



Level



Pressure



Flow



Temperature



Liquid
Analysis



Registration



Systems
Components



Services



Solutions

Extract measurement

09/08/2004

Michael Mies

Slide 1

Endress+Hauser 

People for Process Automation



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Solutions

Basics

Challenge and
history

Solution and
realisation

Success story
Waldhaus

Cost effectiveness

Basics

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People for Process Automation

Spindle: The basic instrument for extract measurement

Basics

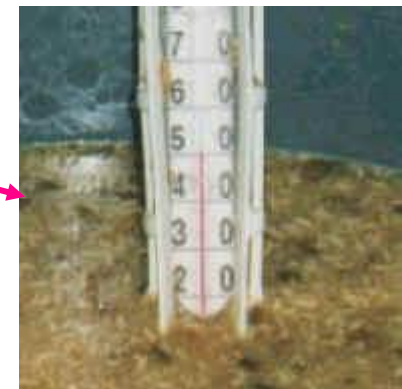
Challenge and history

Solution and realisation

Success story
Waldhaus

Cost effectiveness

Two times every day
Discontinuous
Manual
Needs knowledge and experience
Necessary for quality



Typical curves of fermentation

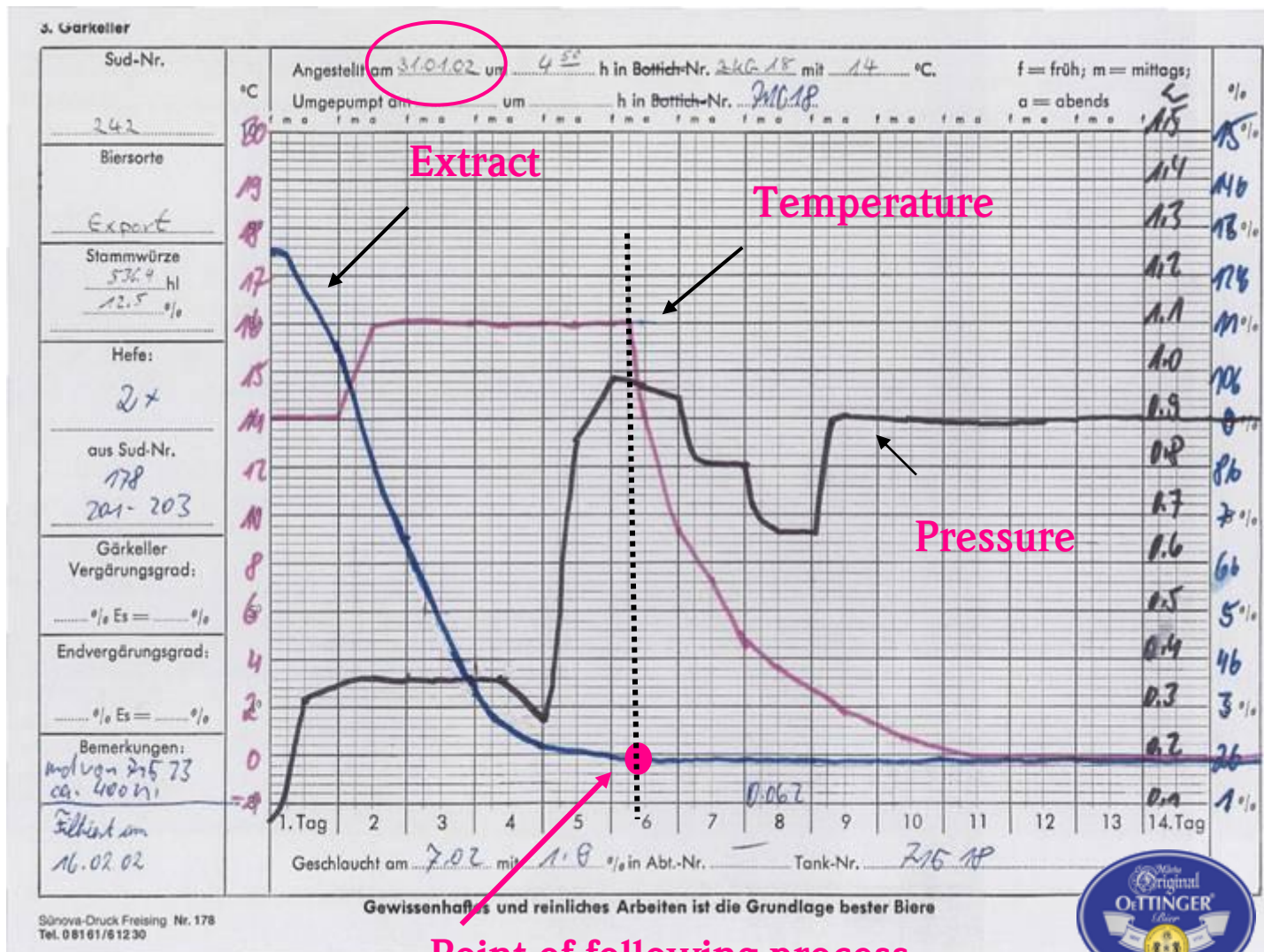
Basics

Challenge and history

Solution and realisation

Success story Waldhaus

Cost effectiveness



Measurement principles for extract determination

Basics

Challenge and history

Solution and realisation

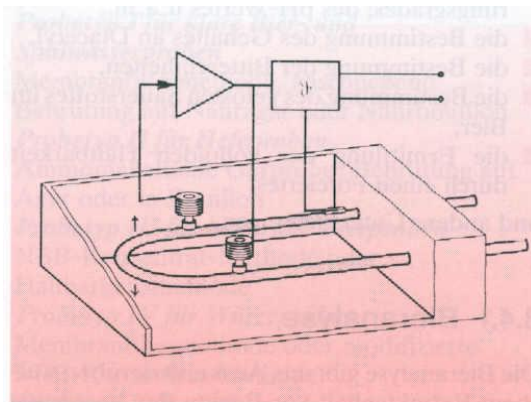
Success story Waldhaus

Cost effectiveness

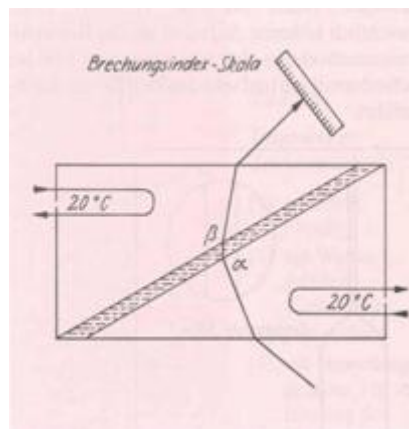
04/02/2013

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Slide 7

Discontinuous, manual



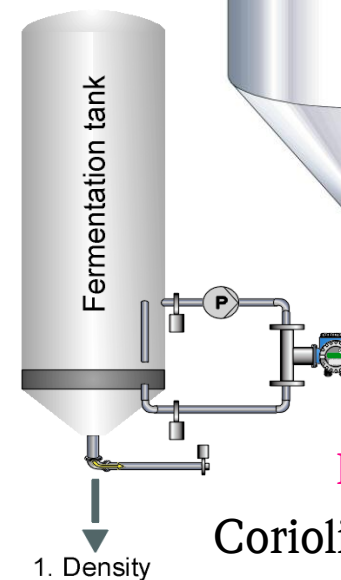
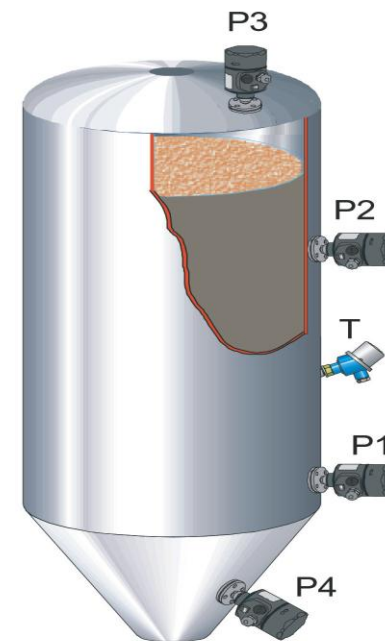
Bending oscillator



Refractometer

Continuous, automatic

Contigrad
Principle



Principle
Coriolis in bypass



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Endress+Hauser 

People for Process Automation



Brewery Oettingen GmbH

Basics

Founded in early middle ages - documents are known from the **year 1333** -; bought by **family Kollmar in Fürnheim in 1956**. The brewery was incorporated into the **Oettinger Group**.

Challenge and history

Solution and realisation

Production of high quality beers with low price - has led the brewery into the **top 5 german beer brewers**.

Success story Waldhaus

Cost effectiveness

Concentration on the **typical business of brewers** - avoiding extensive technical equipment plants as well as any form of media advertising.

