TDK-Micronas GmbH, Freiburg

Consolidated Environmental Statement 2020

to EMAS / ISO 14001

Environmental Statement of TDK-Micronas GmbH for the Freiburg site

1 Foreword

Electric vehicles are putting day-to-day mobility on a completely new footing. With the new propulsion techniques, a technological turnaround is taking place in car production. Electrification of the drive systems is key to the mobility of the future. The main trends, whether with combustion engines or with electric and hybrid vehicles, continue to be the reduction of CO_2 emissions and vehicle electrification. New legal regulations call for strict controls and are thus also increasing the demand for sensors in all vehicle types. TDK-Micronas supports all these processes with modern sensors that are based on the so-called Hall effect and on the TMR technology (Tunnel Magneto Resistive). More than 85% of the magnetic field sensors in a car are today based on the Hall effect. TDK-Micronas currently offers the largest Hall effect sensor portfolio, including switches, linear, direct angle and current sensors for numerous applications. In this connection, we always keep a close watch on the demands of car manufacturers: Only recently, TDK-Micronas brought onto the market an innovative, TMR-based current sensor (CUR 423x) for monitoring the battery in electric vehicles (xEV).

The TDK parent company is based in Tokyo, Japan, and is regarded as a world-leading provider of electric solutions for a smart society. Based on its comprehensive material expertise, TDK promotes social change at the peak of technical evolution under the motto "Attracting Tomorrow". TDK focuses on demanding markets in the fields of automotive, industrial and consumer electronics as well as information and communication technology. In addition to passive components, TDK's product spectrum also covers sensors and sensor systems. TDK-Micronas is part of the Sensor Systems Business Company of TDK, and is the competence center for magnetic field sensors and CMOS integration.

In line with the motto "think globally, act locally", the safety of mankind and the environment has maximum priority for TDK-Micronas, also specifically on site in the technical facilities and equipment. Following the introduction of a joint Environmental Protection, Industrial Safety and Fire Protection management system, we were certified in July 2000 for the first time according to ISO 14001, and then in July 2001 according to EMAS. The decision in favor of environmental protection and industrial safety had been taken much earlier. Since the mid-eighties, a department established expressly for this purpose has been working on the implementation of environmental and safety-at-work guidelines. Environmental protection and sustainability began for TDK-Micronas with the selection of its suppliers. Environmental issues have a decisive influence on our choice of materials with regard to recycling, disposal, packaging, transport and quality achievement. We attach major importance to ecologically sustainable solutions. We have documented our environmental policy in our Principles of Action relating to Environmental Protection, Industrial Safety, Fire Protection (ESF) and Energy, which you can read below.

As regards the risks in terms of the coronavirus, TDK-Micronas has initiated a number of changes to its internal procedures and will adapt them to the relevant recommendations over the coming months.

Günter Weinberger
Chief Executive Officer TDK-Micronas

2 Principles of Action (environmental policy) of the ESF system relating to Environmental Protection, Industrial Safety, Fire Protection and Energy

Statutory Basic Conditions
We are committed to compliance with all applicable environmental, energy and industrial safety legislation as well as other requirements accepted by TDK-Micronas. In order to achieve this commitment, an effective internal and external system of approval management, risk analysis, and emergency precautions is implemented and developed. Our primary goal is to prevent and avoid environmental impacts and safety risks during normal operation, and in the event of an emergency, rather than limiting effects and/ or damage.

Motivated, responsible and Competent Personnel
For efficient environmental protection, we need motivated and environmentally aware employees, with management providing a good example. By encouraging open communication, our employees are informed about all projects and activities in relation to both our local environmental management system and corporate environmental protection. Moreover, extensive training for our employees in environmental protection, industrial safety and fire protection is performed regularly.

Clear Structures
With clearly defined responsibilities and processes for all activities related to the environment, and the health and safety of employees, we have created the infrastructure for efficient and effective environmental protection, industrial safety and fire protection and development. In this context, we attach special value to interdisciplinary teamwork.

Availability of information and resources
We ensure that the information and resources of the environmental, safety and energy management, which are necessary to achieve the strategic and operative targets, are available.

Principle of “Sustainability”
In assuming its responsibility for future generations, TDK-Micronas regards avoidance or minimization of environmental pollution as the top priority. This requires making optimum use of the resources we consume, such as materials and energy. This applies to all the phases of our product lifecycles we are able to influence, including processes within the company, and requires a forward-looking assessment of potential environmental impacts in all cases.

Cooperative Dealings with our interest Groups
We take precautions to ensure that all contractors working on our factory site comply with our environmental and safety standards. In cooperation with our suppliers, we explicitly encourage them to implement the same environmental standards as TDK-Micronas. Furthermore, we advise our customers regarding all the environmentally relevant characteristics of our products. As a matter of course, we also promote close cooperation with authorities, and conduct a dialog with interested members of the public. We communicate openly our environmental and energy policy, the environmental impacts from our company and the environmental and energy performance.

