

Beer Recovery from Surplus Yeast Using the TSS Vari sc by Hach

Introduction

In modern breweries, the recovery of beer from surplus yeast is becoming increasingly important. In addition to economic benefits (such as reducing product losses), ecological aspects like resource conservation and wastewater reduction also play a key role. To make these processes efficient and automated, the TSS Vari sc by Hach can be used – a high-precision sensor for measuring solids in turbid media.

Process Description

Surplus Yeast

At the end of fermentation, a large quantity of yeast remains, which still contains significant amounts of drinkable beer. This suspension typically consists of:

- **20–30%** yeast
- **70–80%** beer

Recovery Process

The recovery process takes place in several steps:

1. Removal of surplus yeast from the fermentation tank into a buffer tank
2. Measurement of solids concentration using the TSS Vari sc
3. Separation using a separator or decanter
4. Return of the clarified phase (beer) to the storage tank – only if quality is sufficient
5. Disposal or further use of the yeast



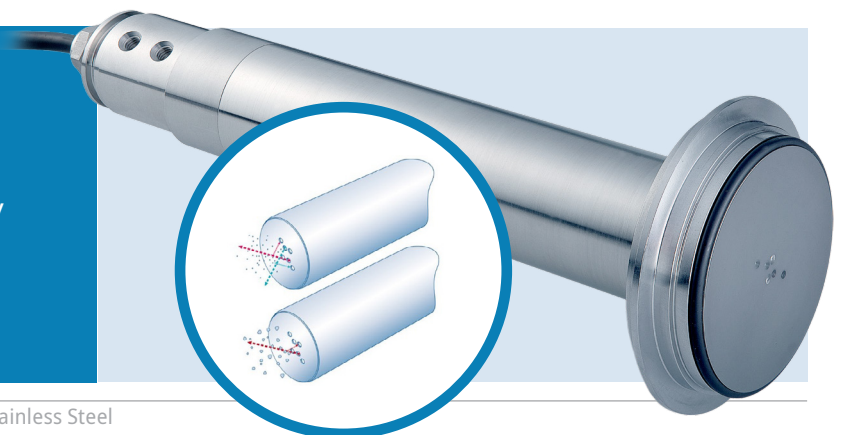
Use of the TSS Vari sc by Hach

Device Technology

The TSS Vari sc measures the total solids (TS) or suspended solids concentration in liquids using an optical scattered light method (NIR). It is ideally suited for hygienic applications in the food and beverage industry.

Advantages

- ✓ Inline real-time measurement
- ✓ High accuracy even with high turbidity
- ✓ Low maintenance requirements
- ✓ CIP-capable (Cleaning in Place)

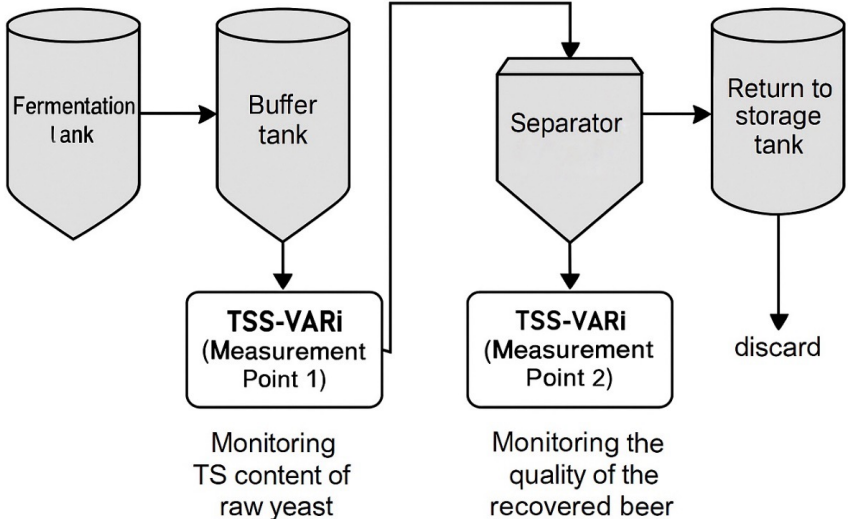


TSS Vari sc Turbidity and Suspended Solids Inline probe, Stainless Steel

Measurement and Process Concept

Setup

- Fermentation tank
 - Buffer tank
 - TSS Vari sc (Measurement Point 1)
 - Separator
 - TSS Vari sc (Measurement Point 2)
 - Return to storage tank or discard
- With the high-temperature oxidation TOC/ TN analyser setup, samples were taken using a submersible pump. Typical Measurements and Process Limits



Measurement Points

Measurement Point	Location	Purpose
1	Before the separator	Monitoring TS content of raw yeast
2	After the separator (clear phase)	Monitoring the quality of the recovered beer

Typical Measurements and Process Limits

Parameter	Unit	Typical Range	Target Value
TSS in raw yeast	g/L	80–150	Process optimization
TSS in recovered beer	g/L	0.1–2	< 1 g/L for reintegration

Automation Capabilities

- Integrating the TSS Vari sc into a process control system enables a high level of automation:
- Dynamic control of the separator based on real-time TSS values
 - Automated switching of product streams:
 - If < 1 g/L TS in the clear phase → return to storage tank
 - If > 1 g/L TS → divert to waste
 - Alarm and control strategies in case of limit violations

Typical Measurements and Process Limits

Component	Specification
Sensor	TSS Vari sc
Controller	SC4500 Controller
Process Connection	Hygienic Varinline sensor fitting
Communication Interfaces	4–20 mA, Modbus, Profibus

Example Scenario

Time Point	TSS Raw Yeast	TSS Clear Phase	Action
Process Start	130 g/L	1.5 g/L	No return – still too turbid
Stable Operation	100 g/L	0.6 g/L	Return activated
End of Batch	85 g/L	0.8 g/L	Process end / cleaning



Controller SC4500, Prognosys, Ethernet IP, 2 digital Sensors, 100-240 VAC, US plug

Conclusion

The recovery of beer from surplus yeast represents an important step toward improving efficiency in breweries. Using the TSS Vari sc by Hach allows this process to be precisely monitored and automated. The sensor enables reliable, low-maintenance, and hygienic measurement, helping to reduce product losses while also achieving both ecological and economic goals.

TSS Vari sc	Turbidity and suspended solids probe for colour-independent measurement of highly concentrated sludges. This probe connects to Varivent piping systems.	LXV326.99.10001
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SC4500	Prognosys, 5x mA Output, 2 digital Sensors, EU plug	LXV525.99C11551
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