Production of „Oettinger Pils“, 6 low fermentation beers, 5 high fermentation beers, 1 malt beer, 1 alcohol reduced beer and 1 alcohol-free beer. Softdrinks are also in the program.

Investment only in **high quality technical equipment**. Highly efficient systems which produce a high quality product, requiring a minimum of expenditure in operation and maintenance with a maximum in availability, are installed.



Challenge

Basics

Because of **reorganisation process control** and **automatisation of production areas**, new ideas regarding process optimisations were found.

Challenge and history

Daily **control of fermentation**, Sometimes two times a day, the brewer has to take samples of beer to define the extract.

Solution and realisation

Reducing **time and money** - but increasing the **process quality**.

Success story Waldhaus

Cost effectiveness

Old cellar has four lines with seven tanks. Test line has to demonstrate efficiency of **online extract** measurement.

Construction of installation has to create **stable conditions** for the measurement.



Method of Resolution

Basics

Challenge and history

Solution and realisation

Success story
Waldhaus

Cost effectiveness

[German Institute Weihenstephan](#) was involved to find ideal construction for installation and probe reservoir - in preparation: degree dissertation.

[Reducing of process troubles](#) - small diameter (DN: 8mm) and using a sample reservoir (volume: 3 Liters).

Increasing the [process control software](#) for controlling extract measurement. Adjusting the software for several additional valves.

Taking beer probe into the probe reservoir, pressurising the reservoir and do a [concentration measurement](#) with PROline Promass 83F08.



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Solution and realisation

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People for Process Automation



Usual situation

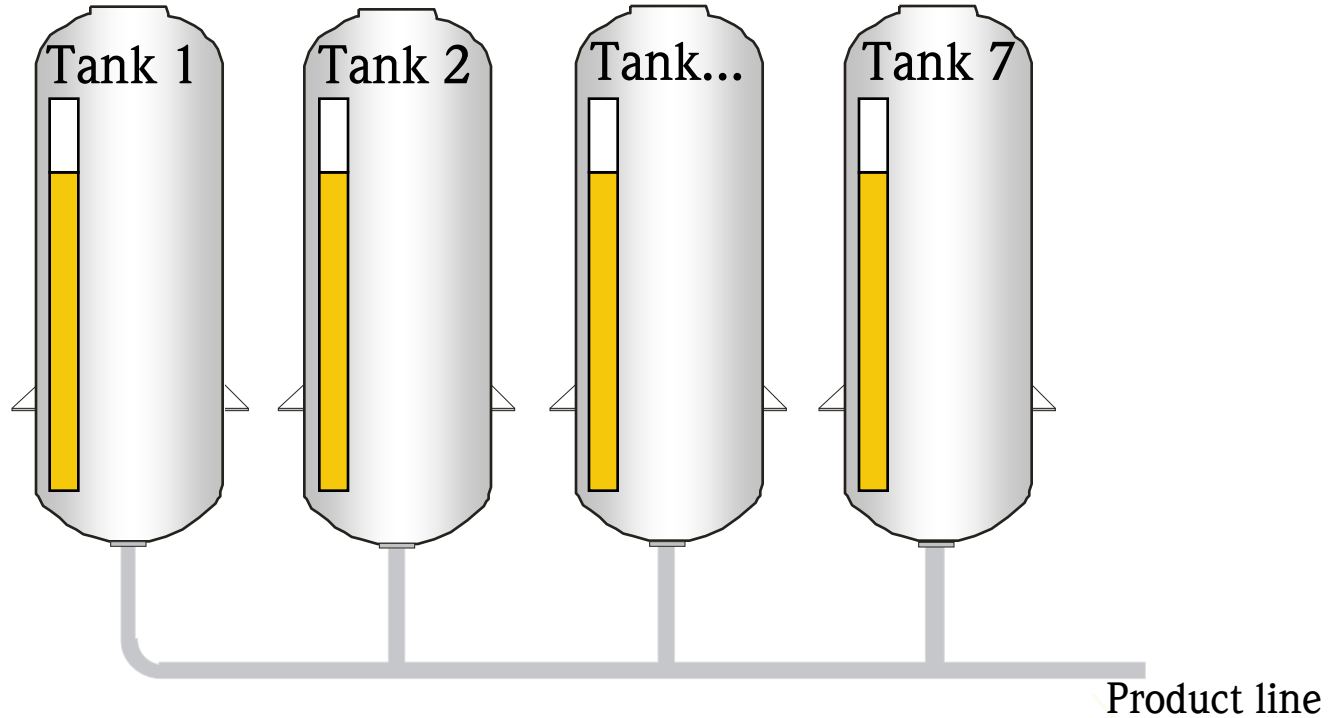
Basics

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Success story Waldhaus

Cost effectiveness



Using “old”,
but gold instruments.