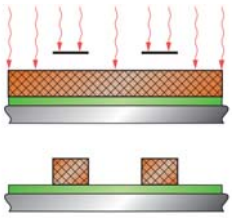
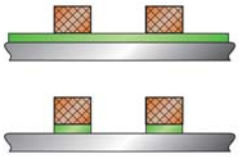
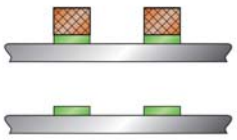
Continuous Monitoring and Effectiveness Control
We regularly perform system audits to ensure the continued development and monitor the effectiveness of our ESF and energy management system. Any deviation from these principles or goals results in the immediate application and monitoring of appropriate corrective action. We regularly collect, record and evaluate environmental and energy-related indicators, in order to monitor our environmental and energy performance to achieve our set targets through measures for continuous improvement. We make sure we acquire efficient products and services that contribute to the conservation of resources and the improvement of our energy-related performance

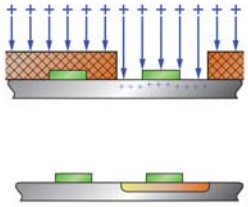
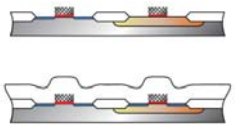
3 Production and Environment

Just as complicated as the products themselves is the production process: Several hundred physical and chemical processes are required to produce the electronic circuits – or silicon chips – on an ultra-pure, monocrystalline silicon wafer. The tiny structures measure less than 0.5 µm and are less than one hundredth of the diameter of a human hair. They can just about be detected by an optical microscope.

3.1 Frontend processes

The table below explains the manufacturing processes for wafers at Frontend: Depending on the type of sensor, several thousand Hall sensors are formed on a round silicon wafer of 200 mm diameter. Every Hall sensor is, in turn, built from as many as 100,000 transistors, resistors, capacitors and diodes. The Frontend processes take place in a clean room, which allows max. one particle larger than 0.5 µm in a cubic foot (35 l) of clean air. The first step involves scribing the wafers with a laser and subsequent cleaning. In a recur treatment to create the structures and adjust the electronic properties of the active elements, the silicon chips are produced on the wafer.

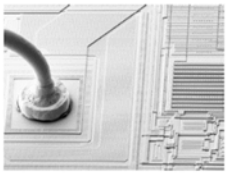
Frontend processes		Main environmental impact	Remedial measures
	**Lithographic processes: For the structuring of layers by photolithography, i.e. the transfer of structures from a photo mask to the photo resist on the wafer.**	Use of solvent-based photo resists and developers, plus the formation of resist residues and spent solvent mixtures.	Environmentally relevant photochemicals have been substituted. Photochemical residues and spent solvent mixtures are sent for energy recovery. Solvent vapors are conveyed to a waste air treatment plant.
	**Dry etching processes: To transfer photo resist structures to the oxide and metal layers beneath by etching.**	Use of combustible, corrosive, toxic and environmentally hazardous process gases, emissions of gases with high greenhouse gas potential and formation of waste gases.	The volume of process gas has been reduced by making improvements to the process control. Exhaust gases are conveyed to a waste air treatment plant.
	**Wet chemical etching processes: To transfer photo resist structures to the layers beneath.** **Cleaning processes for the wet-chemical cleaning of the wafer surface and removal of the resist.**	Use of hazardous substances, i.e. acids, alkalis, special chemicals, solvents and the formation of spent chemical and solvent mixtures. Use of water for rinsing the wafers for cooling.	The use of chemicals has been reduced by making improvements to the process control and by introducing an automatic, accurately controlled dosage system and by introducing spray instead of dip processes. Spent chemicals are reused.

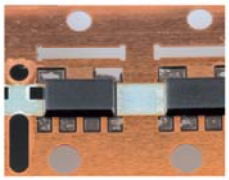
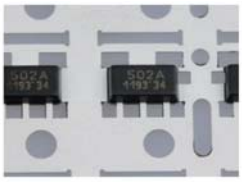
Frontend processes		Main environmental impact	Remedial measures
			Chemical vapors are conveyed to a waste air treatment plant. Use of reclaim water, recovery of water via an optimized control of the water/waste water flows in the ultrapure water treatment unit. Use of groundwater for cooling purposes.
	**Ion implantation processes: For the controlled doping of certain areas with foreign atoms such as arsenic, boron.** **High-temperature processes: For the production of extremely pure oxide and doped layers to adjust the electronic properties of the transistors**	Use of flammable gases and small quantities of toxic gases, plus formation of waste gases.	Safety gas cylinders are used for toxic gases. Exhaust gases are conveyed to a waste air treatment plant.
	**Coating processes: For the deposition of insulating oxide and conductive metal layers**	Use of flammable, corrosive, toxic and environmentally hazardous process gases, emissions of gases with high greenhouse gas potential and formation of waste gases.	The volume of process gas has been reduced by making improvements to the process control. Exhaust gases are conveyed to a waste air treatment plant. Substitution of a gas with high greenhouse gas potential is currently at the evaluation stage.

3.2 Backend Processes

After processing in the waferfab, the wafers are delivered to Backend and tested several times. At the subsequent chip assembly stage, the wafers are first sawn into individual chips. These are automatically bonded to a copper leadframe and the electrical contacts of the chip are connected to the leadframe by means of a 25 µm thick gold wire. Subsequently, the chips are encapsulated by a compression molding compound and the copper contact pins are tin-plated in a galvanizing process.

After further forming processes, all the elements are once again subjected to a check of the electrical function during final measurements and then packed ready for dispatch. The weight of a Hall sensor is, depending on the type of package, typically between 34 mg and 230 mg.

Backend processes		Main environmental impact	Remedial measures
	**Parameter and probe test of the chips: All chips on the wafer are tested for their proper functioning.**	Electricity consumption	Implementation of various electricity saving projects.
	**Grinding / sawing of the wafers: The wafers are ground to a final thickness and then sawn into individual chips in fully automatic precision units.**	Use of water and formation of waste water	Reduction in water usage through efficient control of the water/effluent flows in the 5-step waste water treatment plant and through the use of reclaimed water e.g. in recooling plants.
	**Contacting (bonding): The individual chips are bonded to a copper leadframe (die bonding), the electrical contacts of the chip are contacted to the copper leadframe by means of a thin gold wire (wire bonding).**	Electricity consumption, use of gold wire	Use is made of the latest bonding technology with lower electricity consumption per chip. Various electricity saving projects have been implemented.

