VON ARDENNE

SHORT PROFILE

INSPIRATION. IDEA. INNOVATION.
Manfred von Ardenne (1907-1997) at the age of 16 in his laboratory.

Manfred von Ardenne’s life philosophy was not to regard anything as complete. His many scientific inventions and solutions were not an end in themselves, but rather new steps toward the realization of his visions.

Questioning the status quo, tenaciously looking for improvements, using resources wisely and all the while keeping in mind the economy – these are the virtues that continue to live on in our company today.

Manfred von Ardenne’s inventions and developments laid the foundation for our work today in the field of vacuum, plasma and electron beam technology.

Von Ardenne Research Institute in 1991 was the starting point for our company.

VON ARDENNE was founded in 1991 as a spin-off from the former Manfred von Ardenne Research Institute. The company is based in Dresden and has developed into a global corporation with subsidiaries in China, Japan, Malaysia, the USA and Vietnam. Manfred von Ardenne’s inventions laid the foundations for our work today in the fields of vacuum, plasma and electron beam technology.

The German family-owned company develops and manufactures advanced coating equipment for the deposition of ultra-thin functional layers on materials such as glass, metal strip, wafers, polymer films and flexible glass.

Our equipment makes use of two key technologies. One is magnetron sputtering, a process during which materials such as metals or oxides are atomized in plasma and then condense as a layer. The other one is electron beam technology, a process for melting metals and alloys.

Equipment, components and technologies made by VON ARDENNE make an important contribution to the protection of the environment and to the energy transition.

Our customers use them to produce high-quality, sustainable products that are used for the generation of renewable energy and enable the sustainable use of resources. Apart from that, we provide advanced solutions for applications in energy storage and electronics.

VON ARDENNE has been committed to photovoltaics for more than 20 years and provides the leading international manufacturers of crystalline and thin-film solar modules with highly productive coating systems. We cooperate closely with them to develop the next generation of modules that will be even more efficient.

A core element for the energy transition is the fuel cell. And bipolar plates are essential components of fuel cells. VON ARDENNE has succeeded in depositing a carbon coating on stainless steel bipolar plates. The carbon coating has similar electrical and chemical properties to a gold coating and enables the low-cost production of efficient fuel cells.

Efficient energy storage will be another key factor for becoming independent from fossil fuels.

We are developing novel coating solutions for lithium-ion battery cell manufacturing, which offer a number of advantages compared to conventional methods.

Our process enables an increased output and power density as well as a long lifetime of the battery cell and fast-charging capacity at low production costs.

Coated architectural glass helps save up to 80 percent of the cooling and heating energy of a building. We provide the worldwide leading producers of architectural glass with the necessary equipment. Our customers in the automotive sector are using similar coatings for their glazing. Our ultra-thin coatings help reduce emissions and energy consumption of vehicles with combustion engines and increase the range of electric cars.

Aero engine manufacturers aim to reduce the fuel consumption of entire aircraft fleets. Modern turbine blades that are coated on our equipment with a high-performance ceramic layer contribute to that aim.

The electronics industry is another important field of application for our technologies.

They are applied in, for instance, medical technology, the automotive and the lighting industry and in industrial and consumer electronics.

Manfred von Ardenne’s inventions and developments laid the foundation for our work today in the field of vacuum, plasma and electron beam technology.

The founding of a new company as a spin-off from the Manfred von Ardenne Research Institute in 1991 was the starting point for our company.
Customers often break new ground with their product developments. Then, there are no ready-made solutions for the realization.

Which layers must go on which substrate? Which technology does this require?

Which coating method is the right one for a special task? Naturally, we master magnetron sputtering. We were among the first to have used it on an industrial scale: over 45 years ago. Today, we focus on coating the largest formats.

The electron beam process, our second key technology, has been part of our portfolio for more than 60 years. The electron beam guns made by VON ARDENNE are the most powerful in the world and are the benchmark in the industry.

We are able to translate product property requirements into efficient, competitive coating solutions and develop and manufacture innovative machine concepts for this purpose: the perfect combination of application expertise, technology and process expertise and technical expertise.