New installation (hardware)

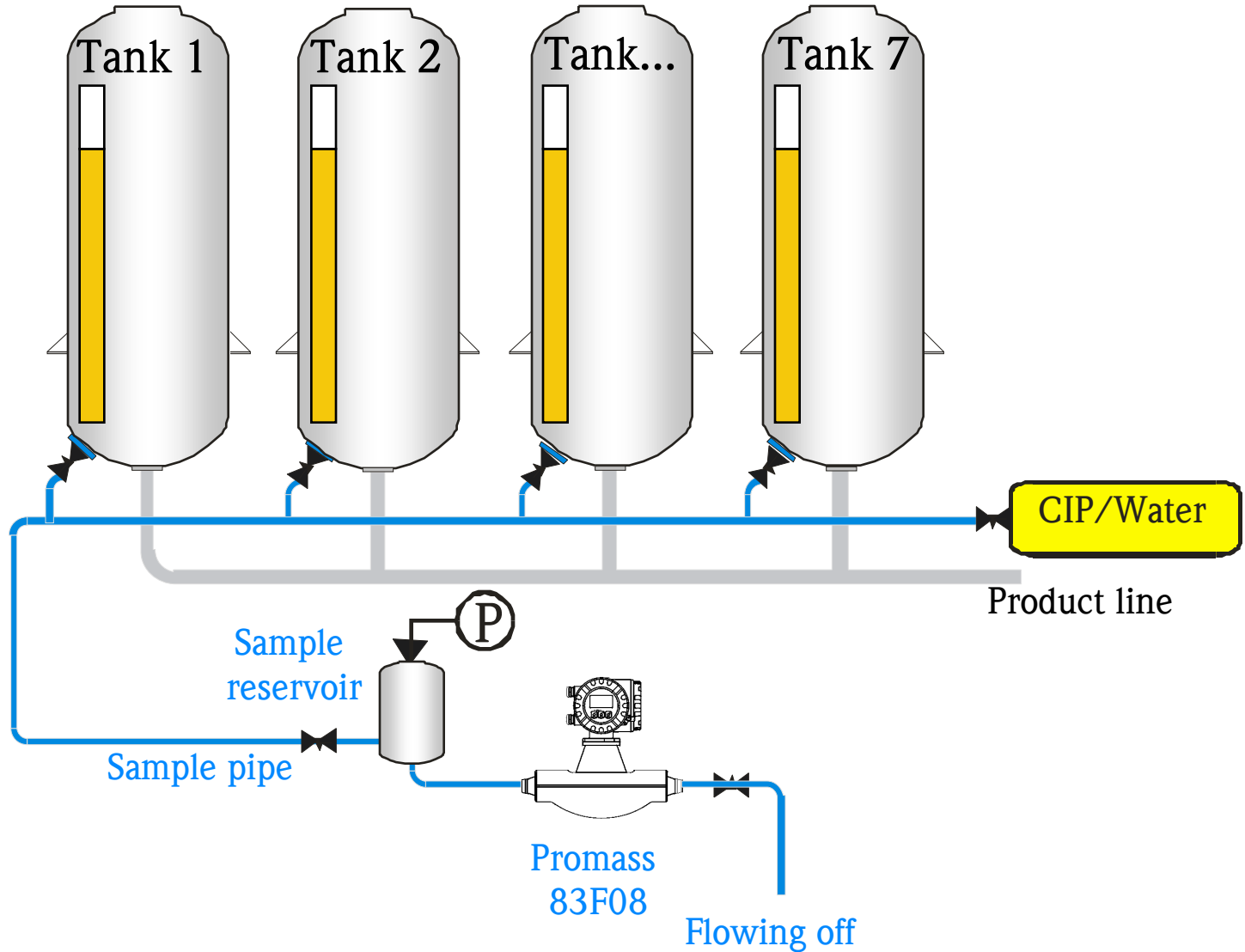
Basics

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Solution and realisation

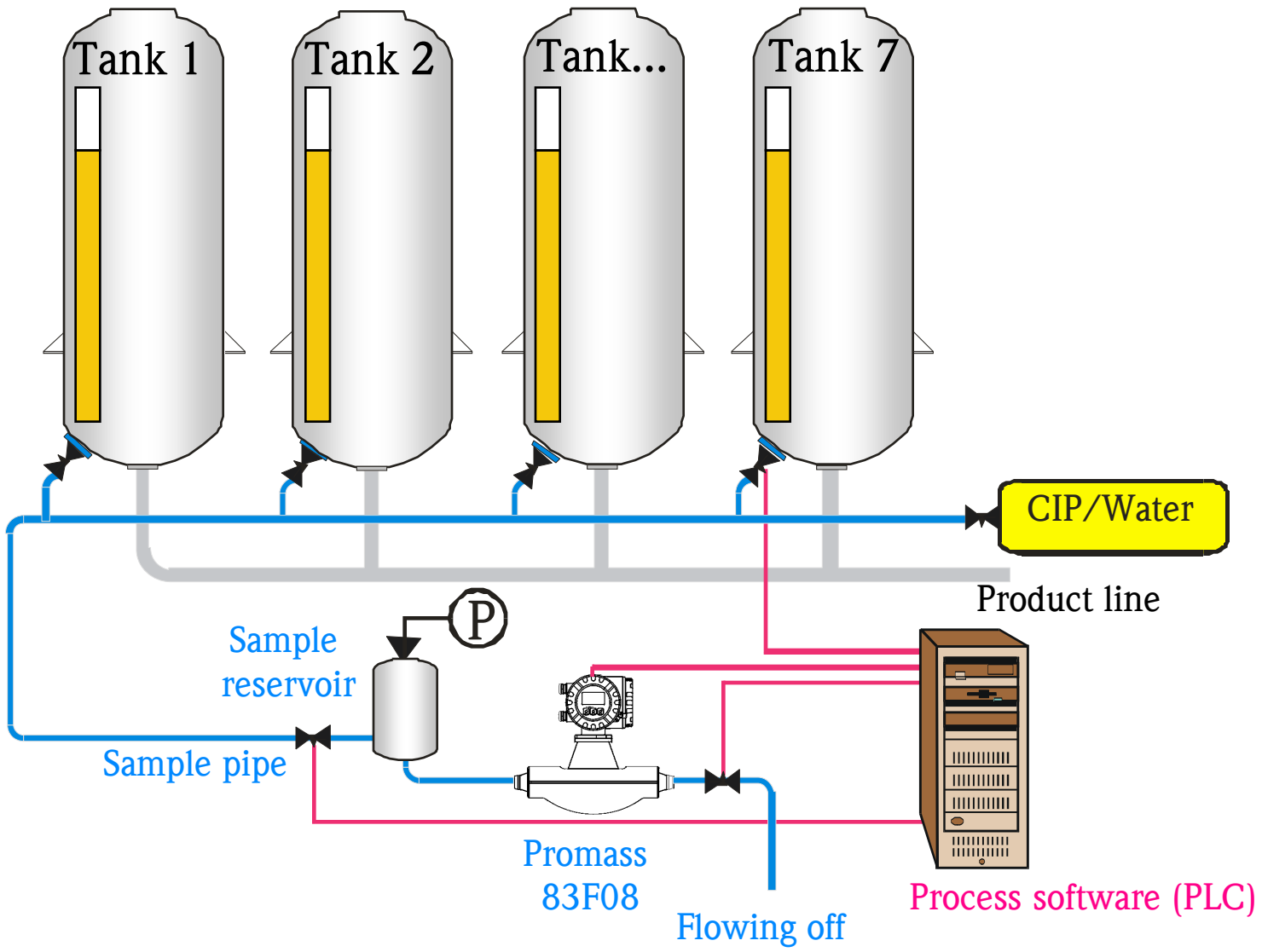
Success story Waldhaus

Cost effectiveness





New installation (software)



- Basics
- Challenge and history
- Solution and realisation
- Success story Waldhaus
- Cost effectiveness



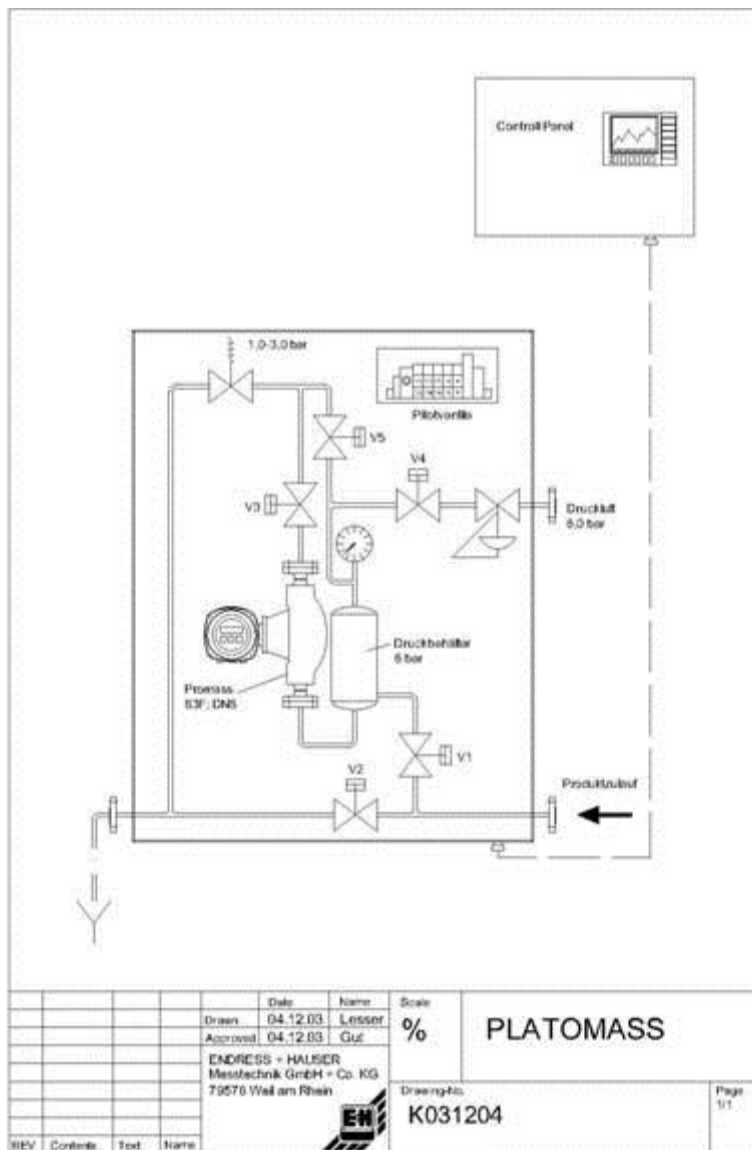
Basics

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Success story
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Bill of material

Basics

Challenge and history

Solution and realisation

Success story Waldhaus

Cost effectiveness

10	55001520	1	Stck		
	Platomass Messeinrichtung				
	Messeinrichtung bestehend aus : - Funktionsfähige Einheit mit kompaktem Edelstahlschrank und allen notwendigen Einbauten. - Promass 83 F, betriebsfertig im Schaltschrank eingebaut - Dokumentation				
20	55001520	1	Stck		
	Steuereinheit kompakt				
	Kompaktsteuerung zur Steuerung der kompletten Messeinrichtung incl Simatic C7 mit PROFIBUS DP und Bedienpanel. (4 Zeilen a'20 Zeichen 8 mm)				
30	55001520	1	Stck		
	Alternativ : Steuerungssoftware für Simatic S7				
	Komplette Steuerungssoftware ausführt als Funktionsbaustein zum Betrieb in einer vorhandenen Simatic S7. Zum Betrieb dieser Software muß die Simatic S7 PROFIBUS DP fähig sein				
40	55001518	1	psch		
	Inbetriebnahme der Steuereinheit				
	Inbetriebsetzung der kompakten Steuereinheit und Anpassung der Gesamtanordnung mit der Platomass Einrichtung an die Messumgebung				
50	55001518		Stck		
	Alternativ : IBN der Simatic S7 Steuerungssoftware				
	Softwaremäßige Installation der S7 Software in die vorhandene Steuerung Simatic S7 mit Anpassung der Platomass Messeinrichtung an die Messumgebung				
60	55001519				
	Planung und Ausführung der Anschlussverrohrung (vom Zwickelanschluss bis zur Messeinrichtung)				
	Gerne bieten wir Ihnen diese Leistungen nach Prüfung der Einbausituation an.				

