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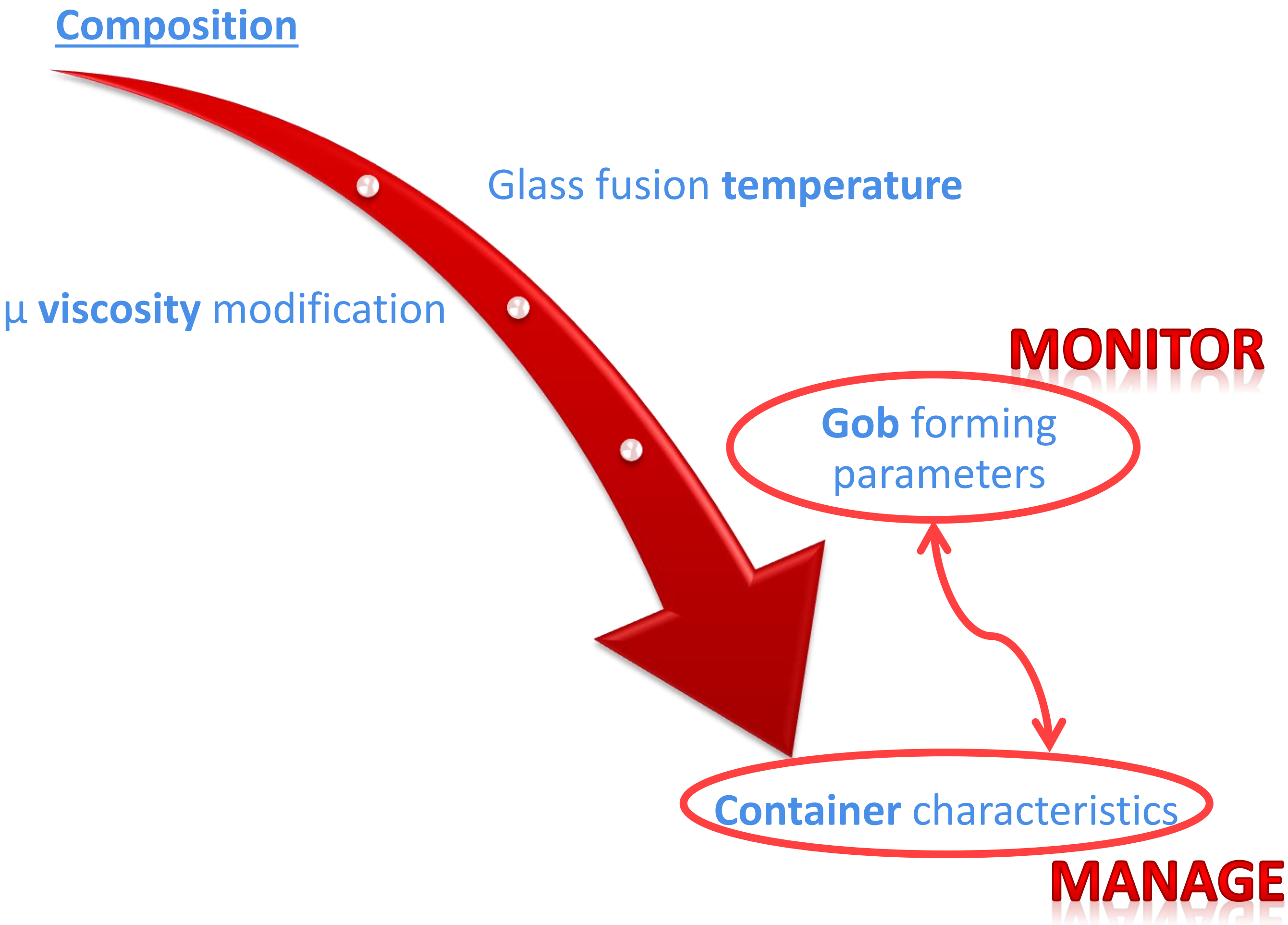
msc & SGCC

GLASSPEX 2015

Hot End process control:

Two bricks to characterize your production and pilot your process

INTRODUCTION



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1. Master your process with Gob Supervision.
2. One new product : Tiama Hot End Laboratory Tool.

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1. Gob Critical Parameters

Which parameters need to be monitored for critical gob and forming performance ?

2. Available Tools for Gob Monitoring

- **Optical Pyrometric measurement tools**
- **Gob vision shape control state of the art**
- **Closed loop weight control objectives**

3. Environment Benefits in Gob Control

- **Energy**
- **Raw materials**
- **Safety and Health**

Gob Critical Parameters

Credit: Löber, Müller-Simon, Bergmann and Simon, HVG, IGF-AiF-FV Nr. 16547N

Available Tools for Gob Monitoring: Optical pyrometric measurement tools

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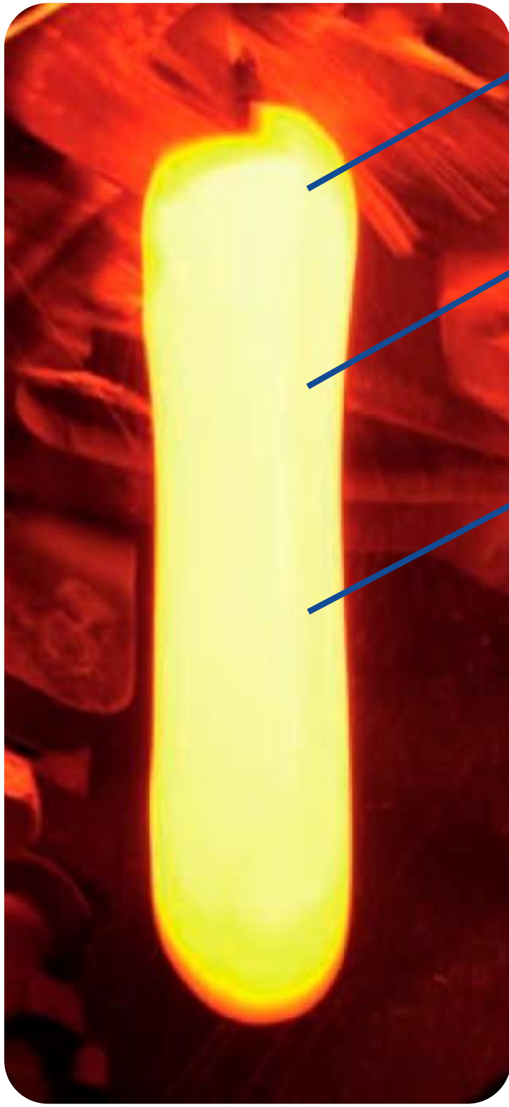