It is our conviction that the machine is not the only crucial element, but also the trust in our support and expertise. This conviction has advanced us further. The best solution does not just consist of hardware. It consists of the whole package. You can expect this empathic approach to customer strategies from us in the future - combined with our machine platforms.

SPUTTERING EXPERTISE

ELECTRON BEAM EXPERTISE

TECHNOLOGY AND PROCESS EXPERTISE

TECHNICAL EXPERTISE

APPLICATION KNOWLEDGE

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WHAT WE DO - THE VON ARDENNE BASIC PRINCIPLE

BEFORE: UNCOATED SUBSTRATES

AFTER: COATED SUBSTRATES

AND THIS IS WHAT OUR CUSTOMERS MAKE WITH THESE COATED SUBSTRATES:
VON ARDENNE is a leading manufacturer of equipment for coating architectural glass. We provide the major glass manufacturers around the world with the latest coating systems. These systems are equipped with VON ARDENNE magnetrons - the key components of our machines. Depending on the desired configuration and required coating system, we equip our modular glass coating systems GC330H and GC254H individually for our customers.

Coated architectural glass reduces the energy consumption considerably, thereby contributing to environmental protection. In this way, sunlight protection coatings prevent the building interior from heating up in the summer and reduce the costs of cooling. In winter, on the other hand, Low-E coatings almost completely prevent the loss of heat through the glass surface to the outside so that hardly any heating energy is lost. In this way, up to 80 percent of energy for heating or cooling buildings can be saved.

VON ARDENNE coating systems are also setting new standards in thin-film photovoltaics. With these products, our customers manufacture thin-film modules for use in solar power plants, roofs, and facades. PIA|nova® and XENIA are modular, highly automated equipment platforms for the deposition of metallic contact layers, transparent conductive oxides (TCO) and various absorber layers, for instance in the CIGS or CdTe technology. The modular design of the equipment makes it possible to configure the equipment according to customer requirements and offers module manufacturers flexibility, reliability and maximum efficiency. The trend in the industry is towards much larger modules, up to an area of 2 x 1.2 meters. Thanks to many years of cooperation with module manufacturers and our experience in the coating of large glass substrates, VON ARDENNE is a driving force in the reduction of production costs while simultaneously increasing the efficiency. Our modular systems are setting new productively standards in production lines with an annual capacity of up to 1 gigawatt.

We have acquired an excellent process know-how based on the more than 150 coating systems we have installed for crystalline and thin-film solar module providers. This expertise has been incorporated into the development of coating systems for the next generation of high-efficiency solar cells. VON ARDENNE already dominates the heterojunction technology (HIT) market with the modular XEA|nova wafer coating system, which can be configured according to the needs of the customer. Such coating systems are currently operated in production lines with an overall capacity of 1.5 GWp. The double-sided coating of wafers in just one coating cycle is just one of the features of this highly productive and flexible tool, which is suited for both standard and special wafer formats. Increasing productivity and reducing costs for cell production remain driving factors for the industry. Our latest system concept XEA|nova L takes this trend into account: up to 10,000 wafers in a 6-inch format can be coated per hour, depending on the cycle, on carriers sized 1.5 x 3.3 m.

We make the same advantages available to renowned automotive glazing manufacturers with our equipment and technologies. Sunlight protection coatings also prevent the interiors of cars from heating up, thereby reducing the energy consumption. Such glazing is extremely relevant for electric vehicles: The energy required for heating and cooling is provided by their battery, which ultimately reduces the range of the vehicle.

This trend will continue to shape the development of the industry, which has the aim to consolidate the status of photovoltaics as a reliable and economic source of renewable energy. Therefore, VON ARDENNE will keep working on new high-efficiency cell concepts that will be made possible by our highly productive and precise thin-film deposition technology.
Coated films are indispensable components of touchscreens, tablets and smartphones. Sun protection films in vehicle glazing ensure a pleasant interior climate and save fuel at the same time. Windows retrofitted with Low-E films in older buildings lower heating and cooling costs considerably.

Our FOSA and FOBA web coating systems can be customized for a variety of other applications such as polymer films coated with contact layers for displays or films with anti-static, anti-reflex and Low-E coatings or carbon coatings for high-performance lithium-ion batteries.

