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## When everything flows ...

How the engineering system sustainably optimises workflows

According to Gabler's *Wirtschaftslexikon* (Business and Economics dictionary), a **workflow describes a business process** based on a division of labour from which tasks, processing units and their interrelationships are derived. The online dictionary IT Wissen (IT Knowledge) refers to the structured control of logically linked, chronological processes involving several departments.

In engineering, especially in more complex plants, lots of processes based on a division of labour are interconnected in a logical and chronological context. However, the use of different tools and file-based data storage are like separating locks between the processes, which impede the flow of information. Even if agreements with colleagues from other departments or the transfer, multiple entry and correction of data can be readily attributed to a workflow: it can hardly be described as a "flow". To remain with the water image, it more closely resembles one of those fish ladders,

with whose help, for example, salmon struggle forward laboriously step by step. Not everyone reaches their goal in this manner. Database-driven work such as that provided by the Engineering Base (EB) platform is crucial in order to be able to control today's highly demanding engineering tasks in a really smooth manner. This is because the central data model provides all engineering information pertaining to a plant or machine at any time to everyone involved, and changes are automatically visible immediately to everyone. In addition, users of the departments concerned such as sales, electrical design, fluid/pneumatic or process engineering are much more flexible in their time management. They no longer have to wait for certain data or information from neighbouring disciplines, but can work simultaneously. Furthermore, EB's database principle enables them to create and edit objects without a graphic counterpart, regardless of the diagram, in lists or the Explorer.

### Increasing flow speed

With the Advanced Typical Manager (ATM), AUCOTEC has added to this principle of highly efficient workflows (without any unnecessary tool changes) another component which further increases the flow speed: the automated configuration. With conventional tools, the raw concept of a machine or plant based on the requirements specified in different lists is transferred manually across several stages into engineering and the desired plant is developed as a result.

In contrast, the ATM automatically develops the real documentation (see page 3) from standardised, abstract descriptions of functions with clear handling of variants and options. The configuration can be set up directly in the Typical Manager, but the relevant information pertaining to the plant description can also come from other sources, for example, the existing ERP system. This is due to the very open EB platform with which the data

flows exceptionally well into the "branches" of engineering - and this in both directions! Intelligent update and change management are the levees which ensure the flow.

It is not possible nowadays to proceed faster to a specific, consistent result from the original design of a plant, which does not even have to originate from an engineering expert in the case of EB! EB creates a workflow which minimises manual work and thus errors. Thus engineering flows - in a purposeful, efficient and automated manner across all departments. Result: Better engineering quality in less time.

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## From tool provider to consulting partner

Dear readers,

After five consecutive record years, all the signs are indicating growth again in the current financial year, the 31st in AUCOTEC's company history. They show that our recipe for success meets the needs of the market exactly: state-of-the-art software technology, over 30 years of experience, investment security through guaranteed upward compatibility, personal commitment and a large degree of flexibility. This also applies in the international environment, where we are currently promoting the integration of the new subsidiaries in Poland and Sweden as well as the expansion of established subsidiaries.

Our Engineering Base (EB) system is very successful in the area of process automation in general, and in the oil and gas sector in particular. Its ability to map and optimise engineering processes very flexibly opens up the opportunity of huge potential savings. As a result, AUCOTEC has increasingly evolved from a pure CAE tool provider to a consulting partner.

The successes in plant engineering and power transmission and distribution confirm this strategy. With the unique implementation of IEC 81346 (page 2), as well as the Advanced Typical Manager (page 3), each of which were developed in close cooperation with key customers, users in these segments in particular

benefit from the valuable new capabilities of the EB version 6.6.0.

These successes make us strong, and thus we can and will continue to protect your interests. As your reliable partner all over the world: independent, fast and flexible!

Yours faithfully,  
**Uwe Vogt**  
Executive Officer



**sps ipc drives**



Nuremberg,  
November 24th – 26th, 2015  
Hall 6 / Stand 110

We are looking  
forward to  
meeting you!

