



Image: iStock/paulbcowell

## Coordination is everything!

How EPCs consistently manage and merge the data of the most diverse disciplines and suppliers

**Whether a sugar factory, chemical park, oil refinery or power plant is involved**, plant operators often avail of the services of general contractors when it comes to new measures or execution tasks. Such an EPC (Engineering, Procurement and Construction) provider still doesn't have it easy as he has to be able to safely coordinate millions of data and umpteen different supplier documents, without losing anything or getting documents mixed up. Finally, he should combine everything into a perfectly functioning whole. This places the highest demands on data management.

In the development phase, but also in the modification and expansion of existing plants, data must be constantly exchanged between disciplines and with the suppliers. The larger the project, the greater the amount of time spent coordinating, exchanging feedback and correcting transmission errors or overlooked changes. Engineering Base (EB) eliminates this extra work because the database-driven

platform maps all development processes – also those of the control systems – in a highly transparent manner at all times.

The unique freedom which EB offers EPC companies when linking different control systems to a plant's overall engineering was already discussed in a recent Info Paper. However, general contractors also benefit in particular from the unique overview that EB creates throughout each life stage of a plant: from the integration of subcontractors via revision management in the project up to major execution tasks, EB ensures that nothing can be lost or become mixed up. It is also easy to use and highly practical.

### **Change management: Tracking for an overview**

To enable data to be logged accurately and changes to be safely checked, tracking points can be set on the objects to be checked in the tree. You can see exactly for each attribute

whether something was changed and, if so, when this was done – for internal control purposes as well as for the integration of subcontractors. When cooperating with third parties, the tracking points are set in a recipient-specific manner. This enables EB to create a list of objects to be changed, which is then associated with the particular supplier. The client can thus see at any time the specific version which each supplier has received and the date of receipt. The supplier only receives the data that is relevant to him. This significantly reduces the work involved, sources of error and costs.

With the smart Excel tool, EB automatically saves the status information when importing XLS data and assigns a version number to objects and attributes. It also facilitates processing the import of very large amounts of data. For this purpose, the user specifies the exact data records he wants to import; the change management hides the already imported data during the next run.

### **It's not possible to be any clearer: revising with EB**

All changes are not only visible, but are assigned a status. This assignment can be used alphanumerically at any time for the overall project, partial areas or individual devices and functions. EB provides automatic detection and marking of changed diagrams for graphics also. Project managers can thus very quickly forward such diagrams without time-consuming manual work. Even without opening the diagram, the system reliably detects relevant changes simply from the data of the stored objects. Only EB's database-driven nature makes this possible!

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**30** years

## Upward compatible for 30 years – Preserving values and creating new ones

Dear readers,

This Info Paper focuses on the process engineering industry topics which we encounter at the leading international trade fair AICHEM. With its version for process engineering plant construction, our Engineering Base (EB) platform was able to score in recent years particularly in this sector, for example, at Emerson, INEOS or Südzucker. EB has contributed decisively to AUCOTEC's significant growth in turnover of 74% in five years.

While in the last fiscal year alone, the total turnover of all EB solutions increased by 32%,

the process engineering version was actually able to more than double its turnover.

There is no question about the fact that things are changing. We are pleased because the figures show that EB's added value is well-received in the market. However, one thing is and will always be our priority at AUCOTEC: our customers can rely on the fact that their investment is future-proof. Our systems have always been fully upward compatible for the last 30 years. No other supplier secures your work to such an extent: with data availability for decades! Our long-standing customer INEOS Cologne, which has just migrated to EB,

estimated the value of its data, which it was able to retain despite the change, at approximately five million euros. So what can we do for you?

**Yours faithfully,  
Markus Bochynek  
Executive Officer**



We are looking forward to meeting you!

Frankfurt/Main,  
15.06. - 19.06.2015  
Hall 9.2 / Stand B12

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### Reliable as-built status: everything under control!

Almost every life cycle of a plant is marked by numerous execution tasks. Sometimes, long-term and overlapping planning projects in a wide range of areas mean that ensuring the up-to-date as-built status of the plant documentation is a highly complex task. Only EB can consistently map such asynchronous processes. For more extensive revamping

or expansion projects, the data for relevant sub-projects is exported for separate processing without compromising the up-to-date status of the plant documentation. Anyone working in the original as-built project receives a specific alert about any exports, not only in the as-built project's graphics and object tree, but also in the various wizards, from the wiring manager through to the allocation support for PLC I/Os.