Platomass measurement unit

Control unit compact

Alternative: control software for Simatic S7

Startup control unit

Alternative: startup Simatic S7

Planning and installation pipework



Why Endress+Hauser

Basics

Challenge and history

Solution and realisation

Success story
Waldhaus

Cost effectiveness

- Based on **worldwide experience in brewery technology, paperwork of engineering, drawings, and calculations**, the customer was interested to continue the solution process.
- **Close teamwork** with customer because salesman was interested in a good applicable solution.
- **Willingness for experience exchange** with customer, Weihenstephan, and Endress+Hauser.
- Development of **customized solution**, which was designed to a standard solution. Solution is now **reproduceable**.
- Customer was satisfied by **motivated salesman** and his engagement.
- No flow competitors provide this kind of product or support for this solution.

Conclusion: Solutions with Endress+Hauser

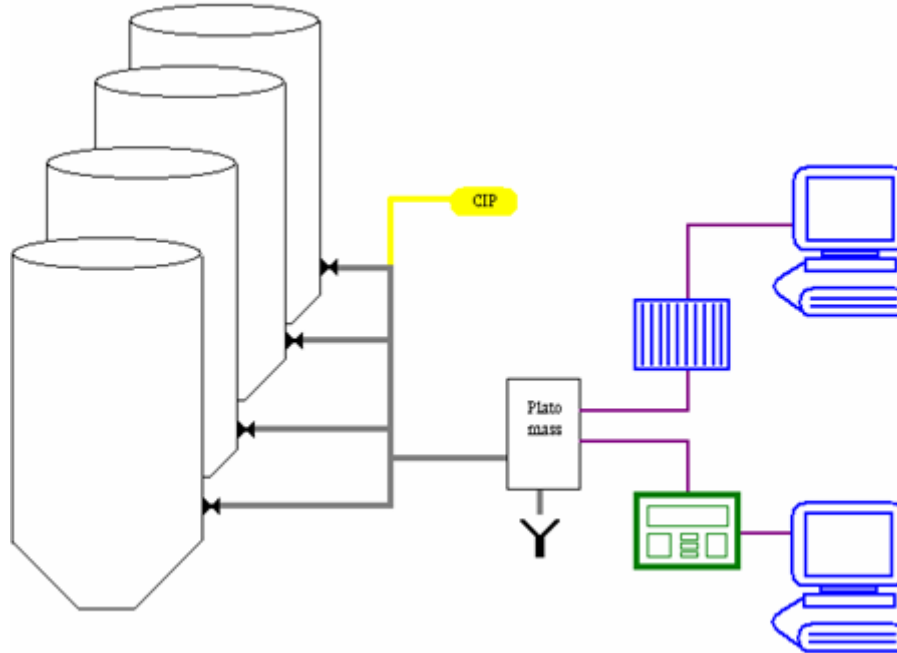
Basics

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Solution and realisation

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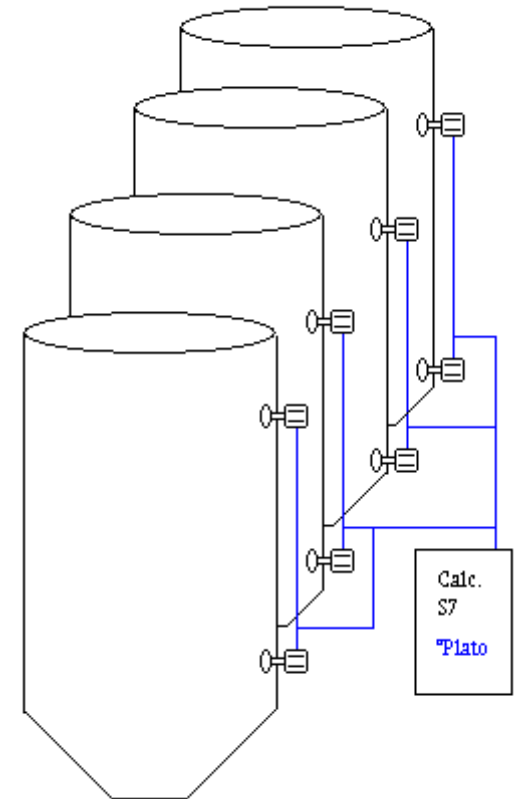
Cost effectiveness



Platomass

Contigrad

Hydrostatic Extract Measurement



Comparison: Solutions of Endress+Hauser

Basics

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Waldhaus

Cost effectiveness

Platomass

Contigrad

Installation

easy (black box)

extensive, because two new holes has to be drilled in tank

Accuracy

 $\pm 0,15$ °Plato
(Promass)

 $\sim \pm 0,25$ °Plato depends on:

- Distance of sensors
- Head pressure in tank
- Environment temperature
- Measure range of pressure sensors

Requirements

Beer sample will be lost
(3-4 litres per
measurement)

above DB sensor should be covered
with beer

Additional pipes necessary



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Success story Waldhaus



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Endress+Hauser

People for Process Automation



Application pictures

Basics

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Waldhaus

Cost effectiveness

History of Waldhaus Brewery

Small company with 5 employees for all production lines (6 types of beer) – beginning with brewing, filling, bottling, and finally packing the product.

Brewery started with 6 fermentation tanks, increased the number up to 9 tanks.

Target was to support small brewer team in their daily work. Accurate and repeatable measurement doesn't waste time anymore for controlling extract during the fermentation.

Platomass reduces costs, increases the flexibility for the company.