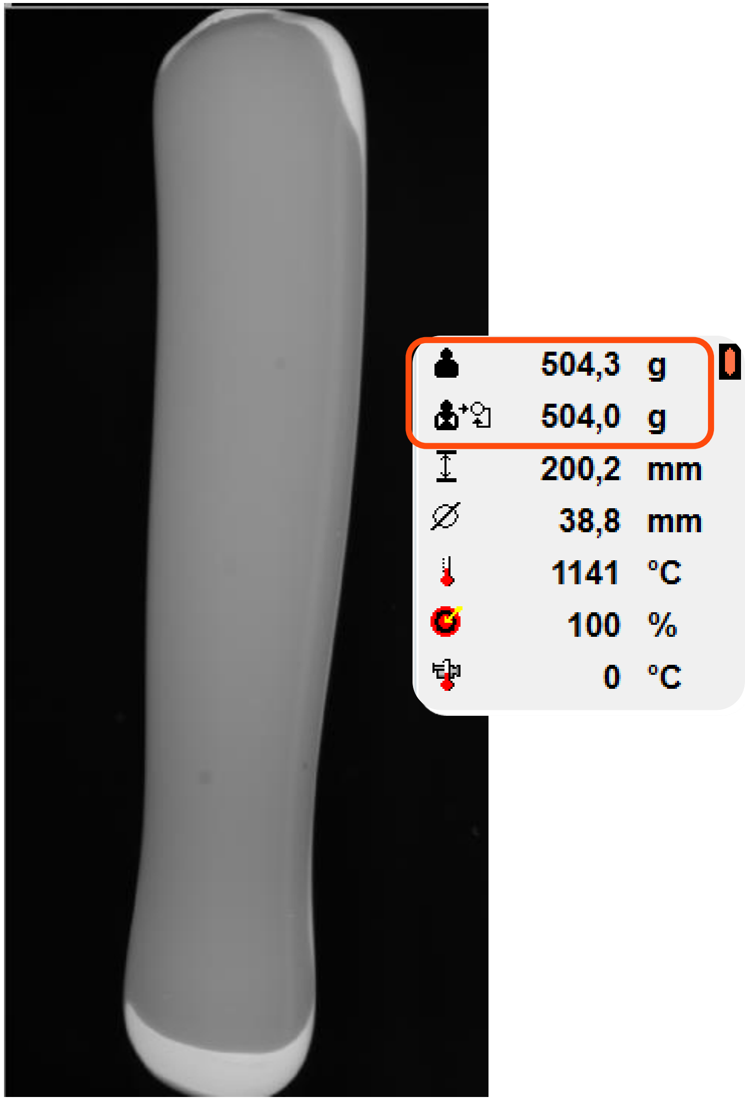
1- Gob weight control

2- Gob temperature monitoring

3- Gob shape monitoring and **reference storage**

Immediate feedback to **improve gob properties** and **prevent production loss**

Feature 1 - Gob Weight Control (1/2)