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**Smooth transition: engineering workflow without local installation?**

Mobility and independence from the workplace will increase further in importance. Modern, efficient engineering is already hardly feasible without the data that is maintained in a central plant model and is editable for everyone simultaneously and at multiple sites, thus without the famous "single source of truth".

Since it was clear to the EB developers from the outset that the dynamics in this area cannot be predicted down to the last detail, they have used vision and state-of-the-art technology to create a system that can proceed along each path in the future.

Thus there are already initial ideas to further develop the recently presented Web Commu-

nication Server (see below) so that the first plant definition, which can be generated on any user interface without local system installation, can be transferred directly into engineering via the Web server. A concept team could then use its plant idea, only configured via functions and their designs at an abstract level, to "feed" EB's Advanced Typical Manager from anywhere in the world. You could thus

retrieve an initial calculation or directly initiate the actual implementation in engineering. Without dams in the form of file limits or client applications, without information seeping into nowhere because an engineer is sick or on holiday. This would mean even smoother transitions for data and disciplines, also beyond engineering.

# IEC 81346 Made Easy

Implementing the standard easily and consistently to a unique depth

The IEC 81346 standard prescribes plant construction as an object model with three independent views: "Product", "Function" and "Location". It is highly complex and makes the same demands of everyone who plans with it. The IEC 81346 standard is often not practically applied in domestic planning tasks because it requires maximum consistency and an overview, which can only be implemented with difficulty using conventional CAD/CAE tools. However, the standard is mandatory when it comes to international projects.

**No need to fear 81346!**

AUCOTEC has succeeded in being the first provider of a system that not only graphically maps these required views, but also makes them purely alphanumeric and editable to full depth. The "detour" via the graphic is no longer necessary with the Engineering Base (EB) platform. The optimum support of IEC 81346 virtually runs "in EB's blood". The system was already designed in such an object-oriented manner at the outset that the object structure could be built without having to create a single document or device in advance. This independence that is required by the IEC has been a feature of EB for years. Thus standard-compliant work is easier and more consistent than with any other system!

**One library for everyone and everything**

A second symbol library is unnecessary with EB. Here, the symbol configurations are centrally managed instead and, if necessary, are adapted easily to the IEC. However, the symbols can also be used in other standards in parallel.

The aspects can also be simply shown or hidden for devices that are displayed in a distributed manner with a frame in the diagram. If all three aspects are visible in the frame, redundant designations are automatically "shortened" for a better overview.

**Automatic knowledge of affiliation**

The usual manual linking of all existing objects and associated devices with the relevant location, function and product aspects can be an extremely tedious task. The error rate is high and any overview is quickly lost. If a larger object is moved or changed, it becomes enormously complex to disassemble these linkages again and reclassify them.

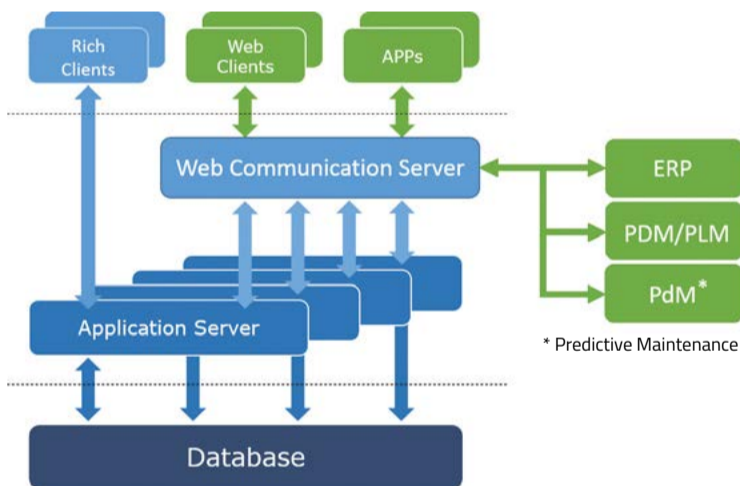
This is not the case with EB. Its central data storage allows you to integrate, for example, external or modified projects into an existing IEC object model simply via drag & drop. Since all de-