Application pictures

Basics

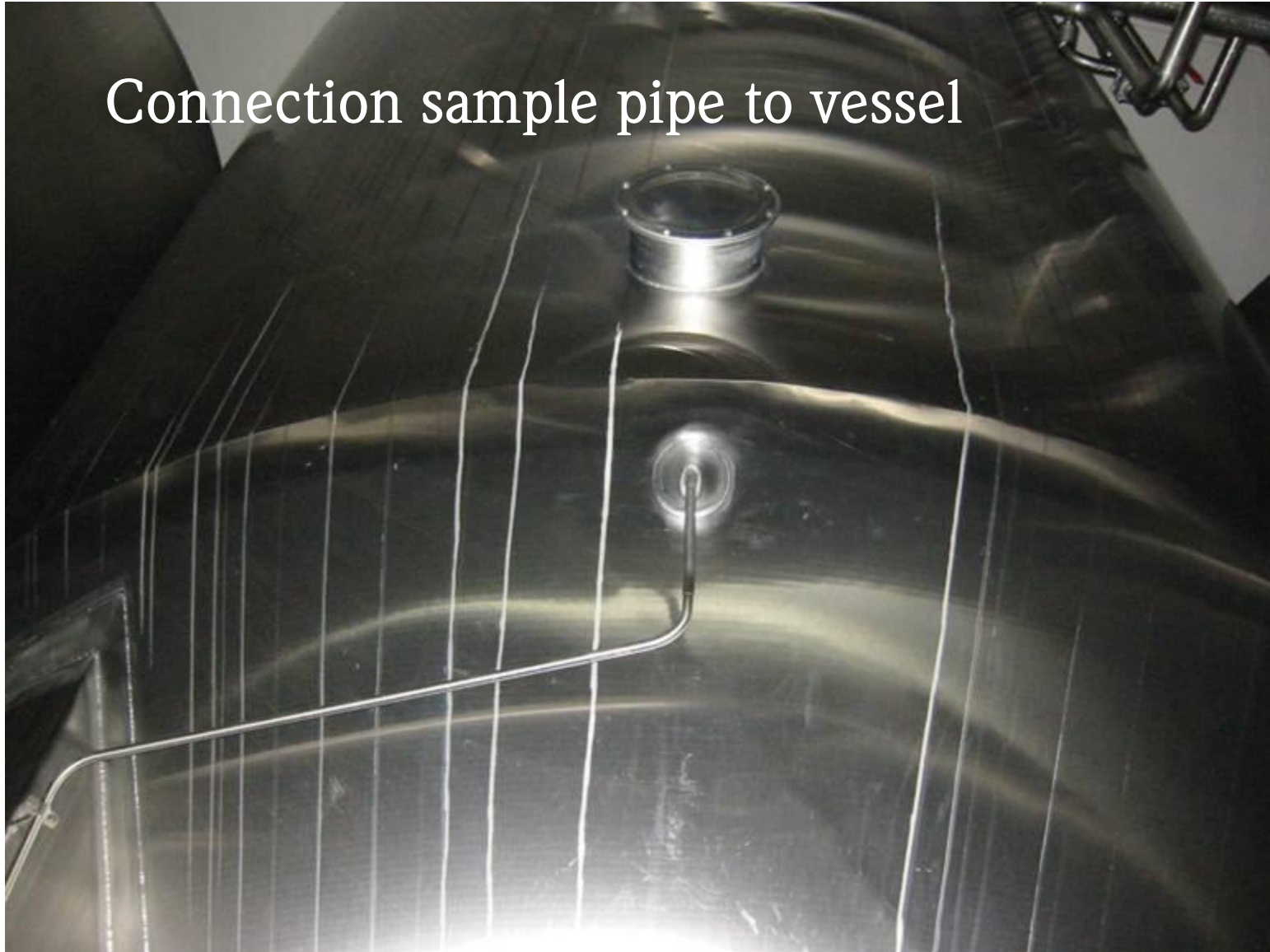
Challenge and history

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Success story
Waldhaus

Cost effectiveness

Connection sample pipe to vessel



Application pictures

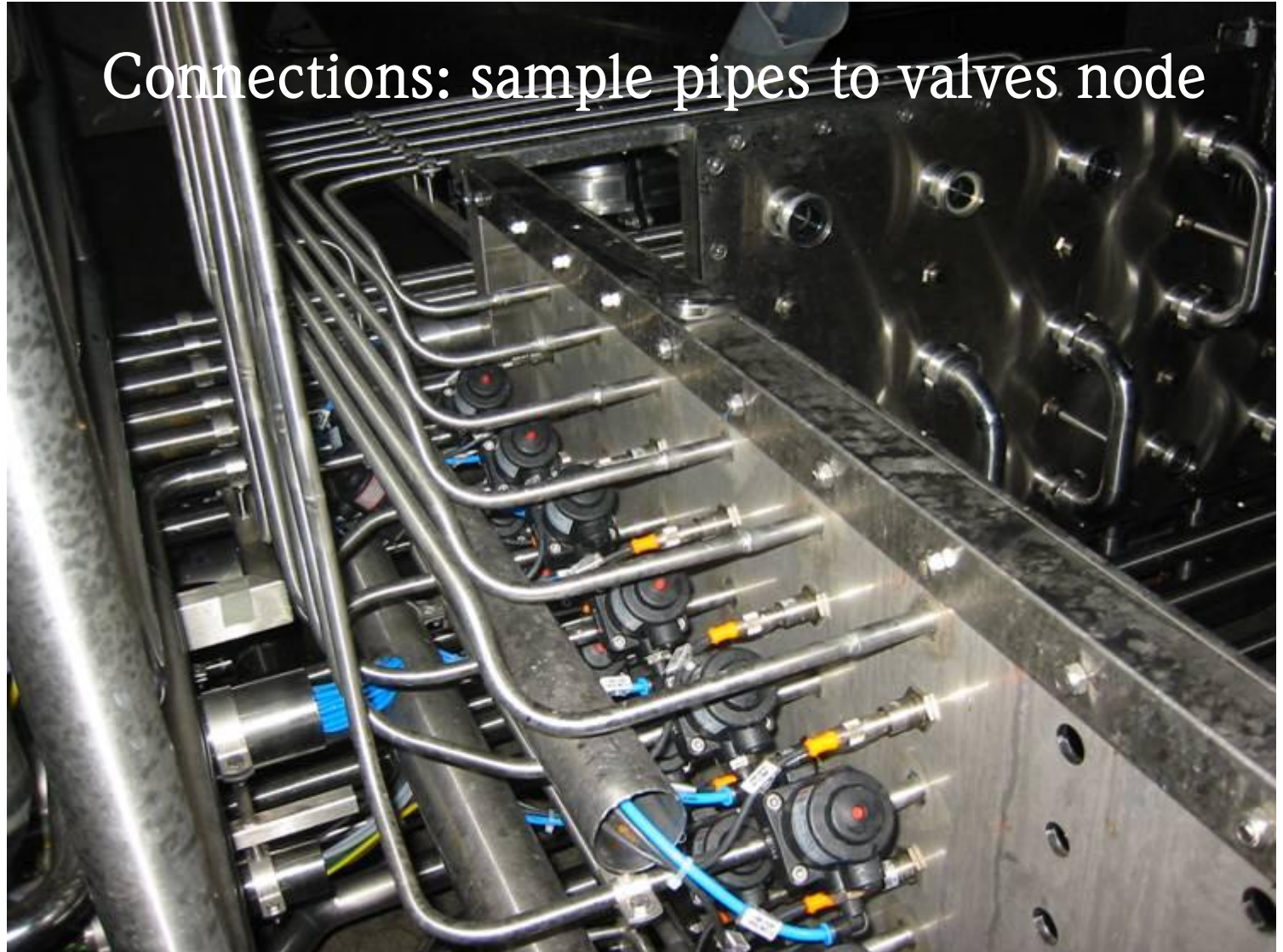
Basics

Challenge and history

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Success story Waldhaus

Cost effectiveness



