The integrated beverage plant

IT solutions for greater cost transparency and higher productivit

Plant iT from ProLeiT AG is an integrated production control system for beverage production – a Manufacturing Execution System (MES) that combines business IT with operational process control. Besides organising the execution of production orders, the MES also monitors technical processes and production specifications online, while displaying the status of the entire plant.

Imagine having the peace of mind that your beverage plant is always running at a profit. The system presents production data in real-time, automatically assign actual costs to each order and analyse online whether the plant is running efficiently. The shift supervisor would have an overview of the entire plant on his screen and be able to react to any problems before there is an impact in production. The specifications of the current product would be displayed as a tachometer in order to intervene immediately and effectively if values exceed the prescribed level. This is not just a beverage plant pipe dream, but a solution that is already up and running in numerous companies – realised with Plant iT, the production and process control system from ProLeiT. ProLeiT systems for technical IT provide the answers to many of the questions asked by the beverage plant management on a daily basis: “How can we best utilise the capacity of our plant? In addition to our own products, we also produce well-known brands and are a bottling subcontractor, but can we afford to take on small special orders?”

The technical manager’s major concern is: “The master recipes of new products quite often have to be adapted during the introduction stage. Does this process require an external programmer for every recipe? And how can we handle the regular product changes more efficiently?” The quality manager is worried about adherence to statutory requirements: “Which process changes are necessary to comply with common production standards, such as „International Food Safety“ (IFS)? Can we ensure perfect product traceability to guarantee complete safety?” All these thoughts lead to a key question: “How do we obtain current production data in order to be able to decide and react accordingly at any time?” The initial survey carried out by the ProLeiT team shows that this question is not so easy to answer. The construction of a beverage plant usually demands the participation of many machine and plant suppliers, with each focusing on their own specific roles. Supplier A provides

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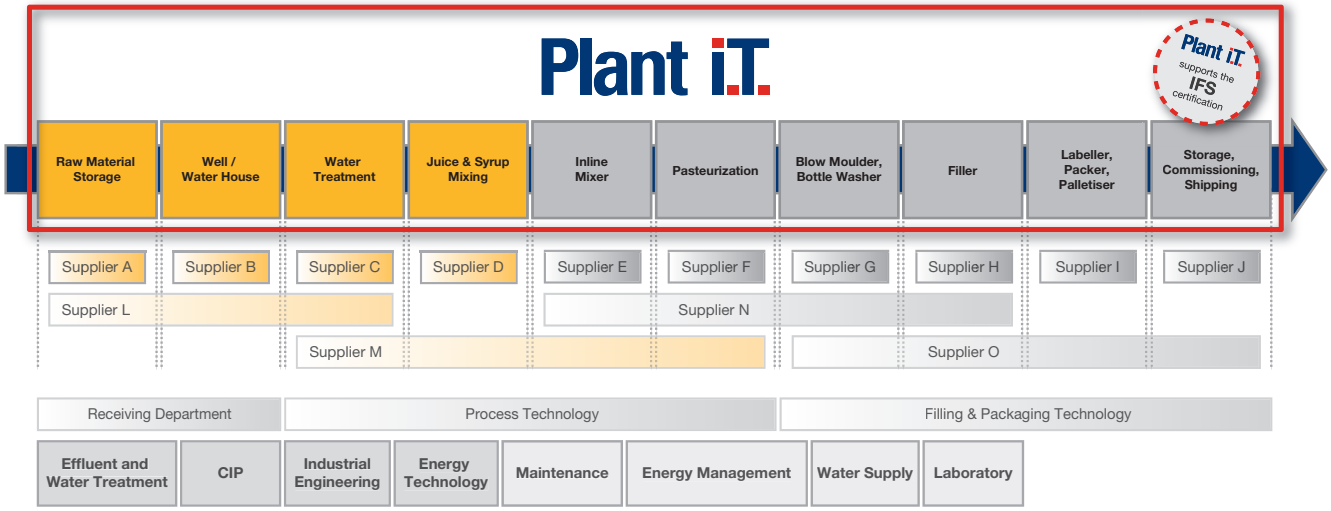
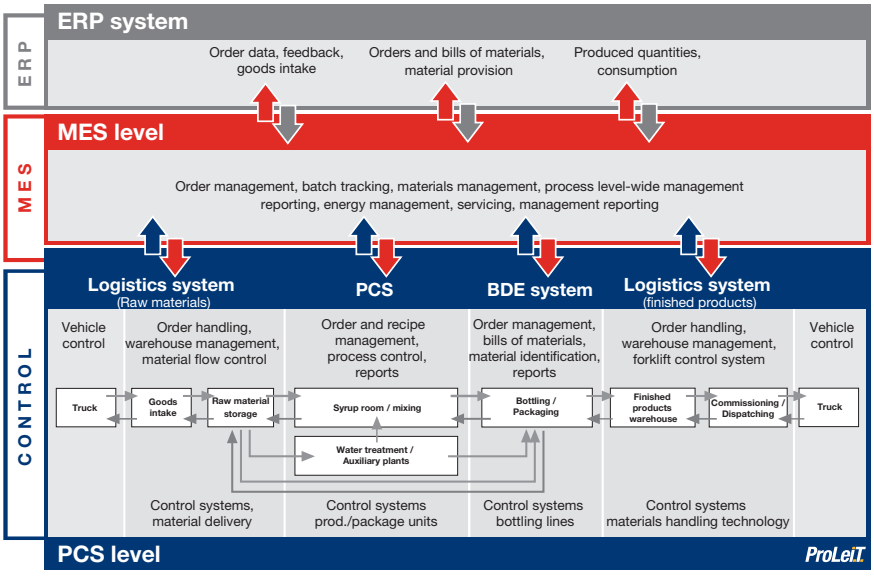