When the modified project is re-imported after modification planning, a special synchronization manager assists in the consistent integration of the data into the new as-built status of the plant documentation. Here, the project engineer retains full control over any changes. Automatically created system information (message objects) guides users and displays specific innovations and discrepancies. No other system has so far been capable

of matching this controlled data integration during the operating phase.

Thus EB turns the coordination of enormous amounts of highly complex data and umpteen different supplier documents into a highly convenient solution for optimum interaction of everyone involved!

## INEOS Cologne embarks on a new path in instrumentation and control engineering (ICE)

### Complete migration with AUCOTEC secures millions of data values



**INEOS Cologne is migrating to Engineering Base (EB) as its new planning and documentation system in ICE and electrical engineering.** The software platform is being introduced across the whole site. The chemical company expects a significant increase in efficiency as a result of the switch to EB. The system is able to integrate the various in-house software solutions for the ICE sector and thus create a better overview of states of planning and plant documentation. This accelerates navigation and the retrieval of data. The continuously increasing inspection requirements for the ICE sector were also a reason for the migration.

### Preserving values

INEOS is one of the largest chemical companies in the world. The INEOS site in Cologne is an important supplier of raw materials for the chemical industry. INEOS estimated the value of the dataset, which is now being transferred to the new engineering system, at around 5 million euros. For this reason, one of the key aspects was the continuing availability of the existing documentation.

"AUCOTEC was the only provider to credibly convey during the competitive phase that it could ensure a complete migration to Engineering Base", explains Thorsten Wirths,

Head of Technical Standardization at INEOS Cologne. He attributes this to the good data basis from the previous tool, which was also developed by AUCOTEC.

### Rapidly productive

Up to 30 users work with the system every day. "The smooth functioning of the transition was especially important to ensure that we could work productively with Engineering Base as quickly as possible", says Wirths. Here, the platform stands out with its easy, intuitive handling, which is essential in particular for the process industry with its enormous amounts of data.

## You have the choice!

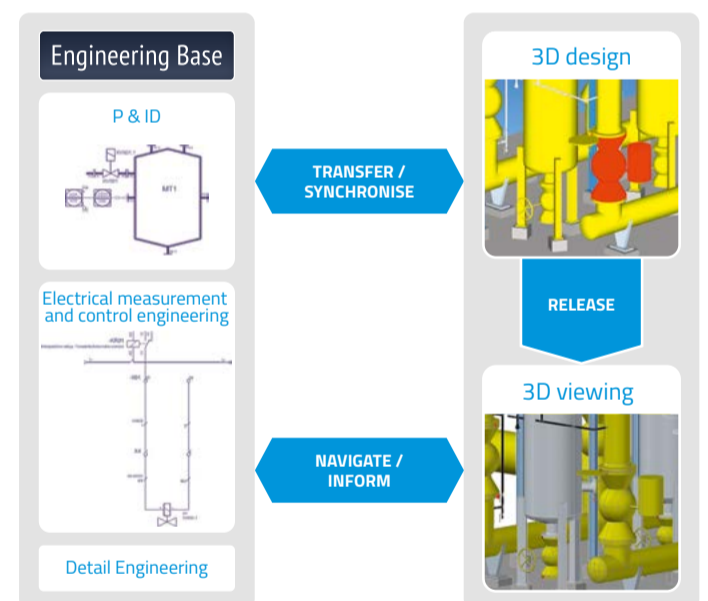
### Independent platform combines 3D plant design and 2D engineering

The development partnership which AUCOTEC and UNITEC Informationssysteme GmbH forged some years ago has already borne ample fruit. Four of the standard 3D systems for modelling process engineering plants are already able to exchange data with AUCOTEC's database-driven system Engineering Base, namely Solid Edge, Plant 3D, Inventor and Navisworks.

### No compromises

For this purpose, UNITEC developed a neutral, universal communications platform. It is also able to link to any other desired 3D system.

Thus AUCOTEC customers are free to choose the system which best fits their requirements. From the plant structure to the object properties, all information and logic of the 3D world are linked in a navigable manner with that of the 2D flow chart and detail engineering. Supplier data can also be integrated without having to purchase the relevant authoring tool. Regardless of the expertise of other disciplines and with optimized licensing costs, process engineers and mechanical, ICE and electrical engineers work with all relevant data and retain a unique overview of the complete plant.