Backend processes		Main environmental impact	Remedial measures
	**Molding: The chips are encapsulated on the copper leadframe with a molding compound to protect them from environmental influences during use.**	Use of molding compounds plus generation of dust and plastic scrap	Molding compounds are fed to the compression molding tools free of dust. Filtered dust is conveyed for special external waste treatment. Use of “green” molding compounds is being continuously increased. Molding compound waste is sent for energy recovery. Saving of reusable materials and electricity through the deployment of new cleaning agents.
	**Galvanizing: The copper leadframe with the chips is coated with tin so that the products can be soldered by the customer.**	Use of hazardous substances and production of galvanic waste water, production of metal waste.	In the galvanizing units, metals are separated electrolytically from the working solutions. Metals from the galvanic rinse water are precipitated in the central waste water treatment unit. Waste metals from working solutions and rinse water are recycled. Galvanic solutions are either treated in the central waste water treatment plant or disposed of externally.
	**Forming, final testing, packaging: The external electrical contacts are formed, the products measured and packed.**	Production of plastic scrap, electricity consumption	Packaging trays are cleaned and reused. Packaging waste is sent for energy recovery. Various electricity and energy-saving projects are being carried out, e.g. the introduction of parallel tests in final testing.

4 Environmental Management

TDK-Micronas has been implementing environmental and safety standards for many years that go well beyond those required to comply with the relevant legislation. In the year 2000, an environmental management system was introduced at the central TDK-Micronas development and production site in Freiburg. As well as corporate environmental protection, the system also covers the fields of industrial safety and fire protection and is referred to in short as the "ESF System".

The key aspects of the system are:

- compliance with the statutory requirements,
- carrying out of risk analyses and hazard assessments in all sectors of the Freiburg site,
- preventive and defensive fire protection and
- continuous improvement processes with regard to ESF topics.

Since 2002, the TDK-Micronas test center in Glenrothes, Scotland (TDK-Micronas Ltd., 86 employees) has also had its own system for corporate environmental protection, based on the ESF. Both systems are certified to the international ISO 14001 standard, while the ESF Management System in Freiburg also satisfies the European EMAS regulation (Eco-Management and Audit Scheme, Regulation (EU) No. 1221/2009 regarding the voluntary participation of organizations in a joint system for eco-management and audit scheme).

The main elements of the ESF Management System to ISO 14001 / EMAS are described below in more detail.

The management team has defined TDK-Micronas' environmental policy in its Principles of Action. The ESF organization currently comprises four full-time ESF staff including the Environmental Management Officer, plus:

23 environmental and safety compliance officers,
28 members of the internal emergency response team,
49 safety officers,
63 fire prevention assistants,
35 company paramedics and 26 first aiders, and
68 responsible officers on duty in all areas of production.

The staff are given regular training, internally or externally according to their respective function in the ESF system.

The management system is described in the ESF management handbook, in the relevant process instructions and standard operating procedures, and can be referred to on the Internet by all employees. They constitute the rules for compliance with the company's environmental policy.

Via the ESF Management System, TDK-Micronas ensures that all legal obligations and other requirements accepted by TDK-Micronas are adhered to. Foreseeable developments in environmental protection and in legislation are channelled into planning at an early stage. All environmental and safety officers, managerial staff and plant managers are actively involved in this process. TDK-Micronas cooperates in full with the regulatory authorities. All the necessary licenses and approvals have been obtained and two applications according to the Bundes-Imissionsschutzgesetz (Federal Immission Control Act) are currently in the approval process. This offers not only legal certainty but also pays off economically. It avoids extra costs caused by late reactions, and also enhances the trust and confidence of TDK-Micronas stakeholders, in other words, the employees, customers, suppliers, regulatory authorities, risk insurers, site neighbors and the general public, and, of course, the parent company TDK.

As part of the process of setting its environmental targets, TDK-Micronas first evaluates the relative importance of direct and indirect environmental aspects. Direct environmental aspects are, for example, the CO_2 emissions resulting from the consumption of electrical and fossil energy, or from chemical consumption. Indirect environmental aspects are, for example, product life cycle-related aspects (design, development, packaging, transport, use and reuse/disposal of waste), the environmental contribution of suppliers or emissions of commuters. After this, an assessment is made of the extent to which the main environment aspects can be influenced through the execution of environmental projects to reduce consumption and/or emissions. The list of the environmental projects can be found on the next page.

One of the most important ways to ensure transparent internal and external communications is the regular publication of the Environmental Statement and Environmental*News*, in which we document the company‘s environmental performance. Environmental management is not a one-off effort, but a continuous objective, because the conformity of the system is monitored every year by an independent auditor. Apart from that, regular internal audits are also carried out to ensure that the procedures defined in the ESF system are being adhered to.

