.

## BATTERY WIRE PRODUCTS

Ulbrich offers special wire products for Battery Cell applications & Bonding Wire for Battery Cell connections.



Ulbrich's core competence is rolling our battery tab and bonding wire products from the highest-quality round wire. This unique rolling process allows us to achieve round edges on our tab products to avoid damaging the separator in the battery cell. We special-clean our burr-free battery tab wire to remove any loose particles from the surface. No burrs and loose surface particles mean fewer short circuits and better battery cell performance.

Ulbrich's special-cleaned, round-edge wire prevents short-circuiting and reduces the carbon footprint of your battery cell and pack production. Ulbrich of Austria is committed to helping address the climate crisis with sustainably manufactured products. We are strategically located to offer our customers a local source for battery wire. Plus, our production site is powered entirely by environmentally friendly energy.

The **Positive Tab** (Cathode) is made of aluminum. The base materials for the **Negative Tab** (Anode) consist of copper, nickel, or nickel-copper bi-metals.

The base material for **Bonding Wire** can be either Aluminum, Copper, or Aluminum-Copper.

Most battery cells undergo two life cycles: 1) batteries for electrical vehicles and 2) batteries for stationary energy storage systems. All components and materials of the battery cells can be recycled after the 2<sup>nd</sup> life cycle.

## FFC

Ulbrich offers specialty Wire products for Flexible Flat Cables Solutions which are made from bare or electro-plated copper flat wires designed for flexibility and durability. Ulbrich's customers are producers of Wire-to-Board connectors, Wire-to-Wire products, and Flat Ribbon Cables.

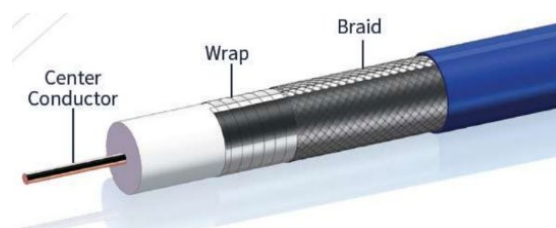
FFC products usually have a high aspect ratio of width and thickness. The Copper Core Thickness often is very thin (0.05 to 0.5 mm), and the width usually is between 1.0 to 4.0 mm.

Base Material: Cu-ETP1 / Cu-OF1 • Surface: Bare or plated • Mechanical properties: hard or annealed

Old cables can be recycled by separating the plastic coatings from the copper wire. The recycled copper gets remelted and then reused to manufacture new copper material products such as wire and cables for different applications.

## RF-CABLES

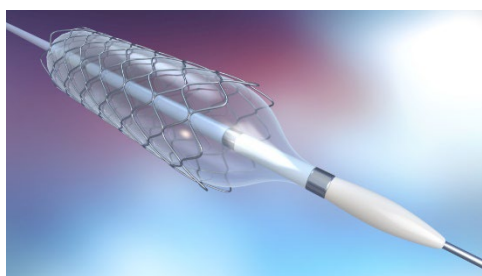
Ulbrich is a leading supplier to the Microwave and RF Cable industry. Ulbrich offers a broad range of value-added precision wire products for specialty cable requirements for the following applications: **Center Conductor Wire**, **Helical Wrap Wire**, and **Braid Wire**.



Ulbrich's product solutions stand for consistent performance, reduced VSWR spikes, and improved flex life. We are constantly working with the customer to find solutions to reduce weight without any performance losses. Our customized Mechanical Properties enable Wrap Optimization and Variability Control. In addition, Ulbrich offers 4-Axis FFT Analysis and Reporting as well as In-Line Statistical Process Controls to ensure High Cpk and Ppk Values.

RF cables are made of high quality and precious materials such as gold and silver. These materials can be recycled by dismantling the plastic materials from the electrical conductors which are usually made of copper materials. Special melting processes are used to separate the precious coatings from the copper conductors.

