



**SIEMENS**

*Ingenuity for life*



Ensuring sustainable  
competitiveness.

We turn technological progress  
into a track record.

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# Only the right decisions bring long-lasting success.

Maximum safety, efficiency and productivity are essential for the profitable operation of chemical plants. We help you to reach these goals in the global marketplace. As a reliable partner for the chemical industry, we make your goals our own.





### Integrated solutions for increased competitiveness

Efficient automation and a stable power supply over the entire lifecycle are essential for the operation of your plant. Through decades of experience in the chemical, petrochemical and oil and gas sectors, we have set standards. Today, we combine automation, electrification and digitalization into holistic solutions.

Integrated Engineering and Integrated Operation permit end-to-end digital plant management. This means analyzing data via the value flow and converting it into customer benefits. Data is transformed into valuable information that serves as the basis for sound decisions – an effective lever for increasing your competitiveness.

### For smart data over the plant's entire lifecycle

Shorten your time-to-market, reduce costs and increase flexibility – all on the basis of our digitalization offerings. These link the virtual world to the real world throughout the entire value chain. They encompass all phases of your plant's lifecycle, including communication systems and IT technologies, to improve overall performance. A consistent, integrated database and the digital image (digital twin) minimize the efforts in engineering, commissioning, operation and optimization while also opening up new possibilities, also within services.

### For the optimal interaction of all components

Totally Integrated Automation covers all the automation tasks in the chemical industry. The optimal interaction of all components is ensured by open interfaces, hardware and software based on global standards, and a consistent data pool. The same applies to motors, frequency converters and Integrated Drives Systems (IDS). The world's only complete drives solution features triple integration: horizontal in every drive system, vertical in every automation environment, and chronological throughout the entire lifecycle.

### For a safe and efficient power supply

From medium- and low-voltage switchgear to transformers and compressors as well as protection and station control systems – we offer a variety of solutions for eco-friendly power generation and distribution. Similar to the strategies for sustainable energy management, these solutions are tailored to your automation and infrastructure. Our comprehensive power supply portfolio, Totally Integrated Power, can be linked to industrial or building automation via intelligent interfaces, allowing you to fully exploit the optimization potential of an integrated solution.

# Because safety is essential for every process step.

Fault-free system operation and the thorough protection of persons, machines and the environment are central criteria for achieving sustainable success in the chemical industry. Protecting plants against the risks of the digital world is increasingly important. Our coordinated concepts for industrial security throughout the entire safety lifecycle ensure the reliable operation of your plant.



## HOW?

Working with chemical substances requires the highest safety standards. Health, Safety & Environment (HSE) regulations must be strictly adhered to. The goal of our safety solutions is to guarantee process and plant safety throughout the entire lifecycle – for example, through explosion protection, functional safety, defense-in-depth concepts and risk management. Our focus is directed at plant security through access protection,

technical measures related to hardware and software, and to the protection of plant-wide communication and networks. Availability analyses and redundancy concepts ensure plant reliability. We achieve high-level system integrity through service concepts that, among other things, enable transparent data management. All of these factors represent opportunities for increased production through suitable safety measures.



## Give safety a competitive edge – with our integrated solutions.

Perfectly and safely coordinated process sequences ensure productivity at its best and reliable operation of your chemical plant – from power generation to building security. We offer integrated safety solutions and services that always keep you on the safe side.

Our SITRANS transmitters for flow, pressure, level and temperature provide maximum precision and reliability.



### Holistic solutions for process safety

We support you in optimizing your processes, for example, through the comprehensive inspection and design of safety equipment and laboratory tests. And further, with SIMATIC Safety Matrix providing maximum safety already during the engineering phase. The safety lifecycle engineering tool serves to quickly and conveniently plan safety applications based on cause and effect analyses.

With SIMATIC PCS 7, we offer an innovative process control system designed for integrated process safety and comprehensive IT security, also meeting functional safety requirements. Thus our Safety Instrumented System (SIS) includes supplementary safety functions in addition to the proven standard components. For example, you can check the functioning of the emergency shutdown valves during operation using the partial stroke test.