5 Environmental Projects

Subject	Goal	Measure	Department responsible	2019	2020
Energy management	Electricity savings amounting to approx. 10,000 kWh / year (2 t CO_2 / year)	Electricity savings through relocation of hazardous substances in the warehouse and optimization of power consumption of the fan	Plant Engineering and Facilities	○	○
	Electricity savings amounting to approx. 10,000 kWh / year (2 t CO_2 / year	Switch to LED technology in buildings		●	●
	Electricity savings amounting to approx. 13,000 kWh / year (2 t CO_2 / year)	Electricity savings through new-generation end-testers and parallel 8x test in the final test	Backend Test	●	
Resource and energy management	Annual savings of approx. 49 t chemicals, 5,200 m^3 water and 630,000 kWh electricity (108 t CO_2 / year	Optimized wafer cleaning through fully automatic spray cleaners	Frontend	●	
	Savings of 10,000 to 15,000 m^3/ year possible	Water savings through installation of a new recooler		●	
Emissions management	Savings of greenhouse gas emissions (CO_2 equivalent emissions). After successful results on the pilot plant scale and rollout of the new cleaning process to the potential separation equipment, emissions of approx. 15,000 t CO_2 / year can be prevented.	Use of a fluorine gas mixtures without greenhouse gas potential instead of a perfluorinated carbon compound with high greenhouse gas potential for the chamber cleaning of equipment for the chemical gas phase deposition on a pilot scale.	Frontend		●
	Reduction of approx. 1,300 t CO_2 / year over the last 3 years, approx. 7,600 t CO_2 / year after 10 years (average life expectancy of a car)	Saving of CO_2 emissions product application automated grille shutter		●	●

Extension ○ Implementation ● completed, goal achieved ●

TDK-Micronas in T124 (fiscal year 1 April 2019 to 31 March 2020)

- Part of the Magnetic Sensors Business Group and the competence center for magnetic field sensors of the TDK group
- Operative headquarters and production in Freiburg im Breisgau (Germany)
- Design center in Munich / Haar (Germany)
- Test center in Glenrothes (Scotland)
- Approx. 1,100 employees worldwide, of which just under 1,000 located in Freiburg

Investments and ongoing expenditures in the company's environmental protection (waste management, water protection, soil decontamination, noise prevention, air purification, climate protection, nature conservation, landscape maintenance, energy production and control) in Freiburg

- 2016 1.7m euros
- 2017 1.8m euros
- T123 0.8m euros
- T124 0.8m euros

6 Environmental Data T124

As part of the process of defining environmental targets, TDK-Micronas has evaluated the relative importance of possible direct and indirect environmental aspects.

Important direct and indirect environmental aspects

Important environmental aspects are:

- CO_2 emissions from the consumption of electricity, fossil energy sources (natural gas) and PFC gases,
- the consumption of process chemicals and, connected with this, the resultant occurrence of hazardous spent acids,
- product applications that reduce energy consumption in car driving.

TDK-Micronas strives to continuously improve the important environmental aspects. The environmental data for the TDK financial year T124 for the Freiburg site are given below. With these figures, we comply with the requirements of the EMAS regulation. This report covers both the absolute consumption figures and the standardized consumption figures – the so-called core indicators. The core indicators are, in turn, related to the fiscal year T124.

For the Frontend, the consumption figures are standardized to the number of "200 mm equivalent mask layers". This figure comes on the one hand from the number of exposed layers, which is a measure of the complexity of the production process. In addition, it takes into account the produced wafer surface area, in that the number of produced 150 mm wafers over their surface area is converted into "200 mm equivalent" wafer numbers.

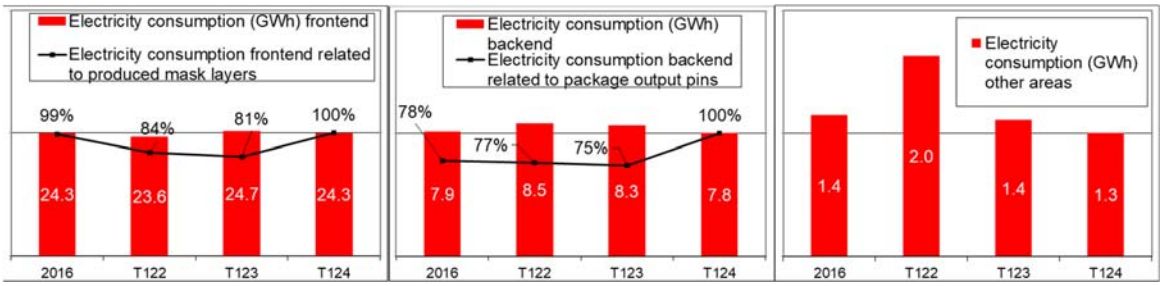
For the Backend, the consumption figures are standardized to the number of "packaging output pins", i.e. the number of produced packages (i.e. Hall sensors or controllers) is multiplied with the corresponding number of output pins, which is a measure of the complexity of the production process.

The core indicators are shown over the last four fiscal years in order to ensure the specified comparability.

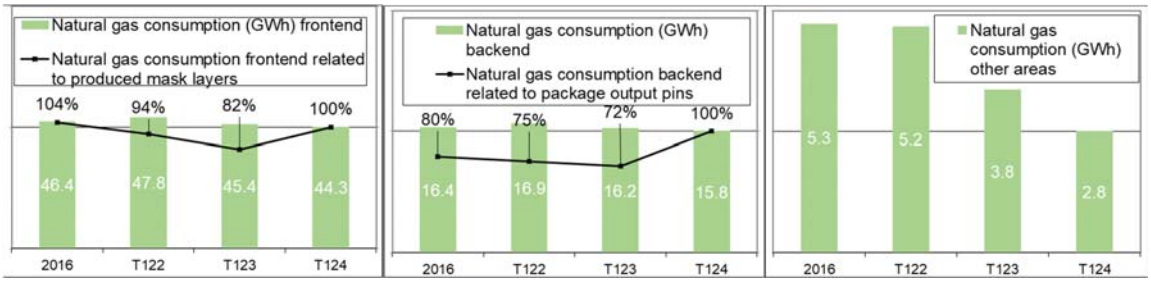
Energy efficiency

The consumption of electricity and fossil energy resources – here exclusively natural gas – together represent the core indicator "energy efficiency".