## MEDICAL APPLICATIONS



Our medical product line consists of round, flat, and shaped wire that can be supplied bare or plated (silver, gold, nickel) depending on the application. Areas of focus for the Medical product line include, but are not limited to: **Metal Reinforced Catheter Tubing** (Braid Wire, Coil Wire) and **Medical Mandrel** (Bare Cu, Silver Plated Cu, Stainless Steel, Aluminum, and CCA).

## CONSUMER PRODUCTS

Ulbrich Specialty Wire Products are made available in various formats to suit the broadest possible range of market requirements. Our precision flats are manufactured with absolute control over edge profile, width, thickness, and other key parameters to ensure optimal delivery and application in many end-use environments. Whether your wire application requires a round edge, square edge, or something else entirely, Ulbrich's wire manufacturing capabilities can meet your precision wire needs.

We offer precision-rolled flat wires in an unparalleled range of alloys and grades. With a comprehensive list of rolling, annealing, edging, and finishing capabilities, Ulbrich Specialty Wire Products can deliver stainless steel flat wire profiles across the full spectrum of stainless classifications (austenitic, ferritic, martensitic, precipitation hardening, and duplex grades). We also offer an exhaustive list of specialty alloys: Shape-memory nitinol flat wire; cobalt-based superalloys; high-strength tungsten profiles; and many more.

Ulbrich Specialty Wire Products find their way into a broad range of consumer product applications, from construction hardware to kitchen appliances and from consumer electronics to personal hygiene accessories. Common products include but are not limited to lighters, razor blades, window hardware, small appliances, electronics, hand tools, eyeglass frames, blender blades, cable ties, and music wrap wire for guitar strings.

## ECOLOGY

### ENERGY / RESOURCES

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#### ELECTRICITY

Ulbrich exclusively uses electrical energy to produce goods, and no fossil fuels are used for wire treatment. 100% of the electricity purchased is from renewable sources. Energy suppliers have granted Ulbrich Ecological certifications. Furthermore, Ulbrich has installed a PV system on the rooftop of its shop floor. The modules for this system are from regional production. Any electrical power produced by these PV modules is used by the company or fed into the regional grid.

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#### WATER

Ulbrich is dedicated to using water as efficiently as possible in its manufacturing facility. Team members are asked on a regular basis for new ideas that could further reduce water consumption.

The main water demand is for the rolling process, as water is required for cooling and lubrication purposes. In 2015, Ulbrich launched a project to reduce the amount of water used to cool the tinning line by installing a cooling system. This helped to save water usage by nearly 20%.

Additionally, a program to reduce disposal volume for wastewater was defined in 2015. This mainly concerns the exchange intervals of the emulsions in the rolling mills. Intervals between the lubricant exchange were extended to reduce the wastewater. However, due to new product requirements from the market (demand for narrower connectors and the associated longer rolling times), the lubricant change intervals had to be shortened again to avoid causing any quality problems. Nevertheless, Ulbrich's engineers are encouraged to optimize lubrication lifetime due to ecological and economic reasons.

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#### SOIL

Ulbrich of Austria started its operation in 2007 using a vacant building which got slightly adapted according to the requirements of the machine park. As the business grew and a larger production area was needed, Ulbrich again chose a vacant warehouse for its operations. This saved consumption of fertile land and avoided further sealing of soil. Infrastructure like energy, water access, and roads were already in place and caused no impact on the environment.

The areas surrounding the shop floor and offices act as parking lots for employees and as up-and-unloading points. This area is asphalted, so no soil is at risk of contamination in case of an accident or vehicle defect.

The processes to manufacture special wire (PV ribbon) for solar applications were designed in-house and have been unique in the market since no chemical preparation was needed to activate the copper surface. This is still the main process utilized to manufacture our products.