### Plant-wide safety begins in the field

Our process instrumentation and analytics portfolio provides utmost reliability and fully meets the high demands of the chemical industry (SIL 3). Thanks to comprehensive diagnostic functions, you always know when processes are running according to plan, and when corrective action needs to be taken. It lets you lay the foundation for condition monitoring and asset performance management.

Safety is also integrated into our control and drive technology – for example, in our CHEMSTAR motors, frequency converters and IDS. Our drive technology is also equipped for extreme conditions, furnished with explosion protection, numerous certifications, and fulfills the highest energy efficiency classes. When integrated into the control system, data from the field becomes valuable information that contributes to the safe control of the entire plant.

### Seamless and secure data transfer

Digitalization and transparent data management require stable and secure communication. Standards, established interfaces such as PROFIBUS, PROFINET and Industrial Ethernet, as well as wireless, remote and RFID technologies permit seamless vertical and horizontal integration – at all levels and over the entire value chain. Most communication already takes place on the web or in the cloud. Here, too, we can provide the necessary infrastructure.

### Unconditional IT security

Along with flexible data exchange for safe process management and shorter response times, data protection is essential at a digital plant. Industrial security – comprehensive plant protection tailored to automation, electrification, the building infrastructure and cyber threats – is a core element. We rely on the multilevel Defense-in-Depth concept – for everything from plant protection against unauthorized access to network security (authentication and encryption), protection of automation systems, as well as integrity checks such as passwords, logbooks and virus protection.



Explosion-proof CHEMSTAR motors and the SINAMICS G180 specific drive solution can be operated under the most extreme conditions and meet the highest safety standards, including ATEX directives.





# Because growing competitive pressure requires continuous efficiency optimization.

Anyone wishing to stay competitive in the chemical industry must continuously optimize the efficiency of their plant. Our industry-specific solutions reduce the total cost of ownership (TCO) while improving performance and availability. The result: More competitiveness for your company.

