

CONSISTENT CHARGE TRACING

Universal data acquisition with production, bottling and logistics

From January 1, 2005 on, the traceability of products of the food industry will be newly regulated. Then, the EU regulation number 178/2002 which defines legal requirements for producers and traders will become effective. The present article describes an automation solution of the beverage industry which contains a comprehensive logging of charge data in the fields of production, bottling and logistics. On the one hand, the appliance of this future-proof technology makes it possible to meet the current legal requirements, on the other hand, it is easy to react quickly to changes of individual by-laws.

The EU food law imposes due diligence on manufacturers intended to reach clearly defined ends in favour of the consumer: Competent information, health protection and protection against defraud. Food safety is one important term to be mentioned in this context. This indicates that potential hazards with the manufacturing and trading of foodstuffs will have to be avoided by taking precautionary measures. As a result, the enterprises will be obliged to carry out tests – a fact which on the one hand will affect their individual organisation, e. g. as far as the hiring of competent staff and the introduction of quality controls are concerned and, on the other hand, it will also refer to raw materials, packaging materials and other. A further demand is to retrace harmful

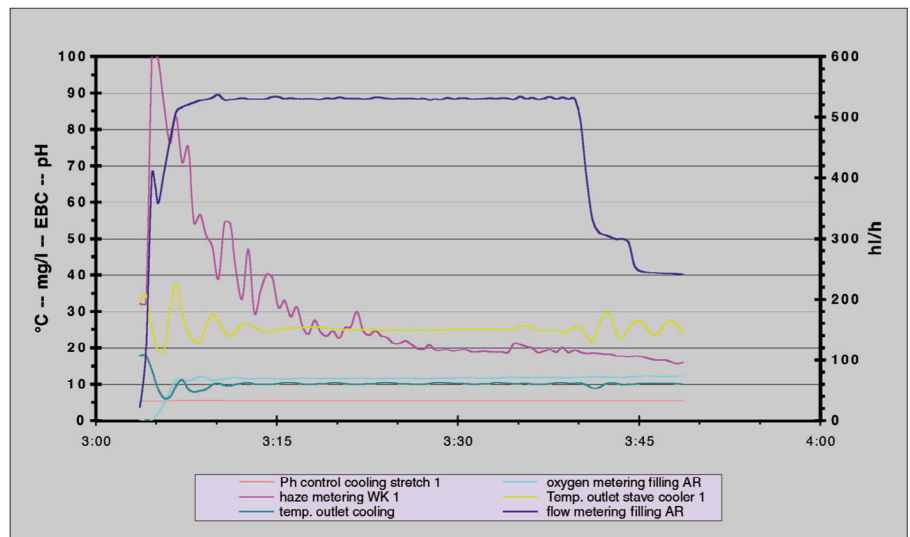
Enclosure 2	Filling report	Juice mixing
Date: 29.04.2004	Start: 27.04.04	
Charge: 25684	Stop: 27.04.04	
Sort: AS	Generated by: S. Müller	

Raw material dosage							
Delivery charge	Start	Stop	Duration	Q-tank	Raw material	Set value	Actual value
No.	Date	Date	hh:mm	No.		kg	kg
16263	27.04.04 03:03	27.04.04 03:08	0:05	15	Apple juice concentrate	1711	1713
25987	27.04.04 03:08	27.04.04 03:11	0:03	29	Sugar	200	203
53719	27.04.04 03:11	27.04.04 03:23	0:12		Demineralized water	9278	9280
53720	27.04.04 03:23	27.04.04 03:27	0:04		Adjustment water	998	1003

Options	
Cooling stretch 01	Yes
Cooling stretch 02	No
Vitamin dosage	Yes
Ventilation	Yes
Water output cooler (start)	No

Options	
Water output end block (start)	No
Water output end block (stop)	No
Water output cooler (stop)	No
Rinse conduction (end)	No
Variety test active	Yes

Target							
Process order	Start	Stop	Duration	Q-tank	Variety	Quantity	
No.	Date	Date	hh:mm	No.		kg	
10002921	27.04.2004 3:48 a.m.	27.04.2004 5:32 a.m.	2:44	AT 6	AS - Multi	12199	



Manual entries					
Parameter	Recording time	Analysis time	Input time	Value	Unit
Vitamin C	27.04.2004 3:11 a.m.	27.04.2004 3:13 a.m.	27.04.2004 3:23 a.m.	3.56	kg

products that have been circulated despite the stipulated quality controls and withdraw them from the market again.

