Semiconductor Manufacturing Technology
Business Group
The moment we let you experience tomorrow today.

This is the moment we work for.
Have you made or taken a call on a cellphone today? Sent an email? Or taken a photo with your digital camera? Regardless of the technical application, you probably came in contact with the ZEISS Semiconductor Manufacturing Technology business group.

Without the technologies produced by the Semiconductor Manufacturing Technology business group, the modern world would come to a standstill. The semiconductor equipment which we as an innovation and technology leader develop and manufacture provides the basis for the flawless structuring of the microchips which are part of practically every modern day technical system.

Today, a large proportion of all microchips is produced with ZEISS technologies. Thus, we are providing more and more people around the globe with access to modern communications devices which are becoming increasingly affordable and easy to use.

Overview of the business group:

Product areas
- Lithography Optics
- Optics Systems
- Photomask Systems

Companies within the business group
- Carl Zeiss SMT GmbH
- Carl Zeiss Laser Optics GmbH
- Carl Zeiss SMS GmbH

Employees
2,700, of whom approx. 30 percent work in research and development (Status: 30 September 2012)

Sites
Germany: Oberkochen (Headquarters), Jena, Wetzlar, Rossdorf, Israel: Karmiel
Optical Lithography

Most of the devices which define daily life today – including computers, cellphones, cars and household appliances – contain microchips for electronic applications. Optical lithography forms the basis for the structuring of the chips: it is the key to the micro and nanoelectronic age.

Through this procedure, it is possible to transfer structures for the conductors to the wafers in volume production. These structures later become the microchips. ZEISS has a wide product portfolio in the areas of lithography optics, optical systems and photomask systems, and covers other important key processes in microchip manufacture besides lithography.

The Semiconductor Manufacturing Technology business group sees itself as a company which consistently pursues the principle of Moore’s law, which states that the performance of microchips doubles every 18 to 24 months.

A cross section of a wafer scanner (see below) from the strategic partner of ZEISS, Dutch company ASML shows how the exposure of microchips is technologically made reality.

Ever smaller and more powerful, energy efficient and cost-effective: these are the demands on microchips. The continuous further development of optical lithography at ZEISS for almost 45 years has enabled chip manufacturers around the world to fulfill these demands.
Lithography Optics

Through the innovative EUV lithography with extreme ultraviolet light, structures measuring less than 20 nanometers can be imaged on wafers for the first time. The ZEISS Semiconductor Manufacturing Technology business group applies all of its technological knowledge and ability in order to make this technological leap. Since 2012, EUV optics are being produced in series.

The biggest challenge is the fact that EUV light with a wavelength of 13.5 nanometers is strongly absorbed by all known materials – even air. This necessitates a whole new overall concept of lithography optics, which has been developed and implemented at ZEISS.

To ZEISS, EUV is the key to the nanotechnology of tomorrow.

EUV Lithography

The future is already being made a reality. Thanks to ZEISS Starlith® lithography optics, chip manufacturers can expose their wafers to nanometer precision. The microchips are then fabricated in further process steps.

Today, most chips are structured using lithography optics which work with light wavelengths of 365, 248 or 193 nanometers.

The quality and form of the illumination and the resolving power of the projection optics play a part in determining how small the structures on a microchip can be.

The lithography optics are integrated in special exposure facilities called wafer scanners at the strategic partner ASML. The Dutch Group is the leading manufacturer of wafer scanners in the world.
The moment we see that our technologies are changing the world we live in.

This is the moment we work for.
Optics Systems

High-precision optical components and modules are part of the key equipment in semiconductor manufacturing and in other industries. One core competency in the optical systems product area is the handling of light at very high intensities, such as the intensities that occur in lasers.

Many years of partnership with various customers and intensive collaboration play an important role in the success of this area. Most of the partnerships are with OEMs (Original Equipment Manufacturers) who build the optical components and modules into their overall systems.

The OEM optics systems from ZEISS include components and modules for lithography lasers. These operate at high light intensities and very low wavelengths in excimer lasers.

The portfolio also comprises modules for measuring machines which are used for the automatic inspection of wafers.
Photomask Systems

Overview of ZEISS photomask products:
Mask qualification: AIMS™
Mask repair: MeRiT®
Mask metrology: PROVE®, WLCD
Mask tuning: RegC®, CDC

The photomask systems product area provides photomask producers with highly specialized systems for the analysis and repair of defects on photomasks, and the measurement and optimization of specific mask characteristics. The area offers a range of core competencies in the field of light and electron optics combined with unique femtosecond laser technology.

Using optical lithography, the structures of various photomasks are transferred onto the wafer. The detection and correction of possible defects on the mask is so important because otherwise, defects would be transferred to the wafer and the chips would hence be unusable. Flawless exposure therefore saves time and money.
Many different occupational groups are represented in the ZEISS Semiconductor Manufacturing Technology business group – in particular physicists, experts in various fields of engineering, and business administration and IT specialists. They all have one thing in common: enthusiasm for new technologies, and the aim to change the world through their work.

We have been expanding this excellent team on a continuous basis for many years. Would you like to become part of ZEISS?

We offer the following entry paths:

- Trainee programs
- Dual studies
- Internship
- Global Graduate Program
- Specialist
- Leadership/technical ladders
- Management

For more information, please go to: www.zeiss.de/career

ZEISS is bound by tradition: This also applies in the responsibility for society and the environment.

The ZEISS Semiconductor Manufacturing Technology business group has held ISO certification 14001 for exemplary environmental management since 2008. At the various company sites, the area works intensively to reduce strain on the environment, e.g. through new energy and recycling strategies.

The products are also part of this strategy: we value efficiency, and environmentally friendly designs play an active part in the recovery of used product components.

Dedication to employees and society is also part of the strategy: the Group shows its commitment at the company sites through the Carl Zeiss Promotion Fund. Not to mention that flawless conduct in accordance with the Code of Conduct is obviously a core component of the job for each ZEISS employee.
As a pioneer of innovative technology and one of the global leaders in the fields of optics and optoelectronics, ZEISS has always challenged the limits of human imagination.

With its trend-setting products and solutions for use in medicine, ZEISS sets the pace around the globe. Both doctors and patients benefit from these leading-edge technologies. One outstanding example is the INTRABEAM® radiotherapy system which offers breast cancer patients considerably gentler and shorter treatment.

Razor-sharp images in The Lord of the Rings, the most successful movie trilogy of all time, or the crystal-clear image enjoyed by nature watchers through their binoculars or spotting scopes – ZEISS reveals fascinating details every time.

Within the sphere of semiconductor manufacturing technology, ZEISS is constantly advancing into even tinier dimensions. Solutions from ZEISS come into play in a large percentage of modern microchips produced worldwide. Wherever high precision is a must, industrial measuring systems and software solutions from ZEISS ensure maximum quality standards: airplanes become safer, cars faster and wind turbines – the future of power supply – more efficient.

Around the globe, two people per second decide to purchase eyeglass lenses from ZEISS. With its focus firmly on the future, Vision Care develops innovative lenses – like the revolutionary MyoVision™ that slows the progression of shortsightedness in children.

This passion for perfection is the driving force behind all the company’s business groups. With this goal always in sight, ZEISS creates customer benefits and inspires the world to see things that previously were invisible.

How will doctors treat their patients in the future? What role will photos and videos play in the communications of tomorrow? Just how far can the miniaturization of semiconductor structures go? These and many other questions are what constantly propel ZEISS to new heights of excellence.