VON ARDENNE provides systems for vacuum coating in roll-to-roll processes, from a small scale to a width of more than two meters. The systems coat different substrates such as polymer films, metal foil or flexible glass and are used in markets for window film, flexible electronics and batteries.

Air traffic is growing constantly and the requirements for lower-consumption and lower-pollutant as well as quieter engines are increasing accordingly. Consequently, the world-wide demand for efficient engines among aircraft manufacturers and airlines is large. In order to meet these requirements, modern turbines must withstand significantly higher combustion temperatures and temperature fluctuations than before. This is achieved with coatings made of modern high-performance ceramics. With the TUBA, VON ARDENNE offers the optimal system concept for the next generation of turbines.

Electric vehicles are becoming increasingly widespread in the automotive sector and will gain noteworthy market shares from cars with combustion engines. VON ARDENNE monitors this trend towards emission-free and environmentally friendly drives very closely.

VON ARDENNE has over 50 years of experience in the construction of systems for industrial production and for research and development. Thanks to this expertise, we have supplied our customers with several hundred systems for the vacuum coating of smaller substrates.

Our modular systems allow for flexible and customized solutions for wafer-based products, three-dimensional objects and substrates with a coating width of up to 1,000 mm as batch, drum coater, cluster or inline systems. These systems are used in research, development and production in a number of industries. These include products in the semiconductor industry, in sensor construction, products with optical precision layers and for micro-opto-electro-mechanical systems (MOEMS) as well as MEMS.

All important technologies for vacuum thin-film technology are used in the systems for industrial production and for research and development. The modular design of the systems guarantees a long-term optimal adaptation to technology and productivity. VON ARDENNE offers the appropriate upgrades for this purpose and supports its customers with an extensive service portfolio.
Our systems are used in more than 50 countries around the world and our export share is over 90 percent. There is no question that customer proximity is extremely important. That is why in 2002 we began setting up offices in regions where our customers are located, either with their headquarters or production facilities.

We now have a global sales and service network with subsidiaries in China, Malaysia, Japan, the USA and Vietnam as well as representative offices in a variety of countries.

VON ARDENNE has already installed over 500 systems at customer locations around the world and many of those reliable and highly productive machines are still in operation. Numerous new systems will be added in the coming years.

The increasing number of installed coating systems is also making the business with services, spare parts and upgrades grow. In order to meet these challenges and to meet our own high standards and those of our customers, we continuously expand our service because: the satisfaction of our customers is the key priority for VON ARDENNE.

This is how we ensure the quick and reliable supply of wear and spare parts in all of our markets. At the same time, we are strengthening our sales and engineering capacities in our subsidiaries to even better meet the market and regionally-specific requirements for services and upgrades.

We offer our customers service from a single source throughout the entire service life of the systems and components - from the delivery to the construction site to the decommissioning.

With intelligent application planning, we ensure that our customers’ service cases are handled by the same VON ARDENNE employees who were already on site during the setup, commissioning and service and who know the system. This results in a significantly more efficient service for the benefit of our customers.

In addition to new hardware and traditional services, digital services will play an increasing role in our product range in the future and will simplify the operation and maintenance of systems, making them even more efficient. These include, for example, special e-learning programs, the digital spare part catalog and augmented reality (AR) applications such as smart glasses, which provide our customers with real-time information such as e-learning content, troubleshooting steps or maintenance advice.
WHO WE ARE & WHAT WE DO

VON ARDENNE develops and manufactures industrial equipment for vacuum coatings on materials such as glass, wafers, metal strip and polymer films. These coatings give the surfaces new functional properties and can be between one nanometer and a few micrometers thin, depending on the application.

Our customers use these materials to make high-quality products such as architectural glass, displays for smartphones and touchscreens, solar modules and heat protection window film for automotive glass.

We supply our customers with technologically sophisticated vacuum coating systems, extensive expertise and global service. The key components are developed and manufactured by VON ARDENNE itself.

Systems and components made by VON ARDENNE make a valuable contribution to protecting the environment. They are vital for manufacturing products which help to use less energy or to generate energy from renewable resources.

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