vices are based on the object that is directly above them hierarchically, a supplied cabinet including all its devices can be included in the specified location structure with just a few clicks. As soon as a device is subordinated to another, it knows where it belongs. Assignments are more or less automatically "inherited" and do not have to be painstakingly associated manually.

10	Part of	Designation	Associated Location	Associated Function	Type
1	-J1 -Q1	-BP1	+J1 +B1 +J01 +J1	=J1 =Q01	Control Switch
2	-J1 -Q1	-BZ1	+J1 +B1 +J01 +J1	=J1 =Q01	Combined Transformer (High Voltage)
3	-J1 -Q1	-BZ2	+J1 +B1 +J01 +J1	=J1 =Q01	Combined Transformer (High Voltage)
4	-J1 -Q1	-BZ3	+J1 +B1 +J01 +J1	=J1 =Q01	Combined Transformer (High Voltage)
5	-J1 -Q2	-BP1	+J1 +B1 +J02 +J1	=J1 =Q02 =BP1	Control Switch
6	-J1 -Q2	-BZ1	+J1 +B1 +J02 +J1	=J1 =Q02 =BZ1	Combined Transformer (High Voltage)
7	-J1 -Q2	-BZ2	+J1 +B1 +J02 +J1	=J1 =Q02 =BZ2	Combined Transformer (High Voltage)
8	-J1 -Q2	-BZ3	+J1 +B1 +J02 +J1	=J1 =Q02 =BZ3	Combined Transformer (High Voltage)
9	-J1 -Q2	-QA1	+J1 +B1 +J02 +J1	=J1 =Q02 =QA1	Circuit Breaker (High-Voltage)
10	-J1 -Q2	-QZ1	+J1 +B1 +J02 +J1	=J1 =Q02 =QB1	Disconnect Switch (High-Voltage)

> EB retains an overview: worksheet with aspect assignments

Thus you can implement the internationally binding IEC 81346 practically, easily, consistently and in a time-saving manner. EB can significantly accelerate the widespread use and acceptance of the standard. Thus more and more projects and engineers can benefit from the advantages provided by such standardization.



> EB architecture with WCS and external connections

## New Web service for Engineering 4.0

AUCOTEC will be presenting its Web Communication Server for the first time at SPS IPC Drives 2015

**At this year's SPS IPC Drives, AUCOTEC will be introducing its new Web Communication Server (WCS), which allows secure bi-directional communication of external systems with engineering and relieves IT departments.**

The WCS ensures direct communication of external systems with AUCOTEC's platform Engineering Base (EB). Thus ERP and EDM/PDM systems forward their data directly to the business logic of EB's multi-layer architecture. This ensures that the data model is always updated with external additions and can

transfer back its changes without additional user interaction.

This direct M2M communication is one of the preconditions to excelling in engineering for Industry 4.0. The Internet of Things cannot be achieved without Web technology. The WCS uses global standards which do not add to IT's workload. Furthermore, for example, predictive maintenance (PdM) is also convenient and secure with the WCS, without a detour via client applications.

## Addition to the family

AUCOTEC further expands its market presence. Two new subsidiaries that were established this year enlarge the international family:

**Poland**

On 1 January 2015, the former development partner Codevantage became AUCOTEC Polska sp.z.o.o. Shortly afterwards, this wholly-owned subsidiary took over the long-time Polish sales partner Temertech along with its workforce. "The very competent new colleagues in Poland will now develop solely for AUCOTEC. We see huge potential for this strategically important market in the disproportionate growth of Polish gross domestic product in recent years", says Management Board member Markus Bochynek. AUCOTEC Polska focuses and coordinates the sales and technical activities there, but is also available for neighbouring countries.