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#### AIR

Production processes require air and nitrogen in reasonable amounts. Internal compressed air is used for cleaning and drying products. Nitrogen, which gets delivered by a local gas producer, is used for direct production processes. Air emissions are reduced to air outtake of drying area in the rolling process. No further production-related emissions get exhausted.

## PRODUCTION

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### LOGISTICS

90-100% of the **raw materials** are sourced in Europe. Sourcing across shorter distances helps to reduce emissions and increase flexibility for our customers. Ulbrich's purchasing strategy aims to use full truckloads whenever possible.

Another advantage of local sourcing became apparent during the COVID 19 pandemic when it helped ensure a supply of raw materials without interruptions in the delivery.

In the case of **auxiliary and operating materials**, full load truck deliveries are not possible due to the smaller quantities. However, attempts are made to use (slower) groupage transports through good planning.

For logistical reasons, **office supplies** are processed via monthly central orders.

**Internal company transports** are carried out exclusively with electric forklifts.

In addition to daily commuting, the **vehicle fleet** is used for business trips once this is possible.

When traveling by car, the focus is on carpooling. Our company cars run on diesel fuel with additional exhaust gas cleaning (AdBlue). The next generation of company cars is already planned to be electric vehicles in combination with installing the necessary infrastructure for charging the EVs. **Business trips** which cannot be carried out by car are mainly organized by rail, flight, and rental cars. Ulbrich cooperates with local representatives who have a shorter distance to the customers.

**Finished goods** are delivered to customers in batches that are optimized to packaging units. Together with customers, Ulbrich's logistician tries to find an optimized, resources-saving transport solution. Ulbrich attempts to avoid cost-intensive air freight shipments.

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### PACKAGING PRE-MATERIAL

Raw materials, like wire or solder alloys, are delivered with reusable or recyclable packaging systems. Wires come with cardboard packaging and steel or plastic spools. The content of this cardboard packaging is above 70%. Solder bars are packed in returnable wooden pallets with stacking frames.

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### PACKAGING OF FINISHED GOODS

Endless wire/ribbon products are wound on quality plastic spools. Most of the spools are made with a recycled content of 50 - 100%. In 2020 over 80% of the newly purchased spools had a recycling share of at least 50%. One type of spool is manufactured without recycling due to the high-quality requirements for the plastic granulate.

As far as economically reasonable, collected empty customer spools get picked up by Ulbrich for cleaning and get reintroduced into the process. Minor quality spools are sorted out and sent to professional raw material recycling.

The packaging of finished goods plays an essential role in product protection but is designed for the highest possible recycling or reuse content. Due to customer storage requirements, some products need to be covered with additional plastic wrap or bags.



All products are packed in cardboard boxes with cardboard inlays, which are made of a recycling share of 75% to 100%. Boxes are designed to be reused for the return of empty spools.

We preferentially use wooden EURO-pallets for transport and storage. Wherever possible, we exchange pallets with the customer/supplier.

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## MAINTENANCE

In-house maintenance is carried out by repairs of machines where possible and economically viable. This prolongs the lifetime of equipment, saving resources.

## WASTE MANAGEMENT

Since the start of operations, a waste management system was developed and implemented, defining standards for all waste incurred or aiming to avoid waste in advance (prevention). Ulbrich's number one focus is: wherever possible, the resources used should be reused and returned or, if not possible, recycled.

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## METALS

Due to a recycling rate of 100%, the process scrap is not seen as waste but as recyclable materials. The process scrap is sorted into different materials like copper, aluminum, nickel, and other solder-coated materials. All materials are sold to partners for recycling.

Solder scrap also has a recycling rate of 100%. The reconditioned solders are used for products with lower quality requirements. A very special low melting solder alloy (Sn/In) can even be re-processed and reused in-house.

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## EMULSION

Emulsion used for cooling and lubrication of the rolling process consists 99% of water. This liquid gets disposed of by licensed waste contractor.

