

*KSB expedites product development with Unigraphics and SAP PLM*

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*Customer-oriented product development is key to pump and valve producer KSB AG. The portfolio comprises pumps, valves and systems for the transport of liquid media. The products range from standardized duplicates to made-to-customer parts with a lot size of one.*

*In order to market the products even faster, KSB replaces its 2D CAD programs by 3D CAD system Unigraphics and integrates it into SAP R/3. By this system reorganization KSB has been able to shorten development times, and to realize a continuous electronic process chain: ranging from the offer phase and engineering to product delivery. DSC Software AG supported KSB in introducing this solution.*

„Efficient processes are achievable only in case data and processes are seamlessly integrated, and linked with the backend system,“ explains Bernhard Adelhardt, Project Manager at KSB. „We use SAP R/3 as backend system which also represents our company-wide PLM platform. Step by step we replace existing hard and software in engineering by the integrated Unigraphics solution. Among others, our chief PLM requirements are a location-spanning data availability, and the complete management of all documents at all stages of development“ .



### **About KSB – the future starts with history**

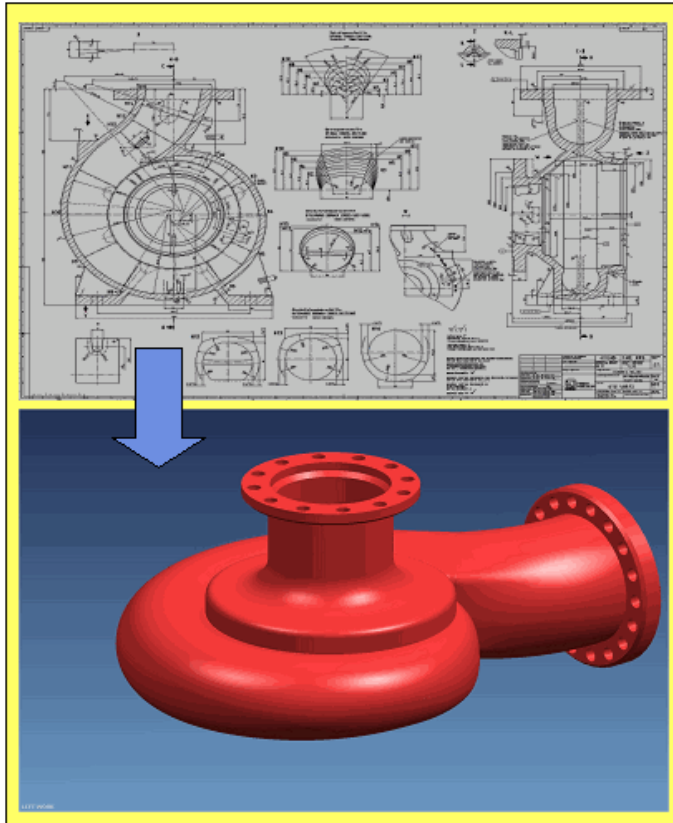
KSB AG is a globally leading producer of pumps, valves and related systems for the transport of almost all types of liquids. Application areas range from building services, industry and water utilities to energy management.

Founded 1871 in Frankenthal (Palatine) the company has a global staff of about 12,000, and in the financial year of 2003 had a turnover of 1,178 billion Euro.

### **Custom-made products**

In order to still provide tailored pumps and valves to customers with even reduced lifecycle costs, changes in product development were necessary.

This objective to achieve involves more innovation, decreasing cycles of development projects , and to cut times in half. In addition, variants with the customer were to be increased while reducing complexity at the same time. This involves improvements in component reuse rates, and in the application of development platforms.



**Fig. 1: The change from 2D CAD to 3D CAD allows a faster product development (Source: KSB AG).**

### **Strategic reorientation in product development**

The realization of the company objectives resulted in a strategic reorientation in product development. The existing CAD system landscape was consequently harmonized and fundamentally renewed. Along with it, SAP R/3 was introduced for uniform and company-wide management of all product data.