In T124, 39% of the energy for in-house consumption was generated by the cogeneration unit for combined heating, cooling and power generation built in 2014. The rest was purchased from the local power supplier, Badenova. The CO_2 emission factor of the purchased electricity and the proportion of renewable energies in TDK-Micronas' total energy consumption are calculated from the legally required annual electricity labeling of the power supplier. Because, however, the electricity labeling for the year 2019 – which is used for the reporting in T124 – is not published until November 2020, the electricity labeling from the year 2018 is used here and also for the years previously.



Consumption of electricity from electricity suppliers and core indicators for the production areas Frontend, Backend and other areas.

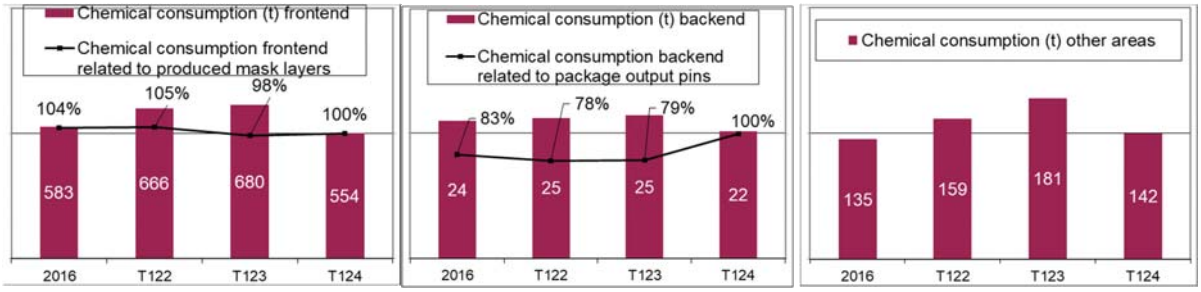


Natural gas consumption and core indicators for the production areas Frontend, Backend and other areas. Natural gas is used for heating and in the cogeneration unit for the production of electricity and heat/cold. In the last few years, no heating oil was used for heating.

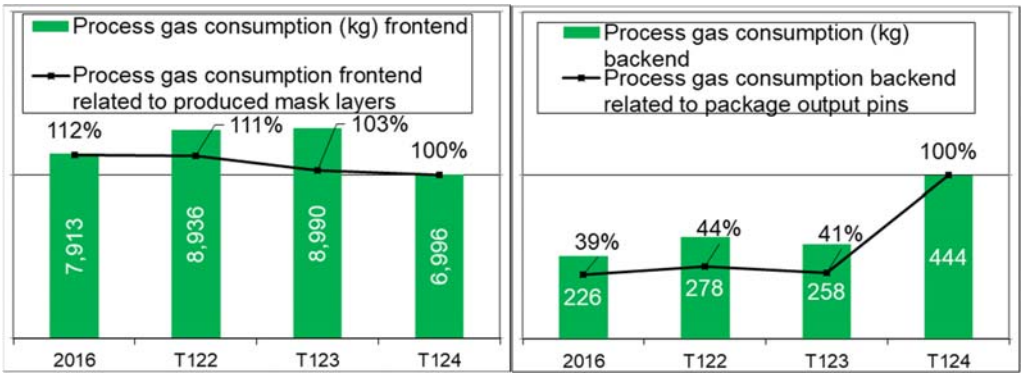
Year	Total energy consumption in GWh	of which renewable energy sources in GWh	Proportion of renewable energies in total energy consumption
2016	101.8	23.3	23%
T122	103.9	22.5	22%
T123	99.7	23.5	24%
T124	96.1	22.8	24%

Material efficiency

The consumption of chemicals and process gases constitutes the core indicator “material efficiency”. Chemical consumption is made up of process chemicals for production and chemicals for water treatment and waste water treatment. In the past, chemicals were saved by optimizing recipes for wet or dry-chemical processes. At the same time, hazardous substances were substituted by non-hazardous substances. Here, however, the processes have reached a level of maturity that can no longer be significantly improved. A further improvement is achieved through the introduction of wafer cleaning using a spray process. Through the elimination of immersion processes, electricity, ultra-pure water and chemicals can be saved.



Chemical consumption and core indicators for the production areas Frontend, Backend and other areas. The reduction in process chemicals in the Frontend and Backend in T124 are due to a reduction in the number of produced wafers and packages.

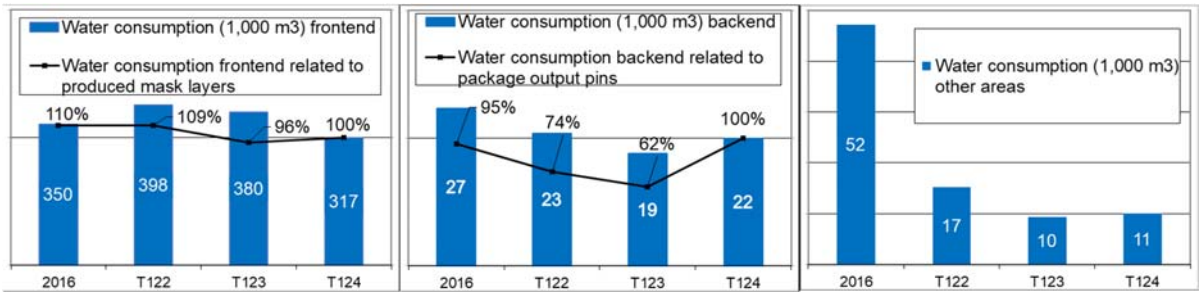


Process gas consumption and core indicators for the Frontend and Backend production areas. The reduction in the process gases in the Frontend in T124 is due to a reduction in the number of wafers produced. The increase in the process gas consumption in Backend are caused by additional processes for quality improvement. The consumption figures from other areas are insignificant.