**Sweden**

In May of this year, the likewise long-standing Swedish sales partner ECC AB became part of the AUCOTEC family, also as a wholly-owned subsidiary which will operate as AUCOTEC Sweden AB. The employee structure was taken over here also. "In recent years, our Swedish partner has succeeded in establishing our products there with a constant annual growth. We are convinced that our subsidiary will be able to significantly increase software sales in this region", says Markus Bochynek. With the new subsidiaries, the number of employees in AUCOTEC AG rose to 225.



> Managing Director AUCOTEC Polska, Rüdiger Lange



> Managing Director AUCOTEC Sweden, Per Wennerström



> Executive Officer of AUCOTEC AG, Markus Bochynek



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# Perfect combination

## Configuring highly efficiently with functional modules and clear variant management

**Configuring is THE keyword for efficiency in planning and designing machines and plants.** With the Advanced Typical Manager (ATM), AUCOTEC has created an intelligent tool for its software platform Engineering Base (EB), which significantly optimises the plant configuration.

### Function modules instead of thousands of sheets

The ATM makes use of functional engineering for this purpose. The individual mechatronic modules now contain complete functions such as gripping or heating rather than individual motors or sensors. The functions are documented in a quality-tested template which contains all associated sheets, devices, and cables and handles them "as a whole" in their functional context. This saves you from copying a project consisting

of thousands of single sheets which can hardly be continuously maintained. Configuring is much clearer and more precise. The update function also enables changes to be immediately identified and incorporated at any time, without having to undo the individual customizations that were already previously created. This saves a lot of time.

### Perfect variant handling

Options such as brakes or sensors are located separately as circuit components in EB. The otherwise necessary unclear variants of sheets with all possible combinations of options for one device are thus a thing of the past. In the event of changes, you simply exchange only the optional circuit component. EB also stores the variants resulting from different dimensions

or manufacturers as quality-tested modules. When selecting a particular motor, the system then automatically assigns the correct item numbers to the correct components.

Instead of the usual complicated sets of rules with wordy explanations of the option combinations which are possible and permitted, only such variants as can be effectively implemented are stored as "typicals" in EB. If all functions that can be ordered are finally preconfigured in EB's database, you are not far from the documentation of a plant at the press of a button.

# "No system could do this so far"

## Lothar Hollmann, SAG, talks about the IEC 81346 standard and the optimal workflow



> Lothar Hollmann

**Lothar Hollmann (63) is Head of Smart Grid Services at SAG GmbH in Oberhausen. Since 1977, he has worked in the secondary technology sector in the energy supply world, which involves local controls, voltage regulation, mains protection, etc. During this period, he witnessed up close all stages of the development of automation and its documentation.**

**IEC 81346, which stipulates a certain plant structuring, is still only very reluctantly implemented in Germany. Why do you think this is the case?**

**Hollmann:** Compared with DIN 40719, the IEC 81346 offers no advantages with respect to the documentation, for example, the circuit manual. Additional costs are more likely to be incurred because the equipment used is usually still documented in the old standard. In 2006, there had been initial implementation trials of IEC 81346 in AUCOTEC's engineering software RUPLAN. But no system could really implement so far the advantages offered by the IEC 81346 with the three aspects of product, function, and location.

### Why should you still plan - independent of the obligation to use it in international tenders - according to the IEC?

**Hollmann:** The IEC 81346 is the valid norm, unless a customer gives its own "in-house" standard. Beyond the mandatory element, profitable synergies can arise from engineering with the current IEC standard if the plant structuring is coordinated with the customer-specific structuring. This must be regulated in advance, however, as otherwise potentially significant additional costs are incurred.

The master data is thereby a key to increased efficiency. The more pieces of equipment there are as objects in the valid standard, which can be used via a tool such as EB, the faster and of higher quality the engineering becomes.