## ISO 15926: AUCOTEC is leading the way

### Engineering Base supports neutral exchange format for long-term secure development data

The data integration standard ISO 15926 has not yet found its place in practice. However, experts believe that designers will now have to get used to it if they don't want to miss the boat. With Engineering Base, AUCOTEC provides a system that already understands this standard.

The request for improved data exchange in plant construction originally came from the oil and gas sector. It is driven by, among others, the US-based Fiatch, a network of committed stakeholders in the industry. Its goal is the development and global distribution of innovative technologies for maximum value added of capital goods. AUCOTEC is one of its members.

### Control is improving

ISO 15926 is intended to significantly facilitate

data exchange between the different systems which are used over the course of the life cycle of a plant. As a uniform format that can be understood by all programs involved, the standard can be used both for improved project control as well as for the flow of information between systems. It is intended to conveniently enable consistent communication and collaboration — and for the maintenance of long-lasting plants, back up data in a neutral format in the long term, while having it available for editing.

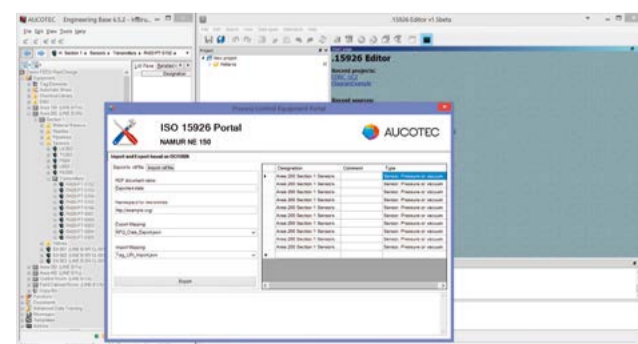
This challenging endeavour needs a lot of time - you can read why standardization projects are so hard to realise in the interview in this Info Paper. ISO 15926 is no different. With its basically open software platform Engineering Base (EB) and as member of Fiatch, AUCO-

TEC is committed in several ways to making engineering more transparent for everyone involved. EB already demonstrated its openness in the VDI/VDE Technical Committee "Integrated Engineering" (see interview on page 3).

### EB demonstrates its practical application

AUCOTEC, in collaboration with EMERSON and Fiatch, showed in a pilot project that EB with its flexible data model already complies with ISO 15926. The audience was impressed during the launch of this project at the Fiatch Annual Conference 2014. EB was able to completely map the neutral format definition for the specified task. It is currently the only integrated multidisciplinary engineering platform which has demonstrated that it is fully compliant with the ISO 15926 semantics, templates and the data model that were developed so

far. This puts AUCOTEC right at the front when it comes to backing up customer data even in the more distant future.



> Engineering Base: Already ISO 15926-Compliant



Image: Folioia/psdesign1

# In a class of its own:

## Intelligent pipe structuring with certified pipe classes for faster and safe engineering

**AUCOTEC has developed a new function for the process engineering-oriented version of its software system Engineering Base (EB), which now makes the piping that is defined in P&ID a lot "smarter".** This allows information on the flow direction, media, temperatures and pressures to be added to the P&ID. The automated target tracking shows both the beginning and the end of the piping as well as the topology of all sub-segments with all connected components such as valves, pumps, flaps or flanges.

The flow direction gives rise to the sequence of devices, which is important for pipe manufacturers and the 3D connection. The topology information forms the basis of the subsequent isometric drawing, which can never be fully derived from a

P&ID. Each piping segment knows to which main pipe it belongs, the devices which mark the beginning and end, and the sub-segments that are involved. In addition, EB automatically displays the standard representation of the connection types for the piping, which is usually determined by the medium.

### Class: tested and certified

By making the pipes in EB "smarter", AUCOTEC has laid the foundation for supporting pipe class-based workflows. The pipe classes define which media the pipes must withstand and under which conditions. AUCOTEC will be providing an initial view of the next stage of development of the workflow at AICHEM 2015. When installing devices in the piping, the workflow will not only provide for rapid selection of materials

guaranteed to match a given pipe class, from the pump right through to the flange bolts, but also pipe classes certified by TÜV Rheinland as meeting current national and international standards, including their documentation.

Thus engineers are on the safe side: without time-consuming researching and calculating, without unnecessary errors, corrections and downtime!