Water efficiency

Municipal water is used for the production of ultrapure water for production, for sanitary and cooling purposes, and in waste air water scrubbers. To reduce water consumption and use the water more efficiently, increasing use has been made in recent years of reclaimed water. Reclaimed water is very slightly contaminated rinse water from process equipments and waste water from the ultrapure water treatment plants. The rinse water is collected and reused in process cycles where less stringent demands are made on water quality. Water can also be reclaimed and recycled via optimized steering of the water/waste water flows in the ultra-pure water treatment systems.

One large project involves the removal, utilization and infiltration of groundwater for cooling purposes. Here, the groundwater is conveyed to a heat exchanger in order to pre-cool the reclaimed water used for cooling purposes. The aim of the project is to increase the efficiency of the reclaimed water cooling performance and save municipal water that was previously additionally used for pre-cooling purposes in the summer months. The savings effect can be seen from the reduction in water consumption for other areas from 2016 to 2017 (basically fiscal year T122).



Municipal water consumption and core indicators for the production areas Frontend, Backend and other areas.

Emissions

In the period from T122 to T124, energy efficiency projects were carried out – or will be carried out – that have led to a saving of around 1,500,000 kWh electricity or 280 t CO_2 per year (partly also in the test center in Scotland).

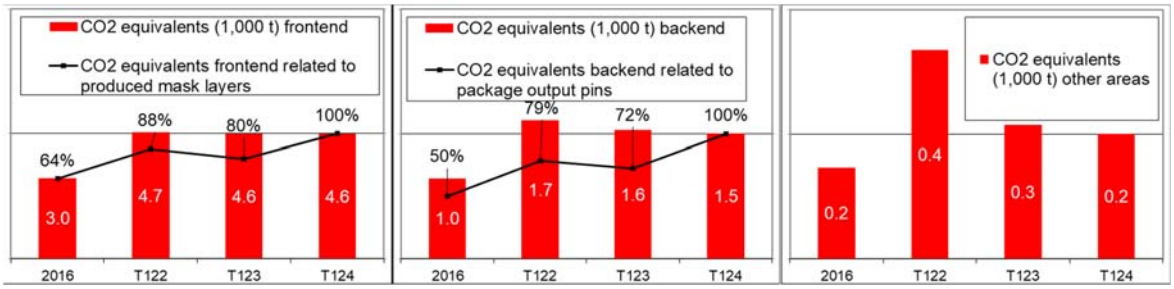
The co-generation unit for combined heating, cooling and power generation built in 2014 has led to a reduction in CO_2 emissions of approx. 6,000 t/year, if the emission factor of the German electricity mix is taken as the basis.

The photovoltaic unit installed in 2011 supplied just under 168,000 kWh electricity in T124, saving around 90 t of CO_2 emissions.

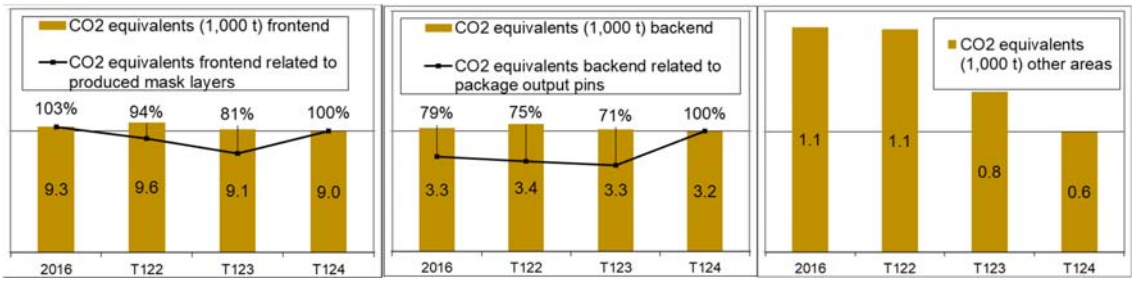
The CO_2 emission factor of the purchased electricity and the proportion of renewable energy in the total energy consumption of TDK-Micronas results from the legally required annual electricity labeling of the power supplier. However, because the electricity labeling for the year 2019, which is used for the reporting in T124, will not be published until November 2020, the electricity labeling from the year 2018 is used, and in the same way for the previous years.

The core indicator "emissions" is, according to EMAS, made up of two parts:

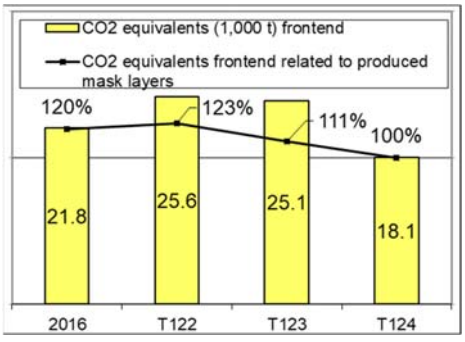
- The "total annual emissions into the air" declined slightly in the years from 2016 to T124 in accordance with the natural gas consumption – from 99 kg to 91 kg with sulfur dioxide emissions (SO_2), from 5,500 kg to 5,100 kg with nitrogen oxide emissions (NO_x) and from 68 kg to 63 kg with dust emissions. Because of the low quantities involved, standardization was dispensed with.
- "Total annual emissions of greenhouse gases" is calculated from the consumption of electricity, fossil energy sources and the emission of PFC gases (perfluorated compounds). The proportion of CO_2 emissions caused by electricity consumption varies heavily with the corresponding CO_2 factor of the purchased electricity. In recent years, this has fluctuated between 123 and 198 g/kWh, and was thus well below the German average of over 500 g/kWh. The greenhouse gas emissions of methane (CH_4) and dinitrogen monoxide (N_2O) are negligible.