### How does Engineering Base (EB) support you here?

**Hollmann:** The first four basic steps of the project creation and structuring can be performed directly in EB, without the need for parallel documentation, for example, in Excel lists: from the creation of the project structure, which is prescribed by the product view according to IEC 81346 for a switchgear, via the copying of the required equipment from the database to the associated structure level up to the definitions of the location aspect and the functional view.

For the creation of the actual documentation, EB offers a particular advantage: multiple representation. The objects can be displayed in various forms in different documents, for example, layout diagrams, cable lists or BOMS, circuit diagrams or inspection plans, etc. The objects are stored centrally with all their properties only once in the database. Changes to the objects (for example, naming, parameters, technical data) thus affect at the same time all documents in which these objects are displayed.

As previously mentioned, the master data has a key function in this process. All properties and graphics for the various types of documents must be created in the master data, regardless of whether the component is a terminal or a complete cabinet. Because of its central importance, we have created a set of rules in a working group with currently four companies as to how master data is created and the attributes which need to be included at least. This significantly simplifies data exchange with our customers, suppliers and competitors.

### How important is the workflow topic at SAG?

**Hollmann:** A workflow is always dependent on the process that is to be controlled thereby. But the efficiency and quality of a project depend on the workflow. In my area, the secondary technology engineering of power plants, a typical workflow starts with tender preparation and runs via the preliminary and detailed planning to the delivery to the customer. From the perspective of the operator, the workflow can extend from the re-

quest via the services to the servicing and maintenance. Here, the success factors lie in the optimal and of course standardised structuring of the entire object, unique master data and clearly defined processes.

### How do you see EB in this context?

**Hollmann:** A CAE system must be able to purposefully and promptly provide the required data to the users in each of the different phases of the workflow. The offered diagrams are finally created from this work-related data for transfer to the operator. EB is the right tool for this in our opinion. Faced with increasingly complex engineering, only more flexible, more consistent and higher quality processes are of help. EB makes such workflows possible, but one must be willing to reconsider and change traditional methods.

The classic, graphics-oriented circuit diagram no longer holds the top position with EB. The important point is the central database from which all processes are fed. EB is universal, thus there are always multiple solutions. You also have the option of creating your own version of EB via macro programming. For our needs, we restrict the system via an action rule.

### What future requirements do you expect for your engineering and what does this mean for the engineering system?

**Hollmann:** I don't expect the time pressure to decrease in any case, on the contrary. And we have definitely not yet reached the end of the road in terms of complexity also. We thus still have some ideas and wishes as to how EB can facilitate work – from the automatic documentation of structuring via a report generator for database queries to paperless work in the plant via a tablet. These are no castles in the air as EB has the potential because it is future-oriented.

**Thank you very much for this interview, Mr Hollmann!**



Images: Rippert Anlagentechnik

## Not just on the surface!

### Surface finishing and filter expert Rippert opts for consistent engineering with AUCOTEC

Rippert Anlagentechnik GmbH und Co. KG has been successful in the market for over 45 years with painting and filter systems, automation as well as industrial fans. Approximately 420 employees design and produce at six European sites for customers from all over the world. Rippert offers complex painting systems as well as standard products and is also the expert who sets standards for air pollution control. In the fan sector, Rippert systems score in terms of energy efficiency, durability and noise control.

#### Consistent

Consistency was the key issue in the search for a more modern engineering system. "Out of all providers who presented their products, only AUCOTEC with Engineering Base (EB) was

able to fulfil a project's requirements from the process engineering flow diagram (P&ID) to control technology", recount Thomas Quante, Head of I&C Design at Rippert and EB administrator Thomas Möller.

From sales via processing and manufacturing to commissioning, all disciplines access the same data model to view or edit engineering information. EB's database and object orientation make it possible. "Different designations of a component in various documents are now as much a thing of the past as time-consuming comparisons of load and field device listings", reports Quante.