# "The bottleneck in plant design"



**Dr. Rainer Drath (44), Senior Principal Scientist and Research Area Coordinator at ABB, on the subject of "Standardization in Engineering" and how you can finally manage it.**

**Data format standards for improved exchange of information are a topic that has been around for decades. Why is it taking so long?**

**Dr. Drath:** There are several factors: The most important one is a typical chicken and egg situation. Standardization is waiting for the users without whom no standard can mature; users are waiting for software support for the standard and the software manufacturers are waiting for the finished standard before

they start costly developments. A second factor is the often loss of transformation of data due to the variety of tools used between, for example, drawing-based or object-oriented data, complex or flat structures.

Also the approach of many bodies to bring all aspects of an application domain into a comprehensive "universal model" and to normalize them in extensive literature makes standardization difficult. Like a ship that is only allowed leave the slipway if it is "waterproof" in the truest sense, such comprehensive models can only be used when they are completely finished. We need much more agile and more flexible standardization methods like the NAMUR data container.

Some companies' concern about their market position if their data is transferred to rival products also inhibits progress. And finally, it is important for everyone involved to reap benefits. So far, it has been the data recipient who has mainly benefited from facilitated exchange, the supplier has only more work.

**Why is standardized data exchange becoming increasingly important?**

**Dr. Drath:** The increasing cost and time pressures and the growing complexity of design data make data exchange the bottleneck in plant design. More and more plant devices are

becoming increasingly intelligent and want to participate in the communication network. Depending on the application, engineering accounts today for up to 50% of the cost of an automation solution. This is why Industry 4.0 is such an important issue: the linking of the diversity of devices and machines from different manufacturers into one network is possible only with standardization. The same applies to the exchange between the planning tools of different manufacturers.

**The interaction between engineering and control system data is particularly important in the process industry. Why?**

**Dr. Drath:** This is a prime example. Here, the plant is designed from a process perspective. The main result is the P&ID in which the control engineering requirements are also specified. It would be a major simplification if these requirements could be automatically transferred to the control engineering design tools because inconsistencies between the two domains have required a huge maintenance effort for decades.

**How are these systems linked today?**

**Dr. Drath:** Surprisingly often manually; which is no wonder when P&IDs are still being printed on paper, faxed, and covered with handwritten notes. Most P&IDs are still created with drawing-based tools that in fact replace only the pencil of the last century. It is almost impossible to obtain meaningful, reliable data automatically.

Another established means is the exchange of Excel sheets. This is extremely inappropriate, however, especially in the context of iterative engineering (repeated execution of a process): the tables are always constructed differently, changes can be difficult to calculate, and a change management is hardly available. This is where the advantage of standardized data formats comes in because they enable such functions perfectly without having to develop them again.

**If standardization is to succeed, what needs to change?**

**Dr. Drath:** Firstly: consistent use of an object-oriented data modelling instead of lists, tables and drawings. Secondly: separation of the data formats from the data models, thus from syntax and semantics. Thirdly: splitting the required data into manageable and independent mini models. Fourthly: prioritization of the models that are actually required and their gradual

standardization plus practical application. And finally, as the key to initial results: consistent use of flexible data formats which can save and link both standard mini models as well as proprietary data.

Thus the deadlock could be resolved amazingly easily and standardization with small, yet fast results would be possible.

**What standard do you consider to be the most promising?**

**Dr. Drath:** In the Technical Committee "Integrated Engineering" of the VDI/VDE Society for Measurement and Automatic Control, we opted for AutomationML after thorough research. Technically, the format supports all aforementioned requirements. However, the amazingly low development effort due to good software interfaces dispelled any remaining doubts. The first working AutomationML interface could be programmed in a few hours for several tools, including AUCOTEC's object-oriented Engineering Base (EB).

**EB can be easily and closely linked to all standard control systems. What experiences have you had?**

**Dr. Drath:** EB is a platform in which individual functions can be implemented as it can be adjusted flexibly. Data and functions can be easily accessed via APIs. AUCOTEC was one of the first companies to develop an AutomationML interface for the NAMUR data container and to make a professional impression with a clever implementation. EB is used internally at ABB, for example, in the area of mining, and has proved to be a very time-saving tool since its integration into the ABB process control system 800xA. AUCOTEC drew my attention with its open and innovative corporate culture, which not only says what it thinks, but also does what it says.

**Thank you very much for this interview, Dr. Drath!**



Images: Südzucker AG

## Energy boost for engineering

“One installation, one database, one training session”: Europe’s largest sugar manufacturer optimizes its processes with Engineering Base

In 1926, five individual companies joined forces to form Südzucker AG in Mannheim. With roughly 18,500 employees, the company is now Europe’s leading provider of sugar products and holds significant market positions in the specialties, CropEnergies and fruit segments. In 2011, Südzucker sought a cross-disciplinary system for the documentation of its engineering processes and maintenance. The company required a system which would clearly consolidate all disciplines from the 2D representation of process engineering via piping lists and instrumentation and control engineering overview plans up to electrical detail engineering. Following comprehensive analyses, the decision was made in favour of Engineering Base (EB).