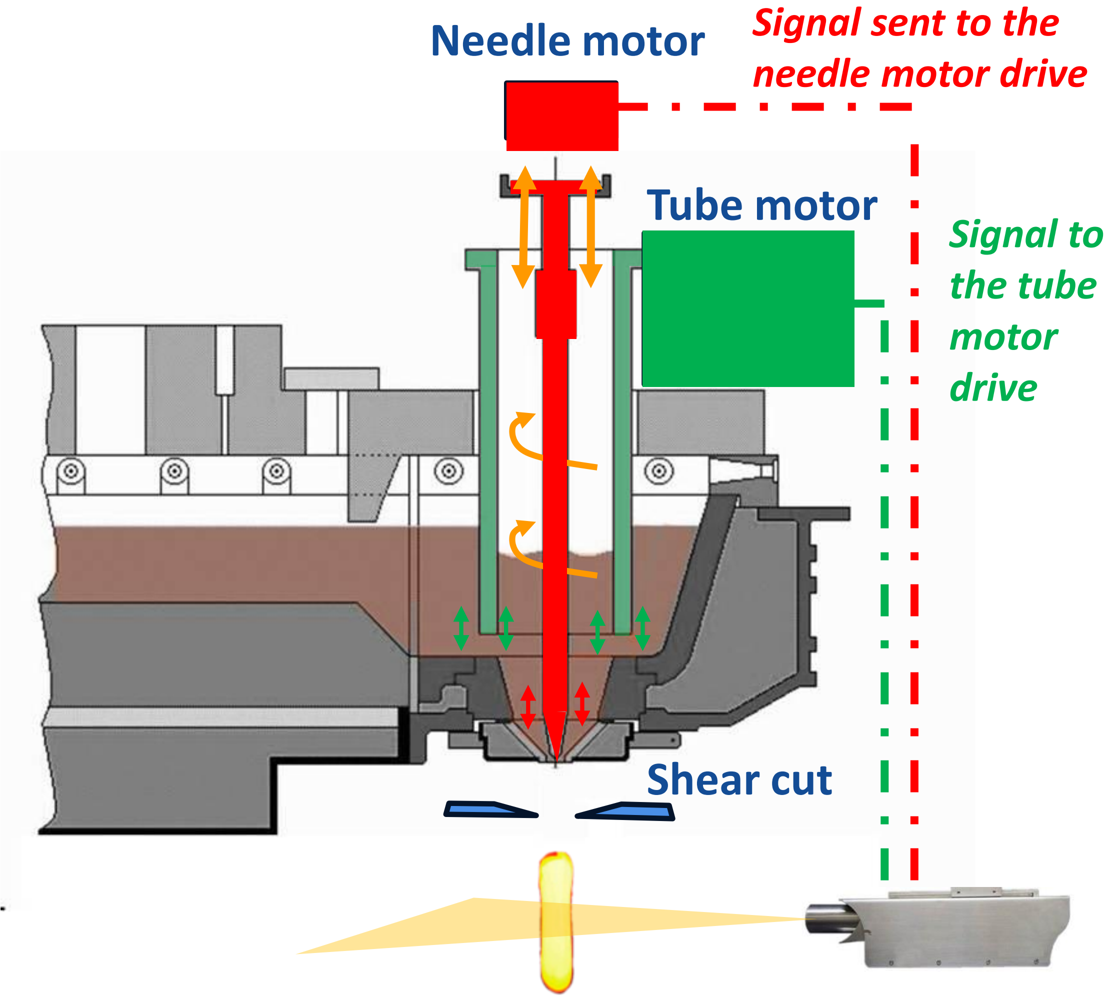


Your benefits :

- ✓ Reduction of container weight
- ✓ Reduction of job change time,
- ✓ More stable conditions in the forehearth

Feature 1 - Gob Weight Control (2/2)

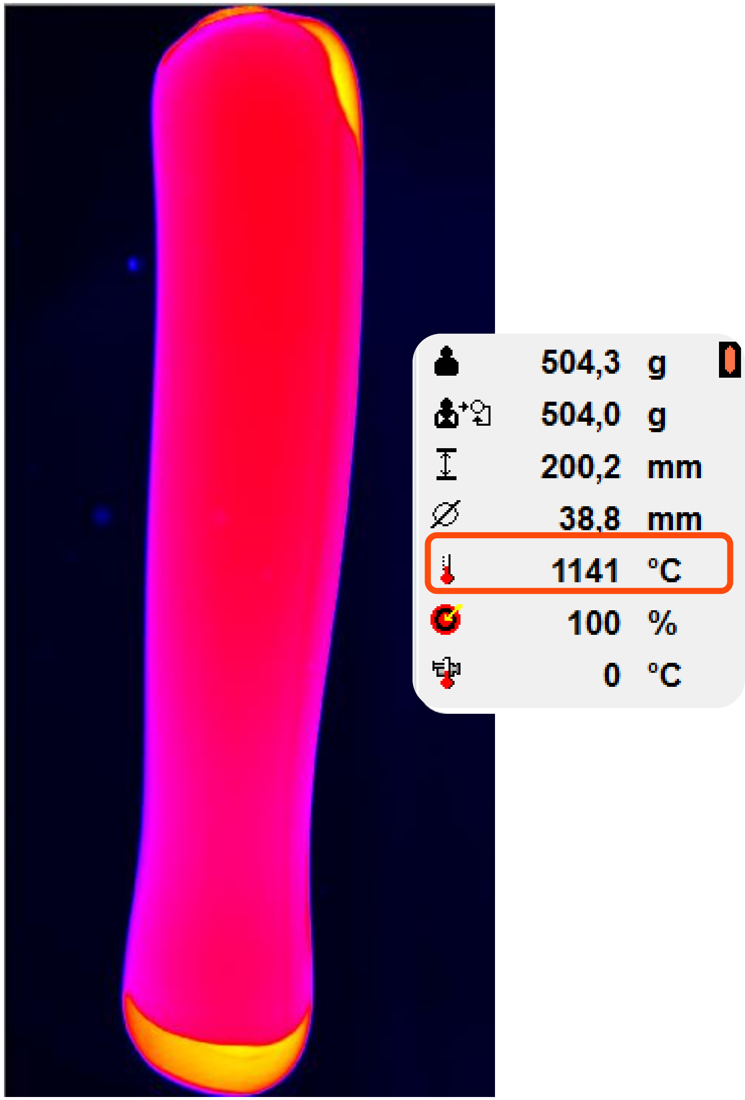
“CLOSED LOOP”



CLOSED LOOP

- **AUTOMATIC** gob weight control by adjusting the tube height or the needle position
- Keeps the gob weight stable within **±0,25%**

Feature 2 - Gob temperature (1/1)



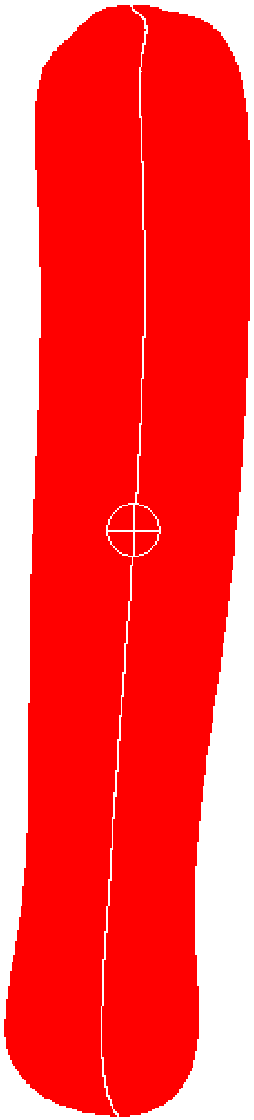
- Temperature measurement along the gob,
- Accuracy : **±3°C**
- Multi zone and average temperature display,

<u>Your benefits :</u>

✓ Temperature reading

✓ Temperature mapping of the gob surface

Feature 3 - Gob shape monitoring (1/2)