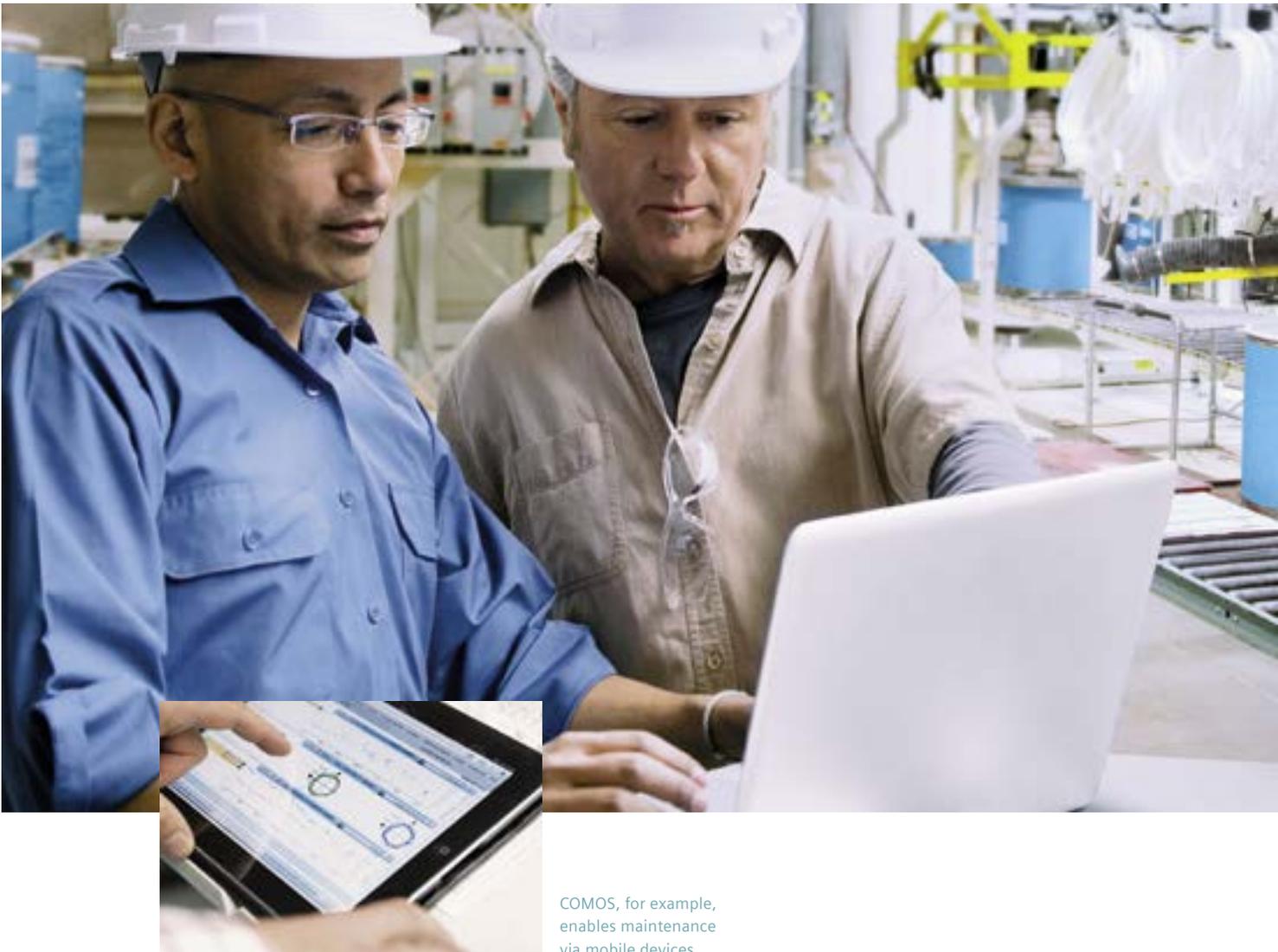
## *HOW?*

The systematic improvement of efficiency must extend to all areas and all phases of a plant's lifecycle. Digitalization prepares the way for Integrated Engineering, Integrated Operation and holistic plant management. The use of real-time data turns big data into smart data. The advantages are tremendous. Already in terms of engineering, you benefit from significantly faster project

planning and high-quality results. Software tools offer seamless, virtual commissioning and ensure efficiency during continuous operation. They also permit the implementation of intelligent maintenance strategies (Integrated Maintenance). In addition, reliable data-based services support analyses, decision-making, safe implementation and process optimization – to protect your investments over the long term.

## Take full advantage of the efficiency potential – with our smart technologies.

Integrated Engineering and Integrated Operation let you access the full potential of digitalization, thus creating the conditions for greater productivity, greater flexibility during operation, high plant availability, and efficient production processes.



COMOS, for example, enables maintenance via mobile devices.

### Faster engineering

With COMOS and the SIMATIC PCS 7 process control system, we offer a software/system solution for holistic plant management. The shared database and uniformity of the tools ensure that over the entire lifecycle of the plant at all times all data remain up to date and consistent (“as is”) – much like a digital twin. Linking the various disciplines from the digital and real worlds results in time savings and improves engineering quality.

### A faster start

SIMIT, the simulation software for virtual commissioning, allows virtual testing and optimization of automation projects. It enables necessary measures to be carried out on-site faster, more cost-effectively, and with fewer risks, thereby expediting the factory acceptance test. Through the integration of planning, engineering and automation data into the simulation platform, data can be made available for the virtually realistic training of operators and maintenance personnel (Operator Training System).