Until 2002, KSP used 2D CAD systems ME10, Euklid, AutoCAD, ICEM DDN, and I-Deas. „These systems are technological mature. They offered little additional streamlining potential. In order to even better tailor and develop innovative products to meet customer request faster, we decided for the 3D CAD system Unigraphics,“ explains Karsten Kreher, Head of IT Research and Development. Since the introduction of the new system, all new products are exclusively engineered with Unigraphics. At KSB, Unigraphics along with SAP R/3 is classified as strategic standard solution. „Thus it stood for reason to integrate both solutions, and to standardize our processes,“ comments Kreher.

## In three months to a productive PLM system

Beginning 2002, KSB decided to use SAP R/3 to manage product data. „Decisive were functional but also strategic aspects,“ emphasizes Kreher.

KSB realized the project in two phases. In phase 1 only absolutely necessary functions were introduced. In phase 2 the integrated SAP solution was gradually expanded. This procedure provided fast benefits with minimized project risks, and high user acceptance.

### Phase 1 – Limitation to essential functions

In phase 1, from January to April 2002, the SAP PLM Integration for Unigraphics for SAP R/3 4.5 was installed. In parallel, the as-is situation in engineering was analyzed. Based on alternative system settings, the KSB project team tested several options to design the system. Then the team defined the requirements for the new system in form of a realization concept. In March 2002, implementation was done by DSC. After final system tests and system approval, engineers were trained. Beginning April 2002, data management went productive.

The tight time frame required a firm procedure focussing on the essential functionalities of the integration solution. To this end, KSB defined imperative functionalities, and other to be introduced later in phase 2. This allowed to reduce the complexity in introducing the solution, and quickly showed visible and measurable success. The same effect was aimed at in eliminating the descriptive numbering system, and in introducing an automated numbering system. In addition, a uniform frame layout for all DIN formats was introduced, and the graphical user interface became English only.

Since the solution went productive in April 2002, all meta data is managed exclusively by the central SAP R/3 system. Document originals are saved to the SAP vault at the respective company location. The integration solution ensures that 3D models and derived drawings have the same assigned number.

ZKM – Models with neutral file
ZMM – Member of a part family
ZMT – Master of a part family
ZDK - 2D drawing derivation incl. neutral TIFF file
ZNF – Neutral format, e.g., STEP, IGES, special customer formats

Fig. 2: Document types for development.

For product development several document types were set up. On creating a new document numbering of the part document starts with 001. In case several drawing sheets exist in Unigraphics, on release all neutral formats of the respective drawing sheets will be summed up in a multipage TIFF document, and saved together with the Unigraphics drawing file

KSB uses the automated version management of the SAP system. On creation the version counter is set to 01. After release, changes are assigned to the next higher version. On release the status of the predecessor is changed to „detached“ by an user exit, and locked.

The drawing header is automatically completed by SAP standard object attributes, or by departmental-specific attributes from classification, such as, pump type, rotation speed.

At KSB, English is the company language. The title block will always hold the English label. In SAP the respective country language is maintained in field label text 2, and displayed in the drawing title block.

Today engineers create important body data of the material master in basic data view 1 and 2. They maintain the fields material number, material description, base unit of measure, weight and material code. Employees in the engineering department link the material master record with the respective document info record.

### **Training and communication – basis for the sound solution acceptance**

The introduction of Unigraphics and the integration solution into the SAP R/3 system took place simultaneously. From day one, engineers learned to save and load their components in the SAP system.

In order to ease the change from two to three-dimensional operation method, key user were intensively trained in modeling with Unigraphics before the solution went productive.

„We did not let all engineers change to the new CAD system at the same time. Top premise was not to break the flow of product data,“ explains Kreher. Engineers got a basic training, and when necessary were able to deepen their knowledge in additional courses. Jointly with on-site trainer, they processed current customer orders in 3D. In addition, key user with their know-how were available.

With Unigraphics KSB introduced a product type related engineering method easing data changes and data display transparency. To automate engineering processes, supporting resources, such as UG Tools, were customized to KSB requests, and installed.

Together with the company-wide Unigraphics discussion forum in the KSB intranet these measures were responsible for a high user acceptance of the solution. Informing the employees was a good basis for project success.