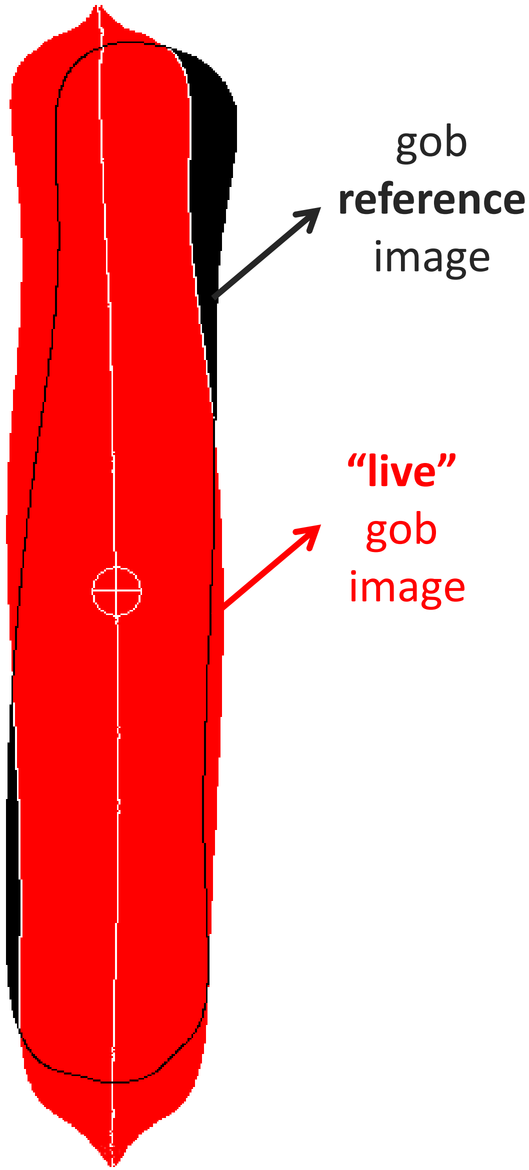


GOB SHAPE MONITORING

<u>Your benefits :</u>

- ✓ Gob tilt and length **alerts**.
- ✓ **Immediately** identify bad shear cuts

GIA
Feature 3 - Gob shape monitoring (2/2)



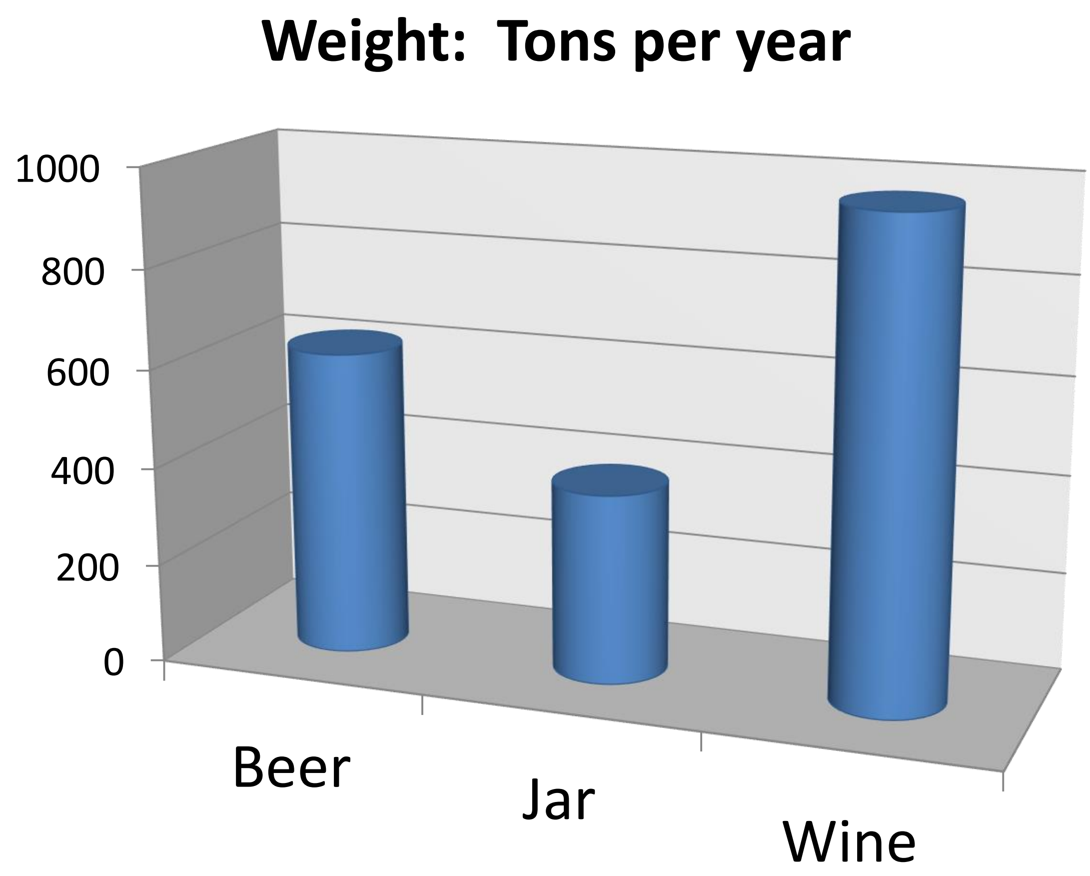
GOB REFERENCE STORAGE

<u>Your benefits :</u>

- ✓ True **job change assistance**
- ✓ **Reference gobs** significantly reduces the job change time
- ✓ Eliminate trial & error during **job change**