### Expertise secured!

The challenge which the company faced was widely varying documentation with the most diverse formats and quality. It amassed over decades in various production locations throughout the world due to the use of various tools and standards. “As well as lacking commitment, we also had no central documentation storage and we wanted to secure our wide-ranging expertise”, explains Josef Jakob, Project Manager in the Central Engineering Department at Südzucker. Prior to EB, all information was at times in small individual databases and drawing files that were maintained separately. The Design, Process Engineering and Electrical Engineering Departments spent

a lot of time consulting, which is now unnecessary due to EB’s central data model.

### Unique

“The holistic approach of EB was the most important criterion for us. Added to that is the fact that the database is absolutely consistent – this is unique”, says Jakob. EB also optimally meets the requirement to be able to integrate and use older graphics and data as well as support multi-site work. That the platform also allows close connections to all standard process control systems and has already provided experience from the process industry as an established system were further advantages.

From the initial idea to the sensor in the field “Thanks to Citrix technology, we now need only one central installation in the Data Centre, one database, one training course,” reports the project manager who is responsible for the planned implementation in all European plants, “which sets universal standards. Multilingualism is also a major help.” He sees the central maintainability of plants as a particular advantage also. “With EB, we cover the entire spectrum of engineering from the initial idea to the final sensor in the field!” Integration in terms of SAP and 3D is planned. “EB’s openness is ideal for this process”, concludes Josef Jakob.

## “The right track”

Industrial filter specialist LÜHR FILTER uses Engineering Base for its process engineering

LÜHR FILTER GmbH & Co. KG is a globally operating family business with over 75 years of experience in the development and construction of air pollution control plants. The product range includes all components from the gas transfer up to the stack, while engineering, customer service and maintenance services complete the offering. Global references in various industrial sectors from power generation via iron and steel to asphalt or chemicals are proof of the efficiency of the plants which filter up to 1 million cubic metres of flue gas per hour. Important core components are produced in the company’s production facilities in Stadthagen, near Hanover.

### “Learning by doing”

In modernising engineering systems for process engineering, the focus was on the intelligent connection of mass data with the P&IDs. The decision was made in favour of Engineering Base (EB). The fact that the previous system was also from AUCOTEC was not a deciding factor. “We looked around thoroughly”, recounts Enno Muncke, Head of Documentation at LÜHR FILTER, “but the integrated Office world and its really simple, intuitive operation convinced us in the end.” After only one in-house training course, employees were easily able to master all other tasks themselves. “It was ‘learning by doing’ in the best sense of the expression”, reports Muncke.

### Speed through simplicity

As one of the original employees of the Department of Documentation, Dieter Konrade explains what now makes his day-to-day work much easier: “The data record level is much simpler and easier to handle, similar to Excel. The user-friendly worksheets enable us to very rapidly search, find and replace”. He provides a second example: “Previously, I had to constantly switch back and forth between the relevant drawing and list. Now, I can simply drag components via drag & drop from the list to the drawing and see everything at a glance. Overall, I’m just faster with EB. I couldn’t do without it now!”

### Seamless workflow support

Department Head Muncke emphasises the seamless workflow support in particular: EB is already used to design the rough plant diagram for quotations. Once an order has been placed, LÜHR FILTER creates the P&ID based on it and includes such details as numbering, consumers or even piping with length specifications. EB automatically generates the resulting lists, for example, for tags. “All aspects are clearly based on each other and the overall picture is very easy to follow. We avoid wide scale duplication of entries and corresponding associated errors”, Enno Muncke reports. “We are on the right track completely with EB”, he concludes.



Image: Lühr Filter GmbH & Co. KG

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



ABB S.A.  
Santiago | Chile



Adasa Sistemas SA  
Barcelona | Spain



Consultoría Colombiana  
Bogotá | Colombia



Klauke Slovakia s.r.o.  
Dolný Kubín | Slovakia



Linnhoff India Private Ltd.  
Mumbai | India



Stadler+Schaaf Mess- und Regel-  
technik GmbH  
Zwenkau | Germany



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Kopřivnice |  
Czech Republic



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