Emission source electricity from electricity suppliers: CO_2 equivalents and core indicators for the production areas Frontend, Backend and other areas. The CO_2 equivalents depend on the electricity mix and thus on the CO_2 factor of the respective year. In 2016, this was 123 g/kWh, in the subsequent fiscal years, between 187 g/kWh and 198 g/kWh, which basically explains the increase from 2016 to T122. The CO_2 factors are published annually by the power supplier.



Emission source natural gas: CO_2 equivalents and core indicators for the production areas Frontend, Backend and other areas. The CO_2 equivalents of gas are 201 g/kWh. Natural gas is used for heating and in the co-generation plant for the production of electricity and heat/cold. In the last few years, no heating oil was used for heating.



Emission source PFC gases: CO_2 equivalents and core indicators; PFC gases are used exclusively in the Frontend production area. The reduction in the PFC gases in Frontend in T124 is due to a reduction in the number of wafers produced.

Biodiversity

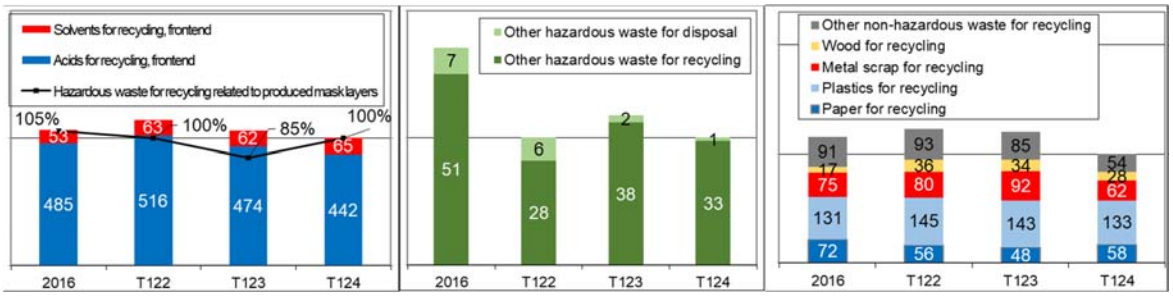
The core indicator "biodiversity" refers to the land use, expressed in square meters of built area. In T124, the figure was approx. 12,300 m^2, which is nearly 25% of the site area.

Non-used areas are – wherever possible – left to their own devices. As a result, the wild fields and meadows that become quickly overgrown with grasses and flowers offer new habitats to insects like bees and butterflies. A small garden has also been laid out with various herbs and other useful plants.

Waste

In terms of waste legislation, the core indicator "waste" consists of both hazardous and non-hazardous waste. More than 90% of the hazardous waste is made up of acids and solvents, of which a

large proportion is recycled. For this reason, the saving in chemical consumption also leads to a similar reduction in hazardous waste. The recycling rate for hazardous and non-hazardous waste is now above 99%, because, since 2015, the spent hydrofluoric acid has been sent for material recycling.



Amount of hazardous (diagram left and center) and non-hazardous waste produced. Because solvents and acids are used exclusively in Frontend and are produced there as hazardous waste, the core indicators can be calculated for this production area. Other hazardous waste and non-hazardous waste cannot be attributed to a specific production area.

Indirect environmental impacts

The main indirect environmental factor is the application of our products by our customers. Sensors and controllers from TDK-Micronas enable reduced fuel consumption e.g. in electric power steering (EPS), electronic throttle control (ETC), the electricity sensor in vehicle start/stop systems, and the automated grille shutter (AGS). For the latter application, the CO_2 emission reductions were calculated (cf. Environmental Projects).

We endeavor to ensure that the suppliers of materials that are used in our products or exert an influence on the quality, such as process gases and chemicals, have an environmental management system in place. At TDK-Micronas, 90% of all material suppliers have a certified environmental management system installed.

Another indirect aspect which is repeatedly evaluated as part of the environmental management system is that of due diligence in the procurement of conflict minerals (gold, tungsten, tin, tantalum) with the aim of ensuring that no raw materials are used that help to finance the armed conflict in the Democratic Republic of the Congo or its neighboring countries. TDK-Micronas needs gold, tungsten and tin to manufacture its products and has obtained confirmation from its suppliers that the purchased metals stem from certified smelting works.

The following section describes the achievements in the fields of industrial safety and fire protection.

Industrial safety

The approval process for new plants and reconstruction projects guarantees that the environmental and safety officers and staff of the Plant Engineering and Facilities department are also involved in the planning at an early stage. Following installation and before final approval, hazard assessments are performed at the various workplaces. Where workplaces involve contact with hazardous substances, operating procedures are drawn up in accordance with the Gefahrstoffverordnung (regulation on hazardous substances. These provide the supervisor with an instruction document for the employees. Trained staff and officers regularly carry out inspections to ensure that the legal requirements are being adhered to, and, if necessary, derive corrective measures to be implemented by

the responsible persons. Hazardous substances at TDK-Micronas are divided into various storage classes according to their physical and chemical properties, and stored separately. All storage rooms and chemical supply plant rooms are equipped with modern water-safety devices to avoid chemical release – e.g. with twin-wall pipes, catch basins, and leakage sensors.