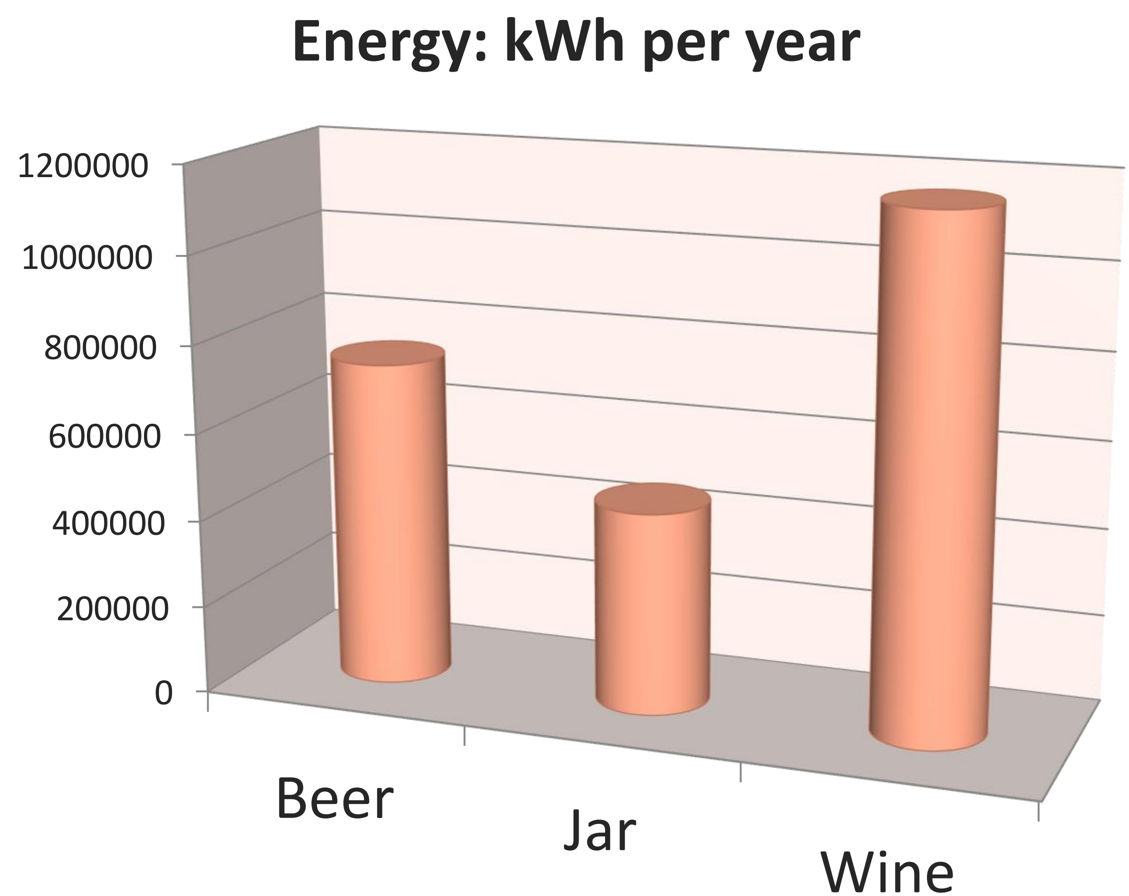
Benefits

- **Raw Material**



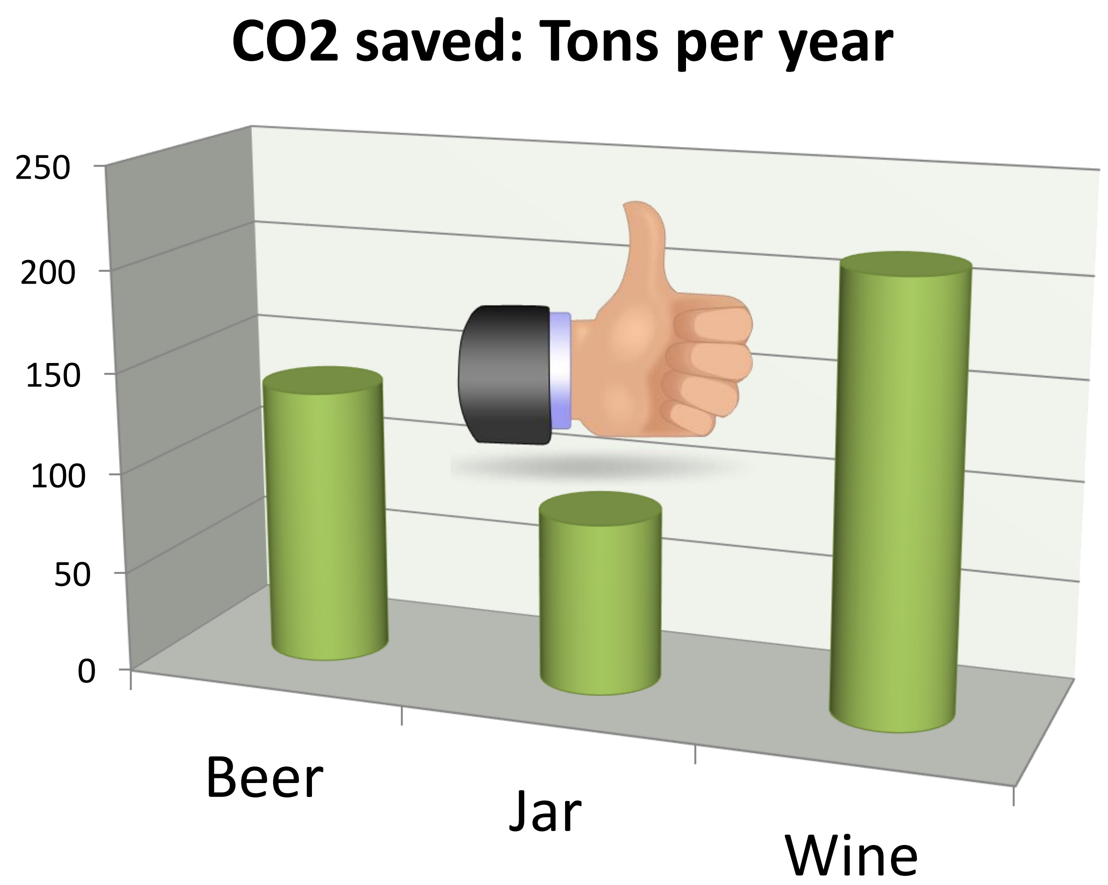
Benefits

- **Energy**



Benefits

- **Raw Material**
- **Energy**
- **Safety**



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One new product : Tiama Hot End Laboratory Tool.