#### Function-oriented

The new work method of function-oriented

assembly formation from single functions with underlying circuit components or circuit diagram pages is now a core aspect of the engineering process. This results in reusable standards which minimise errors and coordination work. Thinking in terms of functions requires a different work method, but the change is worth it, explains the EB administrator and key user: "Functional orientation saves a significant amount of time and divides the sub-systems very clearly."

Rippert applied the new workflow for the first time to an actual customer project on coating for bathtubs and shower trays: the plant consists of three lines with up to eight booths. Since each booth had the same design, their structure could be easily reflected in EB. Once

the first line was completed, the other two lines just needed to be copied. The entire I/O level remained the same for each line, except for the IP addresses of the processors.

#### Future-proof

Rippert will now gradually adjust the new system to its own specific requirements. "EB still has a lot of potential. Its flexibility is open to further requests and requirements on our part and is thus also future-proof in the longer term. Its consistency is exceptional now", concludes Thomas Quante.

## Smart engineering for smart grids

### SAG uses Engineering Base as a central design solution

The SAG Group is the leading partner for the energy infrastructure of utilities and industrial companies. SAG provides manufacturer-independent services and systems for power generation as well as transmission and distribution in electricity, gas and water grids. Approximately 8,500 employees generate a turnover of around 1.2 billion euros. SAG has a nationwide presence in Germany at approximately 120 locations as well as subsidiaries in France, Poland, Hungary, Czech Republic and Slovakia.

#### Intelligent network station iNES

90% of the electricity generated by renewable sources in Germany is routed directly into the distribution grids. They are not designed, however, for this fluctuating power supply and heterogeneous power consumption by increasing numbers of consumers. As an alternative to costly conventional grid expansion, SAG has collaborated with reputable partners and developed the smart grid system platform iNES for intelligent distribution grid management. Thus existing capacities can be optimally used and extreme conditions can be controlled or avoided.

Smart Grid Services, the SAG branch in Oberhausen (Germany), was established for iNES and related customer projects. It uses AUCOTEC's database-driven system Engineering Base (EB) for designing and engineering.

#### "Fast and intuitive"

SAG regards EB's Power EVU version as the successor to the standard energy supply tool RUPLAN, with the latter's decades of experience incorporated in the new software.

The open system platform iNES allows all standard control components from third-party manufacturers to be integrated and controlled. This is also why SAG attaches great importance to the flexibility of the engineering tool. The iNES team agrees that EB is much more flexible than comparable systems. The users also value the SQL database and the well-known drawing tool Visio, which is integrated in EB. "Visio makes its use fast and intuitive", the users at SAG all say. Due to its central database, all data that has been produced during the various steps of an iNES project can be mapped in a common model without format changes. Thus all documents are always up-to-date



Image: SAG AG

and consistent. This saves lengthy discussions, misunderstandings and transmission errors - and thus a lot of time.

#### Central design solution

EB is used as a central CAE design solution for all iNES projects. However, EB's integrative potential could be used even more. Thus the smart grid experts hope to be able to create in future the electrical engineering documentation for plant treatment, in addition to creating such documentation for iNES projects.

And furthermore ... the following companies, among others, have recently opted for AUCOTEC:



ASAP Holding GmbH  
Gaimersheim | Germany



Emerson Process Management PSS  
Warsaw | Poland



Xiamen Golden Dragon Bus Co., Ltd  
Xiamen | China



Howden UK  
Renfrew | United Kingdom



Hyundai  
Seosan-Si | South Korea



KAZ Minerals Aktogay  
Almaty | Kazakhstan



Samsung Electronics  
Gyeonggi-do | South Korea

AUCOTEC AG  
Oldenburger Allee 24  
30659 Hannover  
Phone +49 511 6103-0  
Fax +49 511 614074  
Web aucotec.com

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