Modern Work Processes at the Ludwigshafen Facility

BASF Introduces Mobile End Devices for Plant and Process Safety

Case Study:
Digitalization at BASF



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Digitalization at BASF

BASF Introduces Mobile End Devices for Plant and Process Safety

Wherever people meet machines, and wherever processes must be controlled and monitored digitally, employees need to be able to rely on their mobile devices. This is especially true during production in the chemical industry, where plant and process safety are a top priority.

BASF has long recognized the potential of digital technologies—high-performance tablet computers have become indispensable mobile assistants for inspections and maintenance tasks. Employees at the production site in Ludwigshafen make use of rugged and safe tablet computers from Samsung for this purpose. Explosion protection specialist and IT partner Pepperl+Fuchs has adapted the devices to suit the demanding industrial environment and, in collaboration with Samsung, developed the Tab-Ex series.

These intelligently networked tablet computers provide on-site employees with access to relevant information for their day-to-day work, structure workflows, record data, and therefore allow stable and safe operation—even in hazardous areas.



The rugged devices from Samsung form the basis for tablet computers in the Tab-Ex series from Pepperl+Fuchs.

Highlights

- BASF controls and maintains production plants, for example, using tablet computers in the Tab-Ex series from Pepperl+Fuchs.
- The technological basis for these devices is the Samsung Galaxy Tab Active.
- The rugged and safe tablet computers are also suitable for hazardous areas.



We achieve maximum benefits for operations by introducing digital solutions in which data from planning and production are intelligently linked, and by ensuring that our employees possess digital expertise.

Alexander Badinski
Vice President Digitalization at BASF

With an area of approximately ten square kilometers, the BASF facility in Ludwigshafen am Rhein is the largest integrated chemical complex in the world. The Verbund site consists of around 200 production plants. Here, thousands of products that are essential for various aspects of our day-to-day lives are manufactured. Whether it's menthol for toothpaste and chewing gum, vitamins for animal feed, wax for surfboards, or acrylic acid for adhesives and paints: The BASF portfolio spans from chemicals and materials through industrial solutions, surface technologies, nutrition and care to agricultural solutions.

In the chemical plants at BASF, vast amounts of data are created during the complex daily production processes. To detect, store, and analyze this valuable information, the company is constantly exploring options that make more effective use of digital technologies—with the goal of making production safer and more efficient.

“We achieve maximum benefits for operations by introducing digital solutions in which data from planning and production are intelligently linked, and by ensuring that our employees possess digital expertise,” says Alexander Badinski, Vice President Digitalization at BASF. “These basic prerequisites are crucial for controlling production processes more efficiently using digital tools and for carrying out predictive maintenance at our plants.”

To streamline the various work processes in production while meeting the high demands of the industry, BASF has expanded its mobile IT infrastructure in a phased approach. The chemical company has received support from Mannheim-based Pepperl+Fuchs, which, as a long-standing partner, has provided the appropriate tablet computers.

Rugged Devices From Samsung as a Strong Foundation

There are industry-specific challenges to be overcome when finding an appropriate mobile solution—not only do tablet computers need to be sturdy, they must also satisfy strict safety requirements[1], especially in hazardous areas. For this purpose, BASF uses tablet computers in the Tab-Ex series from Pepperl+Fuchs at 80 operating points at Ludwigshafen. The technological basis for the devices is the Samsung Galaxy Tab Active series. These rugged models have impressed BASF in terms of performance, robustness, and reliability—and have been tailored to meet the challenging requirements of the production industry by Pepperl+Fuchs, in collaboration with Samsung.

"The hazardous area-rated devices stand for proven quality, compatibility, and our long-standing successful partnership with Samsung," says Christopher Limbrunner, Team Lead Product Management at Pepperl+Fuchs Enterprise Mobility.

From the Clipboard to the Tablet Computer

"Until now, many processes were carried out on paper. Transferring content into other systems and analyzing written documents was labor-intensive and meant that a lot of information was only made available after a time delay. However, we have now optimized this process. What was previously performed with paper checklists, logbooks, or by radio is now processed using our tablet computers, which are ideal for carrying out inspections both indoors and outdoors. This progress makes it possible for us to work more efficiently and significantly reduce the time we spend on monitoring and problem detection," explains Marcus Sebb, Team Lead at Digitalization Operations LU, BASF.

For example, the tablet computers are used to monitor the status of plants in the field, or to check whether a fitting is in the intended position. In this case, the QR code on the machine ensures that the correct fitting has been identified and simultaneously provides employees with the necessary information. This prevents incorrect component selection and allows the current condition of each part to be documented with a photo.

The hazardous area-rated devices stand for proven quality, compatibility, and our long-standing successful partnership with Samsung.



Christopher Limbrunner
Team Lead Product Management at
Pepperl+Fuchs Enterprise Mobility

Plant documentation required by the legislator can also be produced faster and more efficiently via digital means. Using smart mobile assistants, employees can for the most part avoid traveling long distances across plant facilities to reach the control center—and can instead communicate directly via the tablet computers.

A wide range of apps specifically selected for applications in production are available for the operations. For the Ludwigshafen plant, there is a unit called LU 4.0, which develops specific applications for the operations and manages digital solutions from third-party providers. The most frequently used applications include digital provision and use of checklists, documentation of events, maintenance notifications, and mobile plant monitoring with optional operation. In addition, the unit enables the retrieval of plant documentation on-site, asset tracking, commissioning, and QR code identification.