Tiama HOT systems product range

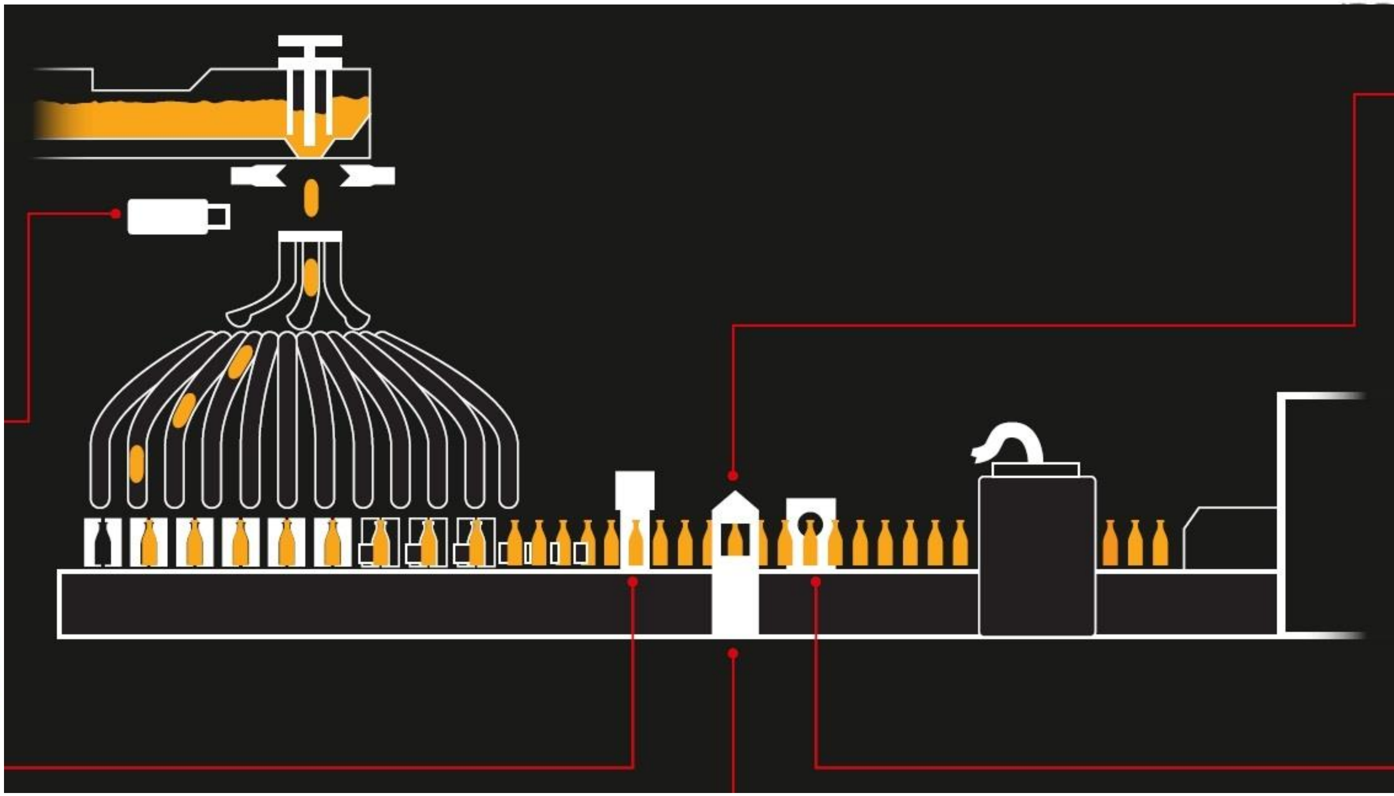
TO FOLLOW

tiama hot eye

One or more visible light-range cameras combined with infrared cameras

tiama hot wall

A thickness measurement sensor adapted to hot-end conditions



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hot-end article weight management

tiama hot move

hot-end article positioning management

tiama hot lab

hot-end laboratory tool

tiama hot form

hot-end IR radiation monitoring

Tiama HOT lab

Hot-end laboratory tool

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hot lab

Current hot-end gauging

With the exception of weight, bottles at the HE are currently measured with go /no-go gauges.

Characteristics such as :
_lean,
_ovality
_and glass wall-thickness
are currently measured at the CE and only then is the information transferred back to the HE.
This equates to a time duration of >1 lehr-length.

Overview

Tiama HOT lab – Precise statistical dimensional measurement of hot bottles including glass thickness

Construction

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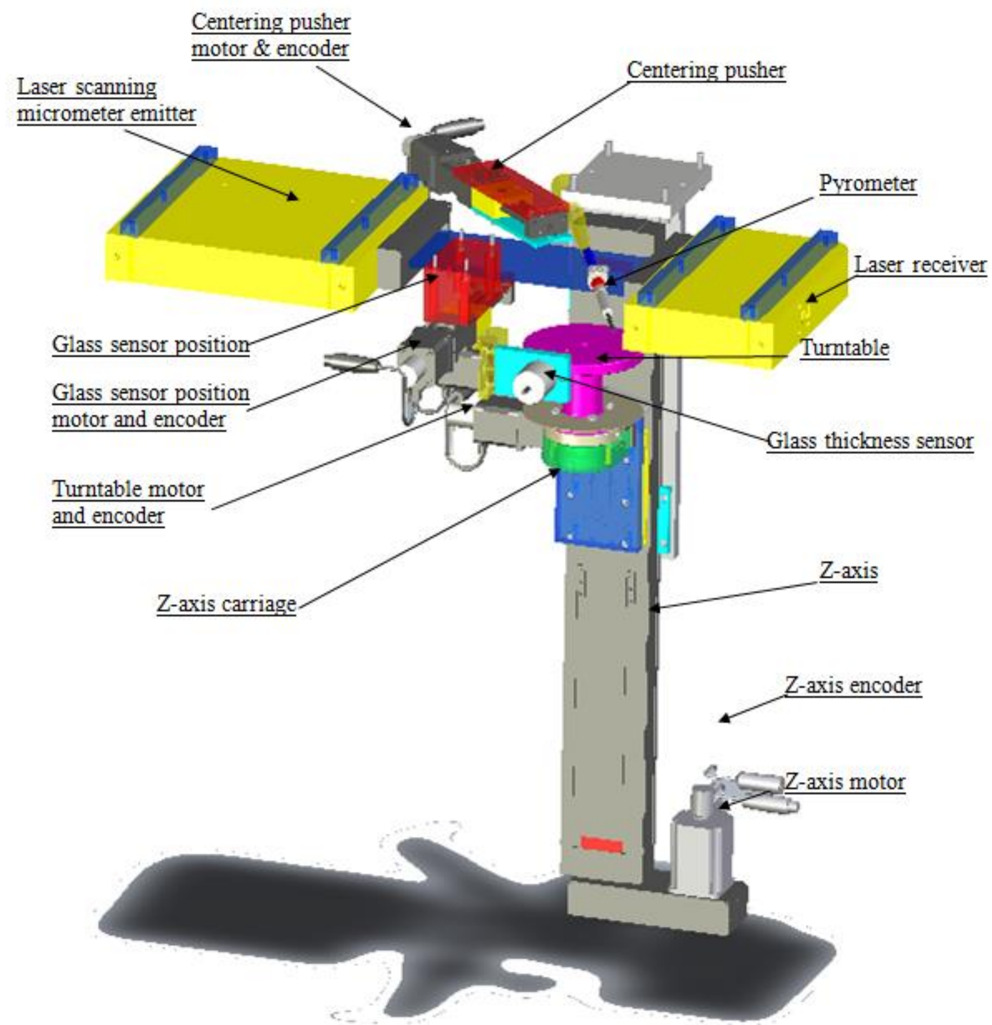
Machine Electronics Cabinet *Measuring Chamber*