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## WASTE SEPARATION

Shop floor and offices are equipped with several waste boxes for separate disposal of paper, plastics, metal (cans), glass, and residual waste. All sorts of waste are collected and disposed of individually. Batteries or waste from the laboratory gets properly disposed of by a licensed contractor.

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## SPECIAL PRODUCTS

Toner from printers gets gathered and sent back to the producer, and cardboard rolls for stretching material are reused.

## SOCIAL RESPONSIBILITY

### WORKING PRINCIPLE

Ulbrich employees are dedicated to friendly and respectful communication among colleagues and management. Shift teams are organized by the manageable number of team members. Each employee is allowed and encouraged to talk with their team leader and/or management at any time. Management practices an **open-door** policy for all workers.

Benefits to employees are granted via support for commuting and special payments for special efforts. Once a year, all employees and their families are invited to a **summer festival**. For Christmas, a special end-of-year party is organized.

### EDUCATION / CAREER

Trainings are available for personal education, either internal or external. New employees pass training programs tailored to their future work content.

Vacant positions are recruited by internal employees first when interest exists. Personnel development is considered for all areas, and chances for growth within the company are available.

### WOMEN'S EQUAL PARTICIPATION

At Ulbrich, the participation of women is promoted equally to men in all business areas, as are equal pay and treatment. For job advertisements, we always request both genders to apply. All positions are as achievable for women as for men.

### RESPONSIBLE SOURCING AND SUPPLIER ENGAGEMENT

Respecting Human Rights and promoting sustainable business practices across the entire value chain are main factors considered when selecting a supplier. Ulbrich prefers local or regional suppliers as they understand and uphold social and environmental standards and treat all workers with fairness, decency and respect.

To avoid financing local wars and fights within the center of Africa, Ulbrich sticks to Dodd-Frank-Act title 15 in terms of prohibited purchasing 3TG (Tin, Tantalum, Tungsten and Gold) from DRC or adjacent countries.

All applicable EU regulations, especially environmental ones, like RoHS, REACH or SCIP are monitored and adhered to. Information of permissible usage is spread within the company and provided to customers if necessary.

### COMMUNITY SUPPORT AND GIVING

Ulbrich allows its employees to support operations in case of emergency for the local fire brigade. The company pays absent hours, so employees do not suffer for supporting the community. In 2022 Ulbrich received Austria's award for being a firefighter-friendly employer.

A local football team is sponsored to encourage fitness and regular training for employees.

At company events like the end-of-year party, all employees are invited to give donations for the Children's Cancer Aid, which gets doubled by Ulbrich.

## HEALTH, SAFETY, AND WELL-BEING

**Health and Safety at work** are top priorities at Ulbrich. In addition to all official requirements, further measures for the Safety of employees have been introduced. In production, lifting devices are also offered for employees to protect the safety and health of all employees.

All shop floor workers receive **work clothing** that can be washed at Ulbrich. Necessary **personal protection equipment** is, of course, provided to each employee.

In addition to workplace evaluations done by the **medical officer**, with particular attention paid to ergonomic workplaces, Ulbrich also makes the medical officer available for employees' additional concerns. For example, the company doctor carries booster vaccinations such as TBE and others during working hours on specific dates.

Sparkling water is offered to workers free of charge on the shop floor in the summertime to compensate for higher temperatures.

As far as possible, the shift plan considers employee carpools to allow **carsharing**. This helps reduce emissions during the ride to the workplace and helps employees save money.

In cases of **personal misfortune**, like a house or car fire, Ulbrich cares for employees by financing a rental car or hotel room.