“The BASF digital transformation has been a strategic priority for us. Using tablet computers, we are already able to make mobile use of a number of digital functions—even in hazardous areas. In the future, we aim to support our employees with additional modern assistance systems, including AI solutions. By doing this, we will drive forward essential digitalization in production, increase the efficiency and safety of our operations, and at the same time boost the attractiveness of our workplaces,” says Volker Hildebrandt, Digital Solutions for Operations and Site Services at BASF.



The Samsung tablet computers assist BASF employees during inspections and provide important information for day-to-day work.

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With Safety in Mind

Wherever combustible materials are produced, processed, transported, or stored, the highest safety requirements apply. Therefore, devices used in ATEX Zones 1 and 2 must have appropriate degrees of protection and approvals to ensure the occupational safety of employees and the safety of the plants. In line with these requirements, modern technologies can also be used in hazardous areas.

The Tab-Ex tablet computer—based on the Samsung Galaxy Tab Active series—can withstand falls and is protected not only against dust and water[2], but also against electrostatic discharges[3]. An intelligent protection concept enables safe use of the mobile end devices. To meet the demands of everyday working life in industrial plants, the Pepperl+Fuchs tablet computer features a break-proof and scratch-free display[4], which can also be operated while wearing gloves[5].

The look and feel of the rugged tablet computers has been well received by employees. The integrated S Pen contributes to user friendliness and efficiency by enabling precise inputs and facilitating work on the device. Many users are familiar with the operating system due to their personal smartphones and tablets, meaning little training is required regarding operation. The slim and lightweight design of consumer mobile devices has therefore been applied to the industrial site.

Alongside the user-friendly and rugged design, the software with Android operating system is also impressive. With the Samsung Galaxy Tab Active as a base device, safety updates, configuration, and OEM support for the Tab-Ex are covered reliably by Samsung.

“The rugged tablet computers have become an important tool in our operations, both on the hardware and software side,” says Sebb. “The use of smart assistants has led to impressive results: optimized processes, predictable expenditure, cost savings, and higher productivity. For this reason, we have set ourselves the aim of implementing high-performance devices across the entirety of our production plants.”

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[1] ATEX Directives

[2] IP68 certification: Protection against permanent immersion in water depths of 1.5 m for 30 minutes and exclusively in clear water. No protection against saltwater, chlorinated water, or other liquids, especially soap solutions, alcohol, and/or heated liquids. The SIM card holder must always be fully inserted into the device to prevent the ingress of water. MIL-STD-801H certification: fall height, humidity, immersion, salt spray, dust, vibration, droplets, etc. MIL-STD-810H is a test standard developed by the US military to accurately determine device limitations. More information can be found at: https://info.endaq.com/hubfs/MIL-STD-810H.pdf
The test methods comprise a fall test on a plywood surface over concrete from a height of 1.8 meters. Real usage may differ from the specific ambient conditions used in the MIL-STD-810H tests. Samsung does not guarantee optimal performance of the device under all extreme conditions.

[3] DIN EN 60079:
https://www.ecom-ex.com/fileadmin/user_upload/product-data/pdf/mobile-computing/tab-ex-05/ATEX_certificate_Tab-Ex_05_DZ1_CERT-7560.pdf
https://www.ecom-ex.com/fileadmin/user_upload/product-data/pdf/mobile-computing/tab-ex-05/ATEX_certificate_Tab-Ex_05_DZ2_CERT-7574.pdf

[4] Corning® Gorilla® Glass 3:
https://files.pepperl-fuchs.com/webcat/navi/productInfo/pds/t221645_ger.pdf
https://files.pepperl-fuchs.com/webcat/navi/productInfo/pds/t221646_ger.pdf

[5] The touch sensitivity may vary depending on the material and thickness of the gloves and other ambient conditions.

About BASF

At BASF, we create chemistry for a sustainable future. Our claim: We want to be the chemical company of choice for enabling the green transformation of our customers. We combine economic success with environmental protection and social responsibility. Around 112,000 employees within the BASF Group contribute to the success of our customers, across virtually all industries and in almost every country across the globe. Our core businesses are the Chemicals, Materials, Industrial Solutions, and Nutrition and Care segments; standalone businesses are bundled in the Surface Technologies and Agricultural Solutions segments. BASF achieved sales of €65.3 billion worldwide in 2024. BASF shares are traded on the Frankfurt Stock Exchange (BAS) and in the USA as American depositary receipts (BASFY).

More information can be found at **www.basf.com**

About Pepperl+Fuchs

In the spirit of research, foresight, and faith in one's own abilities as capital, Walter Pepperl and Ludwig Fuchs founded a small radio workshop in Mannheim in 1945. Experience acquired by Pepperl and Fuchs was transformed into new ideas, and the pair continued to delight in further developing products for customers. The eventual result was the invention of the proximity sensor. This innovation represented the starting point of the company's success story. Today, Pepperl+Fuchs is known by customers around the world as a pioneer and innovator in electrical explosion protection and sensor technology.

More information can be found at **www.pepperl-fuchs.com**

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Samsung Electronics Co., Ltd. inspires the world and shapes the future with transformative ideas and technologies, redefining the worlds of TVs, smartphones, wearables, tablet computers, digital appliances, network systems, storage systems, and semiconductor and LED solutions. Furthermore, we deliver seamlessly networked experiences using our SmartThings ecosystem and our open collaboration with partners.

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