Measurement technology

Measurement Technology

- *Up-to-date Micrometer Laser*
- *CHRocodile Glass Thickness Control*
- *Measurement Time < 2 mins.*
- *Container Temperature up to 300° Celsius.*



Available measurements

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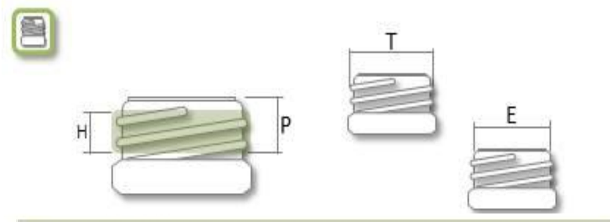
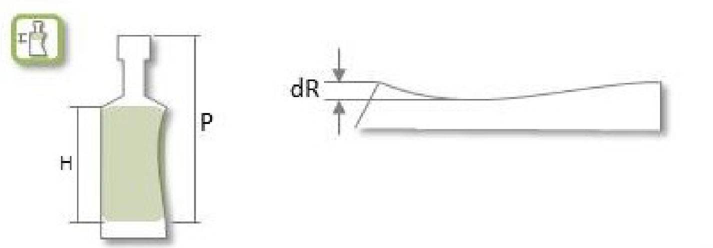
- Band Diameter
- Diameter / Out of Round
- Finish Height
- Glass Thickness
- Height
- Height at Diameter
- Inside Diameter
- Lean (1)
- Lean (2)
- Square Bottles
- Thread Area
- Thread without Seam
- Vertical Zone



Name	
Aktiv	True
Position (P) [mm]	0,00
Höhe (H) [mm]	0,00
Winkeländerung [°]	30

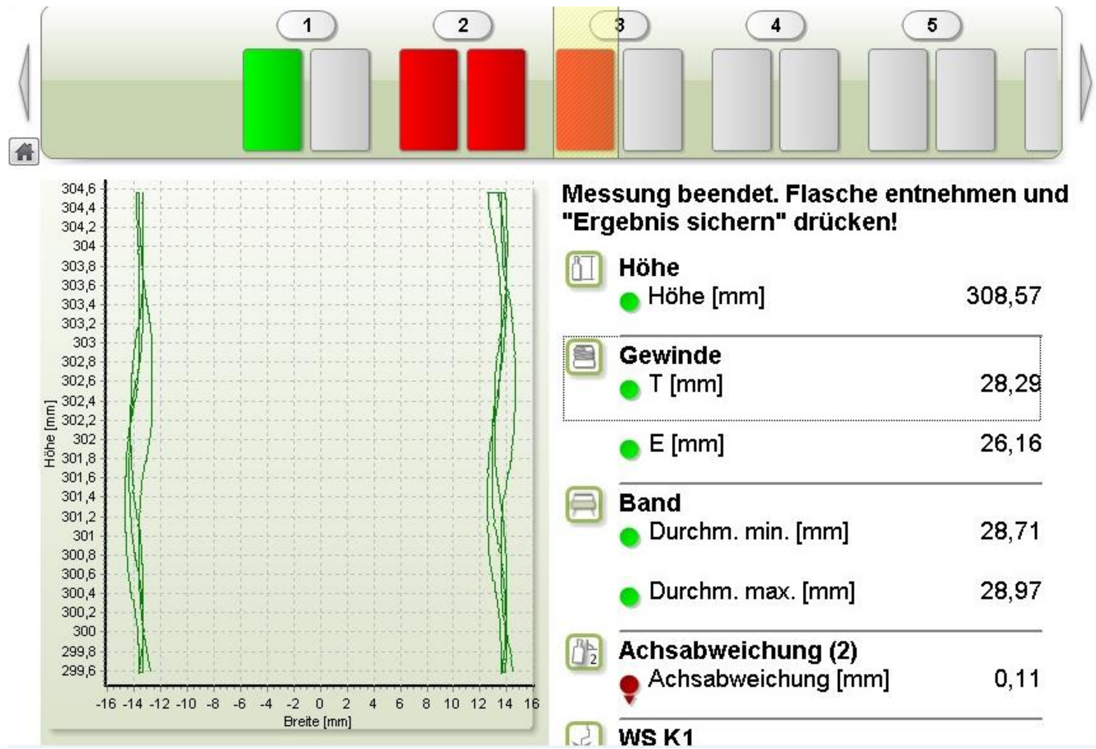


Name	
Aktiv	True
Position (P) [mm]	0,00
Höhe (H) [mm]	0,00
Winkeländerung [°]	30

Finish measurement

Graphical display of thread measurement (T & E)