### More efficient operation

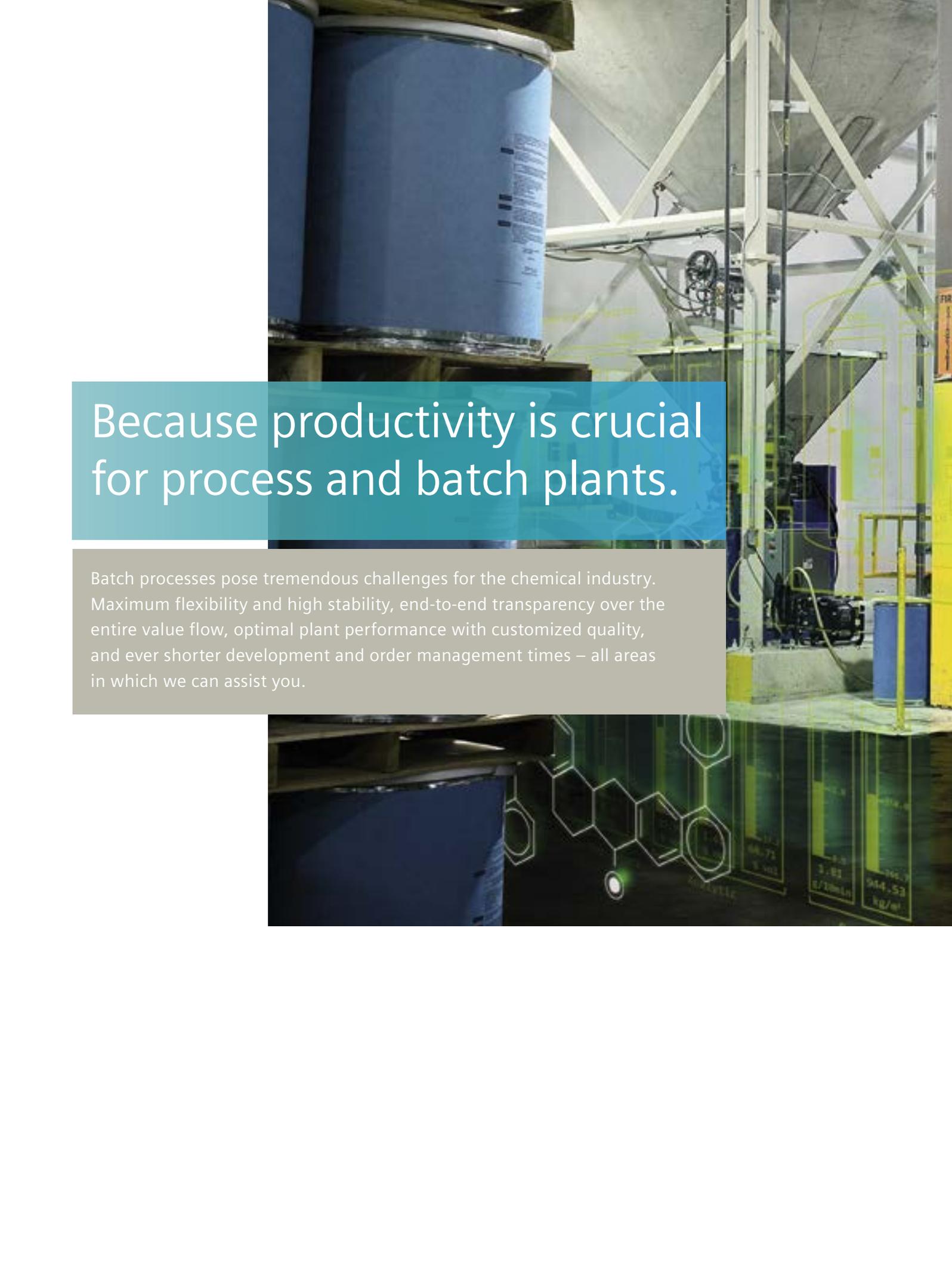
SIMATIC PCS 7 supports the continuous operation of your plant – for example, by means of tools like the Advanced Process Library for automation and the Advanced Process Control for advanced control functions – even for smaller plants or together with alarm and asset performance management for plant optimization throughout all operation phases.

Modern process visualization and simple, innovative operating concepts such as Advanced Process Graphics help operators perform plant monitoring tasks safely and without a glitch. Such monitoring is also possible remotely and via mobile devices. For plant planning, 3D simulation, implementation and analysis of maintenance activities (Integrated Maintenance), we offer a software portfolio with solutions such as COMOS MRO and COMOS Walkinside. All of these tools continuously provide operational data to increase productivity.

Another important topic in the chemical industry is energy efficiency. We provide everything needed for implementing operational energy management, while making energy flows transparent for conducting data analyses to identify and evaluate savings potential. With us, you also save valuable resources when planning and operating pumps. We help you optimize designs and provide expert advice for implementing future-proof concepts. Our energy-efficient industrial controls also help to achieve consistently higher plant efficiency.



Greater efficiency and reduced risk: virtual commissioning and operator training with SIMIT.



# Because productivity is crucial for process and batch plants.

Batch processes pose tremendous challenges for the chemical industry. Maximum flexibility and high stability, end-to-end transparency over the entire value flow, optimal plant performance with customized quality, and ever shorter development and order management times – all areas in which we can assist you.