The numerous plant manufacturers involved in a beverage plant introduce various operating and control systems. The production information remains distributed across the whole plant, there is no continuous flow of data.



The new MES level combines business IT with operational process control.

the water treatment system, supplier B the syrup room, …, quite often several suppliers are responsible for the bottling plants. Each machine manufacturer uses a different operating or control system that usually only maps the part of the process that runs at their own machine.

The entire process is rarely taken into account – and not to mention the complete production process. Information thus remains distributed across the whole plant, with neither a common database nor a continuous flow of data. As business planning tools are disconnected from operational procedures, transfer of production order information is paper-based. The accompanying sheets are transferred from one processing station to the next and it requires a considerable amount of effort to ensure the flow of information remains intact. Production data is recorded manually and often entered into the ERP system one day later, with the associated risk of data input errors. It is therefore impossible for supervisors to monitor the entire production process and to guarantee its plant-wide control. Of course, this situation cannot be rectified overnight, but ProLeiT demonstrates how you can gradually achieve the goal of an integrated process control system.

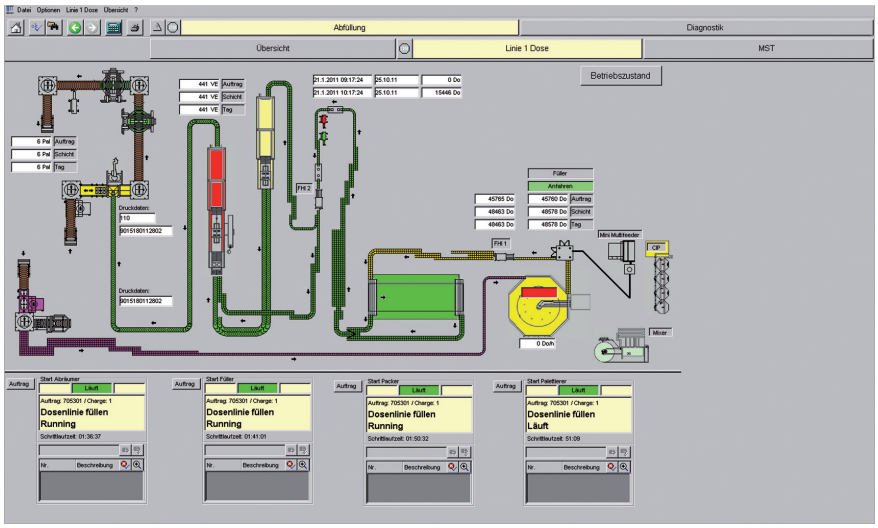
Integration through MES

ProLeiT installs an integrated production control system – a Manufacturing Execution System (MES) – at a new level above the heterogeneous process control technology. The MES forms the link between business IT and operational process control. It organises the processing of production orders and monitors technical processes and production specifications, while displaying the status of the entire plant. During the technical realisation stage, engineers connect all the individual systems of the process control level to the MES. This usually involves the use of database interfaces; or the systems are alternatively connected directly to the controllers and operating terminals. Fragmented islands of information are thus transformed into an integrated IT landscape. ProLeiT then links its system to the higher-order business IT usually an enterprise-resource planning system, such as SAP or Navision. The MES uses the production orders issued by the ERP system to generate individual orders and to adapt them to the specific plant: for instance, to manufacture a syrup, to mix a drink in a batch container, …, right up to bottling and packaging. While the order is being processed, the MES automatically collects and compresses current production data before relaying the prepared data to the ERP system, where it is evaluated in terms of its commercial viability. Since the MES runs on a separate server, it continues to operate even if the connection to the ERP system is temporarily interrupted.