Connections: sample pipes to valves node

Application pictures

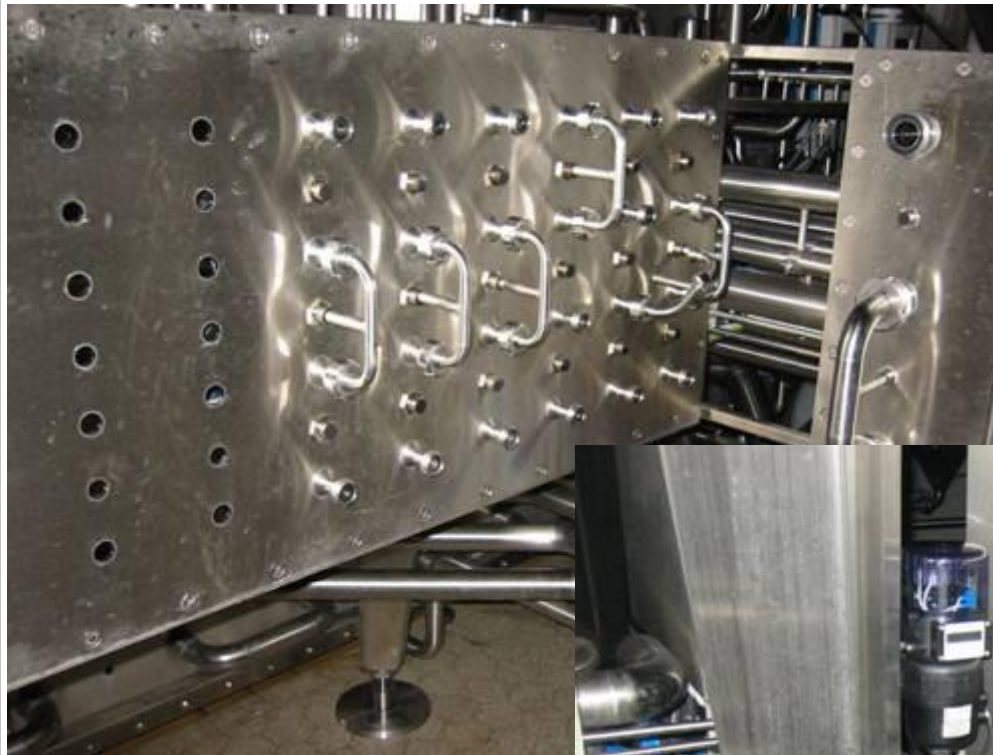
Basics

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Success story Waldhaus

Cost effectiveness



Valves node (front side)



Valve node (Platomass outlet)

Application pictures

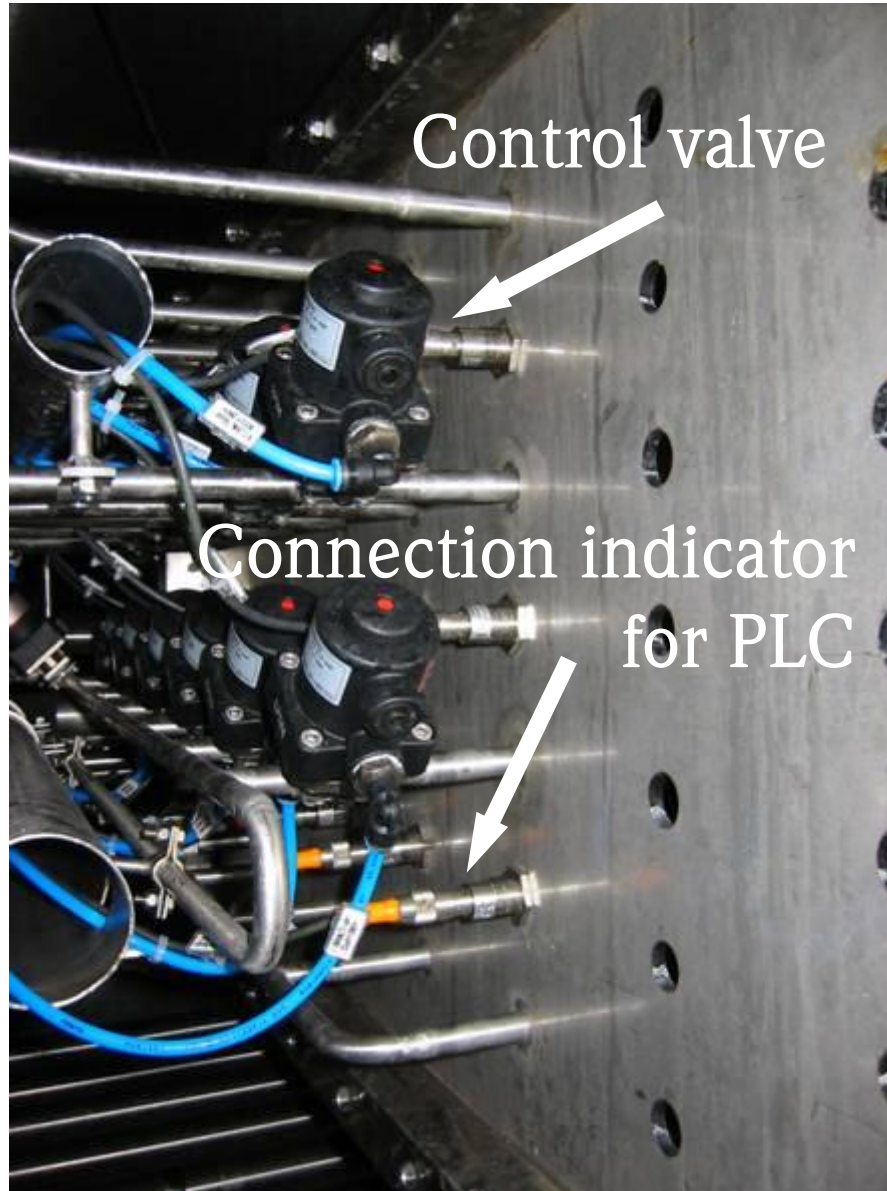
Basics

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Valves node
(back side)