#### HOW?

Increasing productivity in the chemical industry requires relevant planning and production data – from all corporate levels and over the entire supply chain. Continuous status monitoring, for example, enables the intelligent use of assets and analysis to improve decision-making.

It also requires the display of material and information flows and the visualization of key performance indicators (KPIs) in reports, dashboards and scorecards. Our solutions help to optimize your raw materials management, minimize downtimes, speed up product launches and, ultimately, improve the competitiveness of your entire plant.

## Set new productivity standards – with our intelligent systems.

Producing batch after batch precisely according to defined specifications requires integrated, scalable batch solutions as well as online process control and analysis systems. Our portfolio helps you to plan modular plants, operate them flexibly, and includes services for optimizing them over the long term.



### Process control as basis for plant productivity

With its open, modular system architecture, the SIMATIC PCS 7 process control system can be perfectly adapted to particular needs – from laboratory to plant-wide network use, from simple materials and order processing with advanced process functions to S88-compliant batch automation solutions. SIMATIC BATCH is a flexible recipe management system with an integrated recipe editor for complex batch processes. It lets you track processes and further optimize sequences through batch planning, processing and logging.

### Process optimization to increase throughput

Manufacturing Operations Management (MOM) represents a further step toward increased productivity. It comprises a SIMATIC IT Manufacturing Execution System, Unilab Laboratory Information Management System (LIMS) or a Preactor Advanced Planning and Scheduling System. Through the bidirectional flow of information between production (SIMATIC PCS 7) and the online process control and analysis systems, it enables quick feedback between the lab and process. At the same time, it allows quality to be verified in accordance with original specifications. Production sequences can be modified at any time on the basis of latest information. In addition, all data relevant for material logistics and order management are constantly available in the Enterprise Resource Planning System. Thus, MOM ensures maximum transparency and efficiency. The system lays the foundation for shorter time-to-market and ongoing quality improvements, thereby increasing competitiveness.

### Reliable decision-making to improve performance

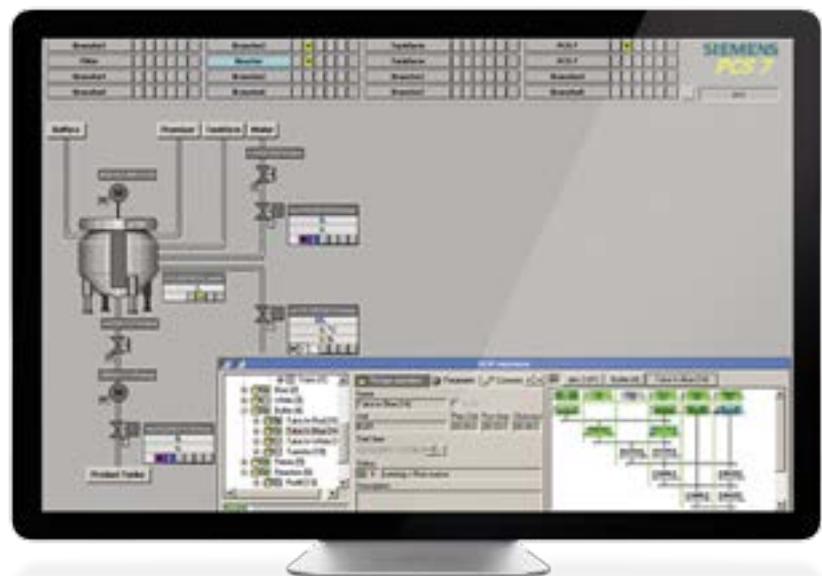
Digitalization creates the conditions for long-term, corporate-wide knowledge management. It is closely linked to XHQ, our Operations Intelligence Software for consistent, coherent analyses of all critical business and operational data. XHQ permits the visualization of processes in real time through corresponding analyses and displays (KPI, dashboard), and also suggests alternative actions.

This type of transparency forms the basis for informed, fact-based decisions – a goal also supported by our Plant Data Services. Through the intelligent analysis of large amounts of data – also on the basis of cloud-based, big-data infrastructures – these services greatly drive forward the digitalization and implementation of Industrie 4.0.