Forum	Topics	Posts	Last Post
<b>Announcements / Ankündigungen / Annonces</b>			
<b>KSB Rules / KSB Richtlinien / KSB Prozesse / Règles KSB</b> Publication of current rules / Veröffentlichung gültiger Regeln / Publication des règles actuelles Moderator: Forenadministrator	1	2	Wed Dec 11, 2002 2:09 pm <a href="#">tullrob</a>
<b>General Information / Allgemeine Informationen / Information general / Informations générales</b> information relevant for many people / Informationen die für viele wichtig sein können / Informations concernant tout le monde Moderator: Forenadministrator	11	12	Thu Apr 10, 2003 3:12 pm <a href="#">hosppee</a>
<b>Unigraphics</b>			
<b>UG Modeling &amp; Drafting, UG Tools, UG Normparts</b> Construction of 3D parts -> 2D drawings / Konstruktion von 3D Teilen und Ableitung von Zeichnungen / Construction pièces 3D -> dessins 2D Moderators: UG_Keuser, Forenadministrator	9	17	Mon Apr 28, 2003 10:49 am <a href="#">berndol</a>
<b>UG Assemblies &amp; Freeform Modeling / UG Baugruppen &amp; Freiformflächen / Assemblage UG et surfaces évolutives</b> assemblies & freeform related topics / alles was mit Baugruppen & Freiformflächen zusammenhängt / Points relatifs aux assemblages et surfaces évolutives Moderators: UG_Keuser, Forenadministrator	0	0	No Posts
<b>UG CAM, UG FEM</b> computer aided manufacturing & finite analysis / Fertigungsunterstützung und numerische Analysen / FAO et analyse par éléments finis Moderators: UG_Keuser, Forenadministrator	0	0	No Posts
<b>Data Exchange / Datenaustausch / Echange de données</b> ProEngineer / AutoCAD / CATIA / IGES / STEP / DXF/DWG / Suppliers, Partners / Zulieferer, Partner / Fournisseurs et partenaires Moderators: UG_Keuser, Forenadministrator	0	0	No Posts
<b>Related Systems / Verwandte Systeme / Autres systèmes</b>			
<b>SAP Interface / SAP Schnittstelle / Interface SAP</b> all UG data management topics / alles was mit UG Datenverwaltung zu tun hat / Gestion des données UG Moderators: UG_Keuser, Forenadministrator	0	0	No Posts

Fig.3: The Unigraphics discussion forum in the KSB intranet promoted acceptance of the solution with the users (Image: KSB AG).

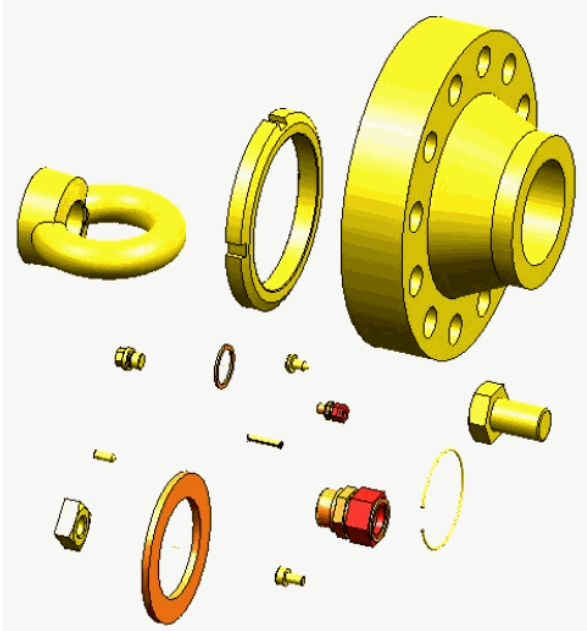
## Phase 2 – Gradual roll-out and solution optimization

In phase 2, from April 2002 to October 2002, the existing integration solution was gradually introduced in all KSB locations involved in product development in Germany, France, and India. In addition, the solution was systematically expanded:

- introduction of company-wide release processes and status networks
- introduction of a signature in the release process
- distribution of digital documents
- introduction of an authorization concept
- revision and maintenance of a class system for documents and parts
- conversion and stamping

## Automated conversion

For an automated conversion KSB implemented the DSC solution ++convert. On defined status changes in the SAP system the conversion process is triggered, and viewing/archive files are generated in TIFF format. Multisheet drawings are automatically converted to multipage TIFF files. Together with the updated Unigraphics original these files are stored in the SAP filing system – at KSB currently the SAP vault.