Application pictures

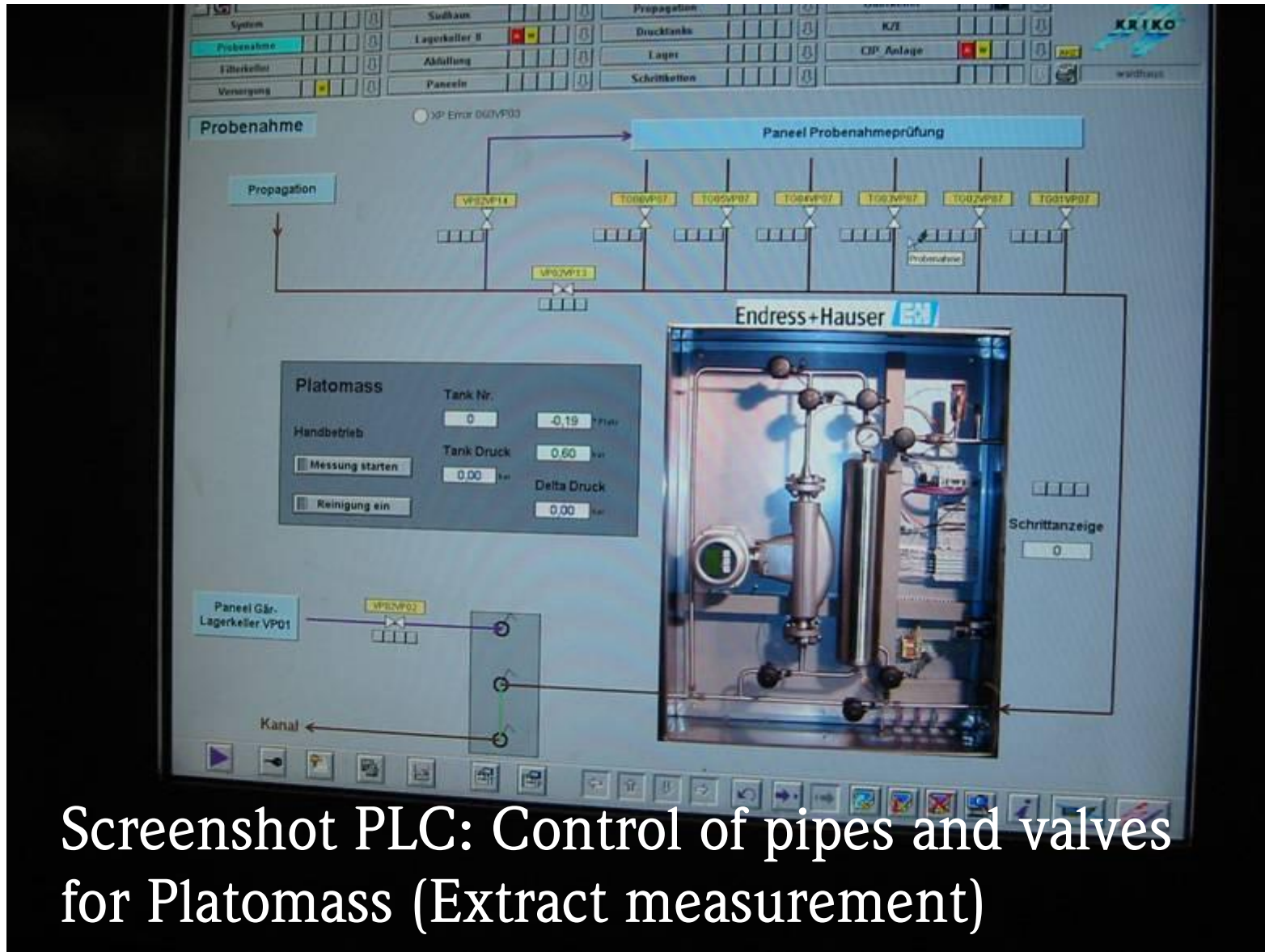
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Screenshot PLC: Control of pipes and valves for Platomass (Extract measurement)

Application pictures

Basics

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Platomass (door opened)

Special installation with inspection glasses at sample bin.

Application pictures

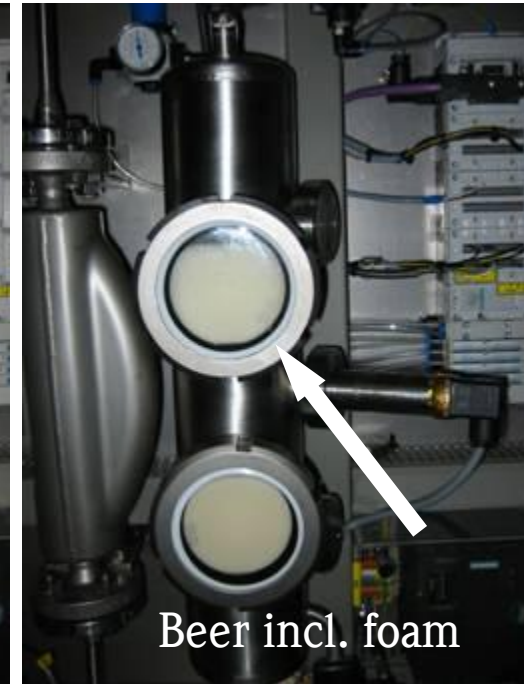
Basics

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Success story Waldhaus

Cost effectiveness



Filling sample bin with unfiltered beer including CO₂

Application pictures

Basics

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Success story Waldhaus

Cost effectiveness



Unfiltered beer incl. foam, but pressurised

Filled sample bin is pressurised for extract measurement

Application pictures

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Display of measured °Plato





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Cost effectiveness

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Endress+Hauser 

People for Process Automation



Cost effectiveness

Basics

Example for profit calculation

Challenge and history

Number of tanks: 15

Solution and realisation

Days of measurement per year: 180

Success story Waldhaus

Cost per brewer: 30€/hour

Cost effectiveness

Time needed per tank (average): 20min = 1/3 hour
(Taking probe, filtering, degassing sample, and measuring)

Costs based on manual measurement

15 tanks * 1/3 hour * 30€/hour * 180 days =

27.000€ per year