### Optimal performance over the entire lifecycle

SIMATIC PCS 7 Lifecycle Services help you secure the full functionality of control systems over a defined period of time with optimized cost-effectiveness. The flexible, customized service agreements are optimally tailored to your needs and give you the assurance that your control systems will keep pace with technological advancements over the entire lifecycle.

Whether automation, power supply systems or drive technology: Our portfolio of industrial and IT services enables you to operate your plants efficiently and safely while also fully preparing for new requirements such as modernization, downsizing or upscaling.



Batch processes can be efficiently planned, controlled and logged with SIMATIC BATCH.





# Because a reliable partner is the best basis for your success.

To remain competitive in the market over the long term, standards for safety, efficiency and productivity must be set. This can only be achieved if all of the existing potential is consistently exploited – preferably with the aid of a trustworthy, qualified partner.

## HOW?

From the plant design to the retrofit, from the development of new processes to the optimization of existing ones – we can support you at any time and anywhere with a global network of experts and committed employees in more than 190 countries. As a reliable partner of the chemical industry, we can assist you over the entire lifecycle of your plant – in full accordance with the demands of the industry. Our goal is to support you in systematically increasing your competitiveness.

## Responsible care

With our solutions and services, you can count on trouble-free handling of your projects right from the very start – regardless of the size or complexity. With us as your Main Automation Vendor or Main Electrical Vendor, you benefit from reduced plant and project management time and costs as well as increased investment protection. To assist you in fully completing all of your tasks around the world, we work with selected partners and system integrators who can provide professional support at any time.

We can also assist you in matters of sustainability and climate protection. Our environmental portfolio helps you to consistently meet your responsible care and sustainable development goals.

# Globally successful – with our chemical industry solutions.

## Always state-of-the-art through standardization

One of the world's leading suppliers of silicon and silicon-based technology chose us as a strategic partner and the SIMATIC PCS 7 process control system as a strategic platform for its batch, continuous and discrete processes.

## Fast implementation and superior project quality

In Brazil, the construction of a state-of-the-art refinery necessitated the integration of numerous companies and close coordination of engineering processes. With COMOS design and engineering software, uniform standards were quickly established for all of the disciplines. These were, of course, in compliance with industry-specific regulations and guidelines.

## Increase in the efficiency of global plants

One of the world's leading gas and engineering firms controls its air separation plants centrally from a Remote Operations Center that was implemented in a close partnership with us. The result: a significant increase in plant operations efficiency.

## Maximum tank system safety and efficiency

For the construction of a new tank terminal at a large European port, we supplied a turnkey solution for the automation and electrical equipment – on schedule and from a single source.

Trust in a partner who thinks and acts for the long term and who will continue to support you with key strategic topics well into the future. We turn technological progress into a track record. That is what makes us the right partner for ensuring your competitiveness.

#### Added value over the entire lifecycle

A leading manufacturer of polymer materials signed a lifecycle agreement with us that included clearly defined service processes. It ensures that the control systems used are always available and fully up to date – at transparent, calculable costs.



#### Safe and reliable power supply

For a Russian fertilizer manufacturer, we supplied a plant with high and medium voltage. We also supervised and commissioned the highly efficient, comprehensive power supply and energy management solution as part of the same project.



#### Ongoing optimization

A plant for chemical intermediates employs digitalization for fast, virtual commissioning before the actual commissioning takes place.



#### Reduced TCO thanks to MAV concept

A large refinery and chemical complex in China chose us as its technology partner and Main Automation Vendor- The plant now benefits from a fast return on investment, increased efficiency as well as improved safety and flexibility.



#### Operational Intelligence to support all operational processes

To systematically improve the performance of all of its refineries, a company in the Kingdom of Bahrain relies on XHQ Operations Intelligence. Our software solution is making an essential contribution to more efficient and more cost-effective production.



#### Intelligent and safe plant monitoring

One of the world's leading specialty chemical groups equipped its butyl rubber plant in Singapore with our plant-wide energy management and automation solutions – asset management, emergency shutdown (ESD), and the simple integration of package units such as compressors.



#### Integrated plant safety and control

For Australia's largest chemical company, we implemented an automation solution based on SIMATIC PCS 7 that meets all performance specifications and safety requirements.



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