Trouble-free implementation of the MES demands extensive preparations. Andreas Rösch, project manager at ProLeiT, describes this planning stage: “We initially get everyone involved in the project around one table, as the laboratory, production and management each has different requirements and demands. We support and help customers optimise the processes and give careful consideration to where which data can be collected. Our goal is a tailored system; the customer should be able to achieve maximum benefits with reasonable investments. If, for example, an operator scans a raw material at the line, its consumption is simultaneously documented in the MES. Wherever the automatic recording of data or the interconnection of technical equipment is too complex, information can also be entered via an input mask.”

Optimisation through transparency

An integrated IT solution provides the beverage plant management with



Detailed view of the bottling line with information on operation statuses, active bottling orders and production counters.

completely new opportunities to control and optimise business and technical processes. The MES automatically collects the data from the current production run; i.e. set-up time. Which raw materials are required / used? How much energy is used? etc. This data is not transferred in a one-to-one manner, but brought into relation with the specified operating, machine and order data. The MES uses this compressed data to calculate the Overall Equipment Effectiveness (OEE) and show where production losses occur. CEOs and plant managers are provided with a plant-wide overview of every order and data transparency – from the operational level to the business planning of production activities. This level of transparency ensures that managers have the actual costs of each order under control and can maximise productions impact on profitability. The technical manager can recognise bottlenecks and plan optimisation-driven investments in the machinery and plant equipment. Product quality is the top priority for all beverage manufacturers. Online integration of the laboratory in the MES allows the laboratory and shift manager to monitor the specifications in real time and to intervene promptly whenever necessary. The monitoring and recording of data helps to optimise recipes and processes, for example the temperature curve during pasteurisation. During production, the MES guides the operator when taking samples, thus guaranteeing a high level of quality. The precise recording of material data for every single order enables batch tracking throughout the entire production process. And the long-term archiving of production data protects the company in the event of a product liability claim. On the basis of the raw material and the mixed recipe, it is possible to produce several versions of a product using an integrated IT system. Since the MES covers every single production area – from the batch processes of the preparation tanks to direct production in the bottling lines – the shift manager can, for example, alter the sequence of orders in order to optimise the plant capacity. Operators of integrated beverage plants can feel confident about the future of their business, even if the market requirements and statutory regulations should change. Many of our customers claim that after implementing MES they were able to answer most of the IFS audit questions. And if the carbon footprint ever needs to be specified on each bottle, no problem: the required infrastructure is already in place.