The definition of traceability expresses the necessity of being able to follow the way of a foodstuff or ingredient through all production, processing and distribution stages. Be it „upstream“ (to the origin), or „downstream“ (to the consumer), enterprises must

be able to find any supplier they received a foodstuff from, any client they themselves supplied with a product, or any product they processed. Apart from that, they are obliged to ensure traceability through all processing stages in the factories.

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To manufacturers of juice or syrup products, this precisely means to observe the following: It must be exactly documented who delivers which kind of raw material such as e.g. concentrates, sugar, vitamins, etc.; all production and filling passes, as well as the pursuit of pallets in the logistic field will have to be recorded completely; the purchasers, e.g. hypermarkets, supermarkets and restaurants will have to be recorded in writing, or electronically respectively.

Problem: Close systems

Today, the state of the art in the beverage industry often tends to isolated applications in the field of production and filling as far as the automation is concerned. As for the traceability, this means in most cases that individual product and raw material charges can be only assigned to an arbitrarily grabbed package if records are kept in paper form. This manual process is naturally extremely fault-prone and time consuming, as it is shown by means of a concrete example of the records kept in a company:

- The goods received are recorded on a routing slip in the lorry reception.
- Production orders are given numbers to be assigned to the raw material charges and the executed processing steps.
- During the bottling, further data are generated in order to guarantee the link to the neighbouring process steps.
- Shipment numbers are assigned to retrace a product with the help of logistics

Process stage overlapping solution

It is an almost obligatory concept in this case to install a universal automation solution at the manufacturing base – i.e. from the process control including batch functionality for the mixing, the production data acquisition for filling and packaging plants to the transfer to the logistics by means of a CCG compliant labelling. The plant iT product family of ProLeit is a software based attempt whose modules cover all these relevant partitions with the production

of liquid products: Direct iT for the process control engineering, Batch iT for the Batch system, Acquis iT for the production data acquisition and tracing and Connect iT for the coupling to external systems (SAP R/3, LIMS, etc.).

The integrated automation of a project therefore admits an installation of system solutions which make it possible to realise an automatic data acquisition even with the reception of the raw products. At this stage, other relevant values e.g. Brix degree and acid number, as well as the expiration date are stored in addition to suppliers' data such as the stock receipt number including the possibility of tracing the respective supplier charge. A complete processing and archiving of process, production and machine data makes it possible to form a basis for traceability with production and mixing, or filling and packaging respectively. In addition to that, the ERP system is connected, a system with the help of which orders are stored and acknowledgments to raw product consumption and process data are delivered automatically. The integration of a laboratory information system rounds off an integrated solution.

The result: A complete charge protocol through which one can navigate with the help of few mouse clicks. Due to the linked electronically stored data, a finished product destined for the logistics can be definitely assigned the embodied raw material charges.

Additional level of abstraction

In order to ensure a standardised documentation and display of data for all production processes with grown structures, it makes sense to generate an additional abstraction layer which is independent from

the existing system environment. The software module Plant Trace iT, an Add On to Plant Acquis iT forms such a „data turntable“ which, apart from tracing the charges, can be used for technical reporting as well. This module is used to connect various guidance and visualization systems via standard interfaces.

Thus, e.g. both data from the process controls (e.g. SIMATIC S7) and laboratory information values can be processed accordingly. Manual inputs are also possible if individual partitions of the entire systems are not yet integrated. The guaranteed future of the solution is based on the prerequisite that it can be extended by interfaces to the world of automation systems and business management. Moreover, weak points and interrelations can be made transparent beyond system and process limitations by means of reporting tools that can be parameterized. This makes it possible to compare production lines and test their efficiency if necessary.

Summary

The EU regulation 178/2002 describes new legal requirements as to food safety. One focal point is fixed with the traceability of products from the food industry. These regulations are difficult to comply with if you work with conventional isolated applications. Modern, integrated automation solutions can produce relief here. Despite grown structures, it is therefore possible to generate a charge protocol with the help of appropriate modules designed for data acquisition which includes all passes from the raw product reception to the finished goods ready for shipment. Just for manufacturers of juice and syrup products who have to adhere to a consistent charge traceability, these systems offer the possibility of safeguarding in view of the future. □