*Fig. 4: Unigraphics standard parts are managed by the SAP R/3-System. The access is managed by SAP classification (Image: KSB AG).*

### **Integration of 20,000 standard parts**

As a manufacturer of products with variants it is important for KSB to quickly retrieve already engineered parts. By characteristics, such as, pump type, model, size, or type of transport, as maintained in classification, engineers are able to access relevant standard parts. In the future, the SAP classification will be available to all other KSB employees, for example, in production, sales, or in preparation.

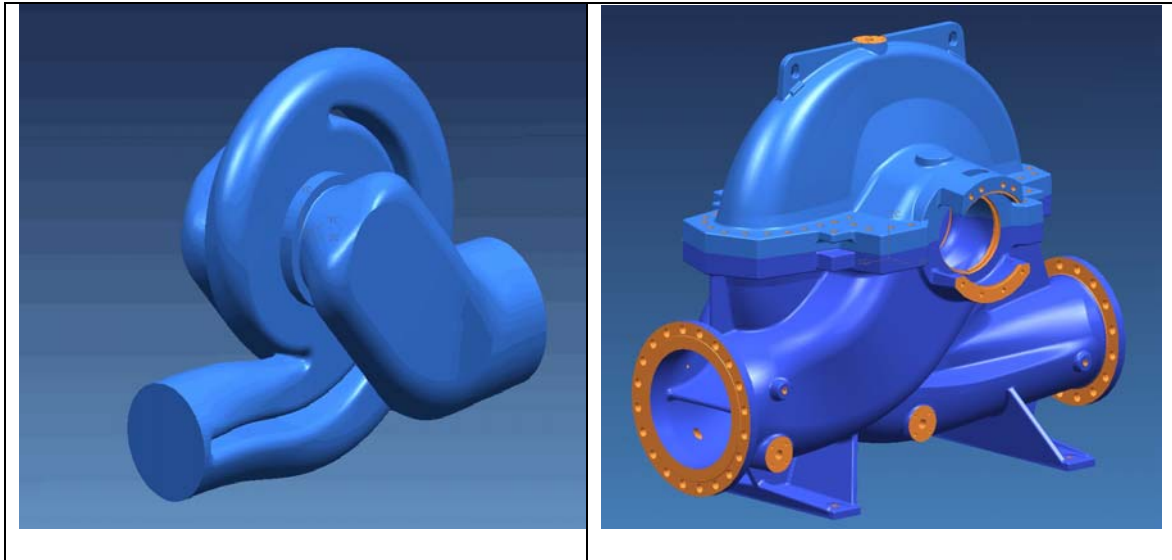
Today over 20,000 classified standard parts are available at a key stroke. To this end, meta data and geometry data from several DIN series have been imported to SAP R/3 by a primary loading process.

First, all master records of a standard series already created in SAP R/3, the so-called preference assortment, were automatically assigned to their physical specification or part instance in the DIN class list of characteristics.

Next – again fully automated with the software REMARC of ARC Solutions – attributed Unigraphics parts in 3D and classifying characteristic records, so-called transfer files, were created.

Finally, Unigraphics part files were checked in into SAP R/3, and the document info record linked with the material master record.

Maintenance and extension of the assortment follows the line of the primary loading process. A new material master is created in SAP R/3, the standard part is created in REMARC as attributed CAD part including related meta data, and the checked in into SAP R/3. The meta data completes SAP objects document and material master. Moreover, document and material master are linked, and the document is released.



*Fig. 5: At first, the „wet volume“ is modeled with Unigraphics (left), then following the respective surrounding pump casing (right) (Images: KSB AG).*

## Seamless integration of CAD- and ERP – a quantum leap for KSB

Today development and management work on the same platform using the same documents. „Continuous engineering data is a strategic competition factor for KSB,“ judges Kreher. Not only materials, BOMs and released documents but also ideas and sketches are managed in the system. Today all authorized employees are able to access engineering data: a simple SAP GUI is sufficient.

„Significant for the project success were a taut project organization, and a competent project team consisting of own employees and external consultants of DSC Software AG,“ declares Project Manager Adelhardt.

### Outlook

„Further developing the solution is an on-going process. Next we will manage further PLM – relevant objects in the system, and realize additional projects in the area if globalization“, says Kreher.

### User contact

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