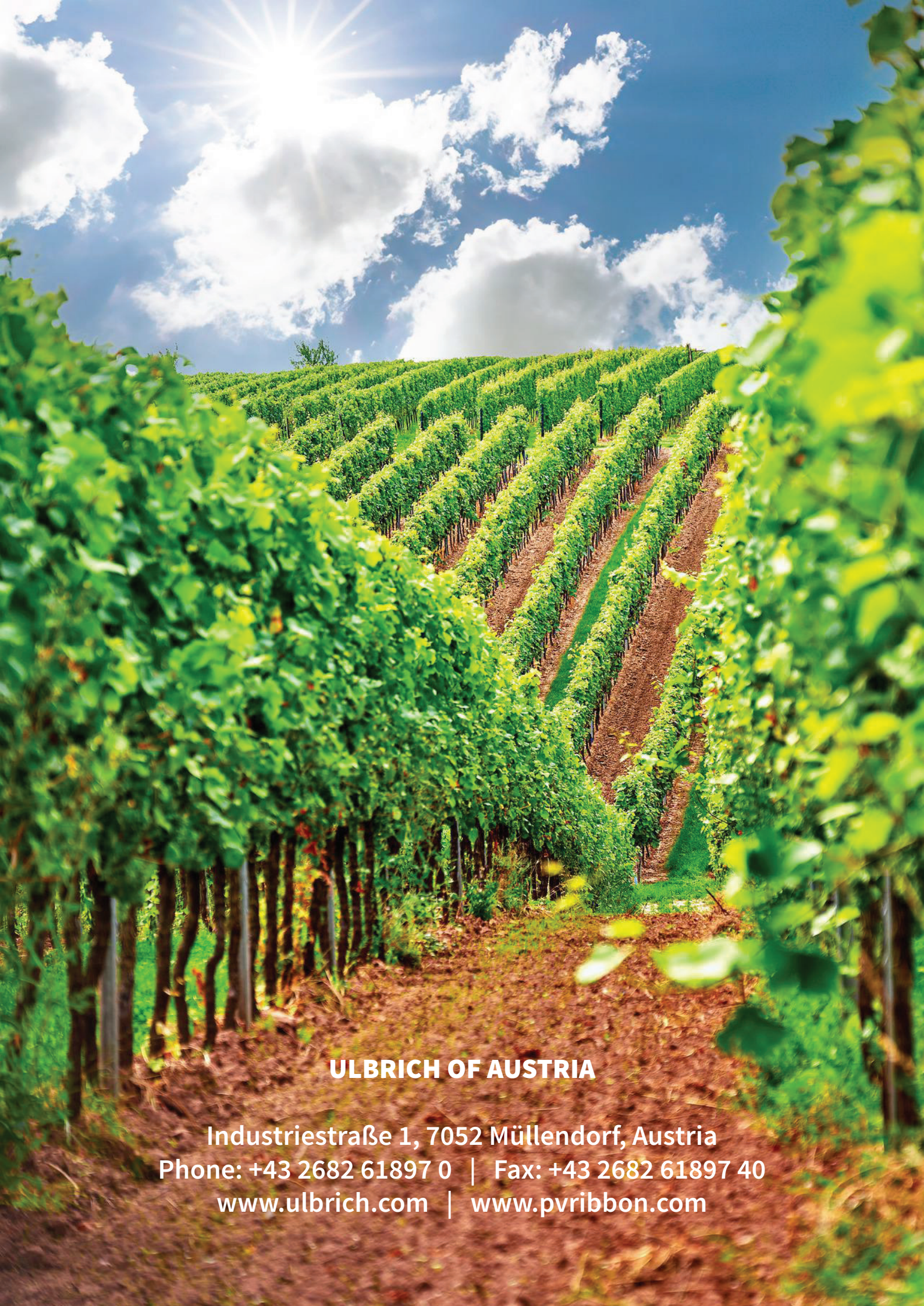
For its employees, Ulbrich grants a protective shield for legal costs, **insurance**, travel insurance, and personal accident insurance.

The company also created a comprehensive **COVID 19 security concept** during the pandemic. In addition to the directive to work from home whenever possible, antigen tests performed by our medical officer were available for all employees. Participation was rewarded with vouchers by the company.



Ulbrich supports the Sustainable Development Goals





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