Fire protection

Because the fire protection officer is a member of the approval management team, he is informed early of any new facilities and rebuilding measures. He defines the protective targets after previous analysis of the buildings and surrounding area in agreement with the risk insurer and, if necessary, with the regulatory authority. He adapts the organization of the fire protection facilities and escape routes, and monitors the implementation of the fire protection systems as far as the equipment and construction work is concerned. Finally, he updates the technical documentation and the regular testing schedules.

Emergency protection

Despite all the previously described preventive measures, emergencies can still arise, the effects of which have to be kept to a minimum. In an emergency – e.g. smoke or fumes – a smoke detector automatically sends an alarm to the emergency call center, where two watchmen are on duty, 24/7. They immediately alert the investigation team in line with the alarm plan and, if necessary, notify the emergency task force, which then puts the required emergency measures into place. Part of the task force is the internal emergency response team, which also includes trained firefighters. The head of the emergency response team regularly organizes exercises in realistic scenarios (e.g. smoke, leakage of hazardous gases and liquids). The safety officer on duty then takes charge of the operation and deals with the emergency together with members of the emergency response team and the company paramedics.

The fire protection concept and the emergency plans also include alerting the Freiburg fire department in critical emergency situations. Once the fire department has received an alarm, it can be on the TDK-Micronas factory site within a few minutes. As in the past, further detailed tours of the site will be arranged with members of the Freiburg fire department so that they can obtain a better picture of the main hazard areas and the type of incidents that could occur. In 2021, the Freiburg fire department is planning a fire protection exercise on the TDK-Micronas production site.

As a matter of course, all alarm exercises and alarm incidents are subsequently evaluated to identify any weak points, take corrective measures and continuously improve.

Training measures

In addition to the legally prescribed training, such as training at the workplace, instruction of external employees and the handling of hazardous substances, regular training is also carried out on the hazardous properties, toxicology and handling of chemicals and gases as well as suitable protective measures. Every year, as part of the emergency planning, training is given to the safety officers on duty in all production areas. Compliance officers take part regularly in courses to update their knowledge and to obtain qualifications relating to industrial safety, fire protection, immission control and water protection.

TDK-Micronas Technology Park

In the few years, the TDK-Micronas site has developed into a technology park with five external companies renting facilities to perform research, development and production in various fields. There are a number of synergies here because all firms require similar infrastructures – infrastructures that TDK-Micronas maintains and offers to outside companies. TDK-Micronas has signed an agreement with all these companies on aspects of environmental protection, industrial safety and fire protection. This so-called ESF agreement defines the responsibilities of both TDK-Micronas and the external companies in matters of e.g. personal and building protection, receipt of hazardous sub-

stances, and waste disposal, and defines the interfaces of processing plants with incoming and outgoing products and materials. The tenant companies are integrated into the TDK-Micronas fire protection concept and emergency plan.

Health protection

The working group for health protection, which comprises members of the company's medical service, the works council, the HR department and industrial safety, carries out projects to encourage health care.

Consultation services are offered on vaccination, giving up smoking, diet, hygiene, skin care and skin protection, difficult situations, health days, and health insurance schemes.

Support for sport and social activities include running groups, mountain biking, regular health activities such as massage, yoga, shiatsu, muscle development, and a portal for leisure activities. It also includes the sale of donated books, donations for animal protection and mindful-based stress reduction courses. Apart from that, the company offers its employees the possibility to take advantage of other health-promoting offers through the service provider "Hansefit".

Implementation of blood donor campaigns in cooperation with the German Red Cross.

Travel to work has also been tackled with environmentally friendly, resource-saving solutions:

- The "Regio-Card" is an annual ticket for use on all public transport in the region, subsidized by the employer
- JobRad – bike, Pedelec or E-bike leasing system subsidized by the employer
- Motivation to switch from car to bike and public transport when traveling to and from work through campaigns organized by an intercompany working group.

The company's health-care service is available on working days and Saturdays.

7 Validation by the Environmental Verifier

Environmental Statement

The next consolidated Environmental Statement will be submitted for validation at the latest in July 2023.

The next updated Environmental News will be submitted for validation at the latest in July 2021.

Environmental Verifier / Environmental Verifier Organization

As Environmental Verifier was commissioned:

Dr.-Ing. R. Beer (Permit No. DE-V-0007)
Intechnica Cert GmbH (Permit No. DE-V-0279)
Ostendstr. 181
90482 Nuremberg, Germany

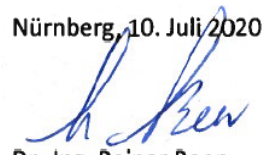
Validation

The undersigned Dr. Reiner Beer, with EMAS environmental verifier with registration number DE-V-0007, accredited or licensed for the scope 26.1 (NACE Code Rev. 2), hereby declares to have verified that the Freiburg site of TDK-Micronas GmbH, as stated in the consolidated environmental statement (with registration number D-126-00053), meets all requirements of Regulation (EC) No. 1221/2009 of the European Parliament and of the Council of 25 November 2009 and Amendment Regulations VO 2017/1505 of 28 August 2017 and 2018/2026 of 19 December 2018 on the voluntary participation by organizations in a Community eco-management and audit scheme (EMAS).

By signing this declaration, I declare that:

- the verification and validation has been carried out in full compliance with the requirements of Regulation (EC) No. 1221/2009 and amendment regulations VO 2017/1505 and 2018/2026,
- the outcome of the verification and validation confirms that there is no evidence of non-compliance with applicable environmental legislation,
- the data and information of the consolidated environmental statement of the organization / the site reflect a reliable, credible and correct image of the organization / the site activities, within the scope mentioned in the environmental statement.

Nürnberg, 10. Juli 2020



Dr.-Ing. Reiner Beer

Environmental Expert