An integrated process control system

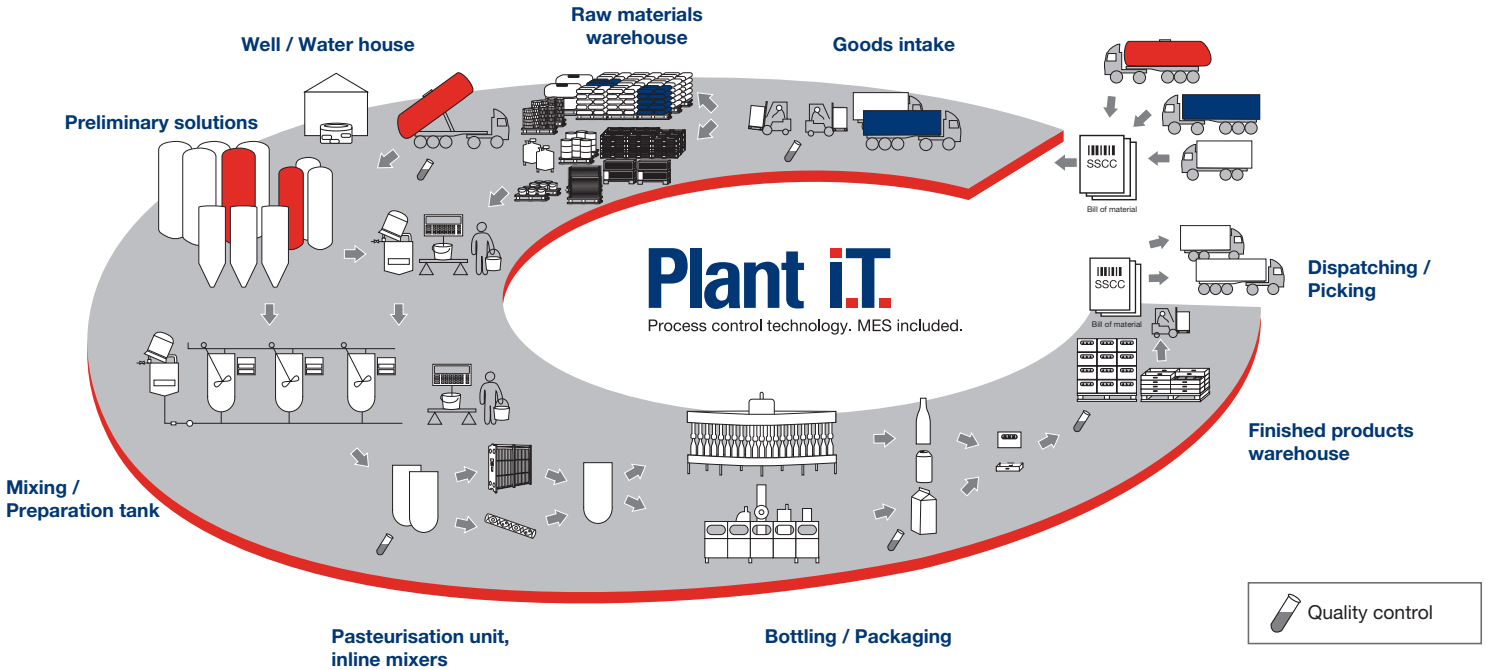
With the implementation of an MES solution, the beverage manufacturer profits from the benefits of an integrated plant. But even if all the plant sections are integrated there is still the problem of the many different individual systems at the process control level. The more systems in operation, the more specialists needed: either members of staff or external service providers for ongoing care and maintenance of the hardware and software. Just as most beverage manufacturers take working with just one ERP system as a given, they should also consider employing an integrated IT solution: an integrated system platform for MES, process control system and line management. The consolidation can occur gradually. It makes sense to migrate the control system to plant sections which are going to be modernised anyway.

ProLeiT has extensive project experience and numerous testimonials in the field of MES solutions in the beverage industry. The Plant iT system range fully supports production and process control in beverage plants. Users real-

„Plant operational management in real-time, can visualise, control and impact plant profitability for each order“

ise every aspect of process and bottling technology efficiently and effectively – from raw material delivery and storage, through recipe-controlled syrup production and the mixing of drinks to bottling, packaging and dispatching. Plant iT is of interest for every type of beverage plant: for both internationally famous soft drink companies and local producers of selected quality beverages. Beverage manufacturers are able to select the products and services they require and which provide the best support for their business model from a tried and tested portfolio of advice, software and engineering services.

ERP	Order dispatching
MES	Execution management
	Specification management
	Resource management
	Data recording & analysis
	Tracking & tracing
PCS	Process control



Concept for an integrated MES solution in a beverage plant