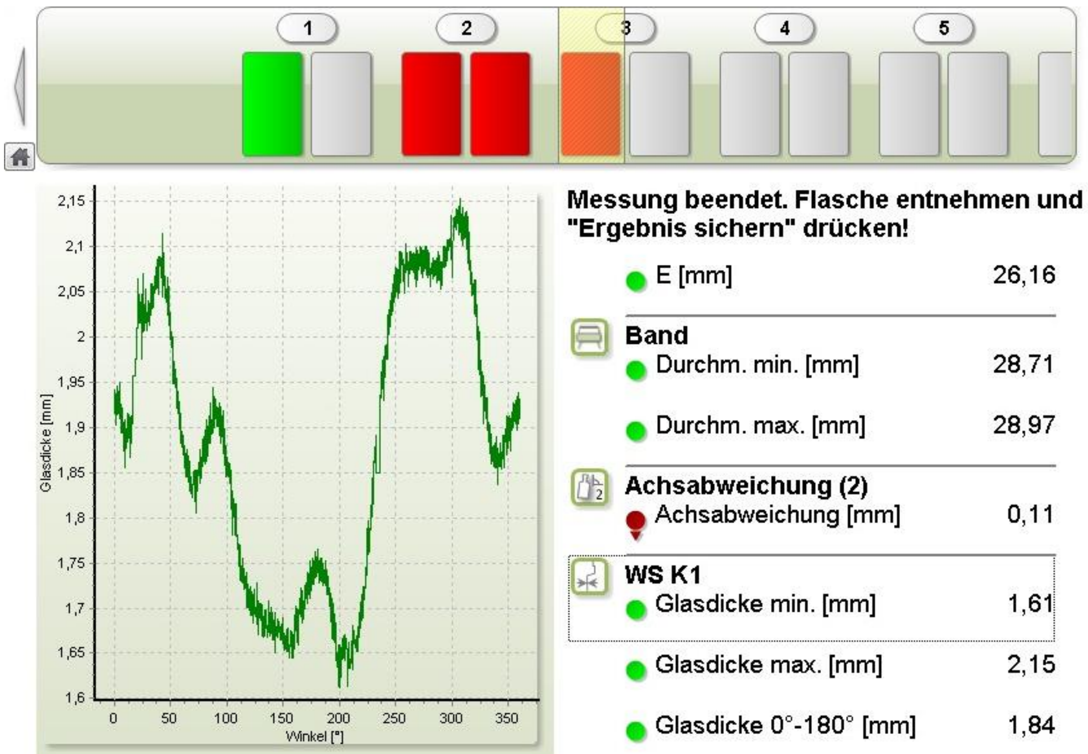
The right side of the screen displays the numerical results.



Glass thickness 360°

Graphical display of glass thickness (360 degrees)

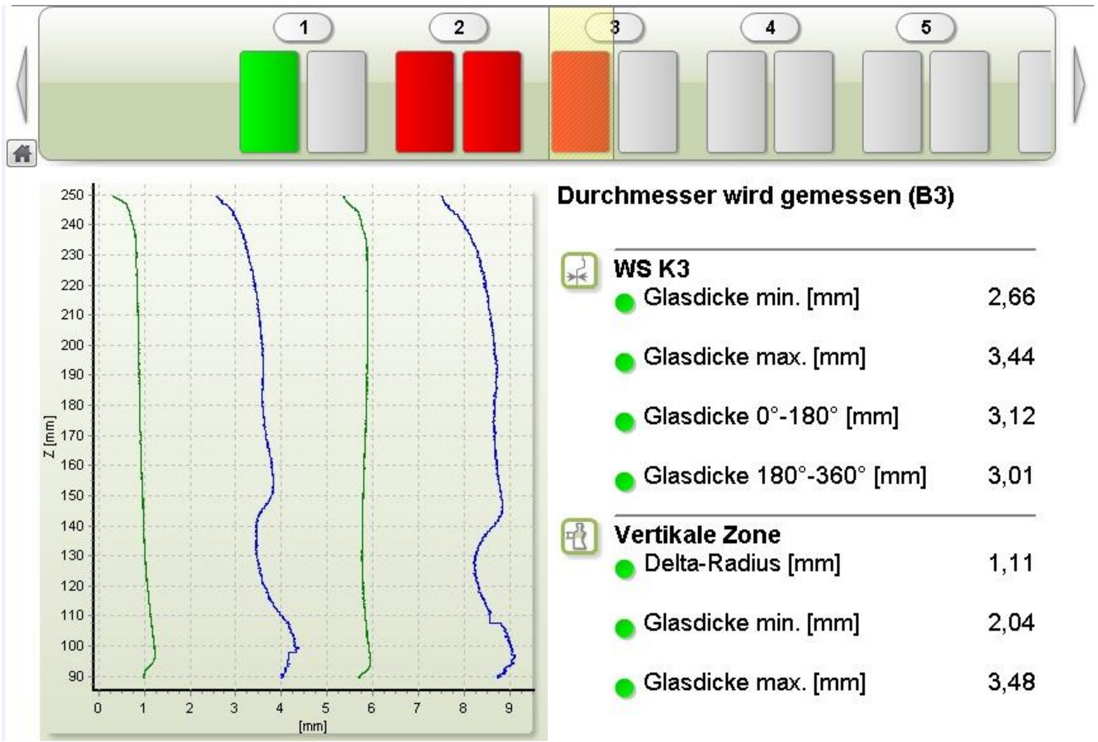
The "x" axis in the graph corresponds to the table/ bottle position. Thus the thin glass areas can be easily identified on the bottle.



Sunk/Bulge & Vertical Glass Thickness

Graphical display of vertical outer surface (green line) and inner surface (blue)

The flatness (sunk/bulge) together with the glass thickness is calculated over the defined area.

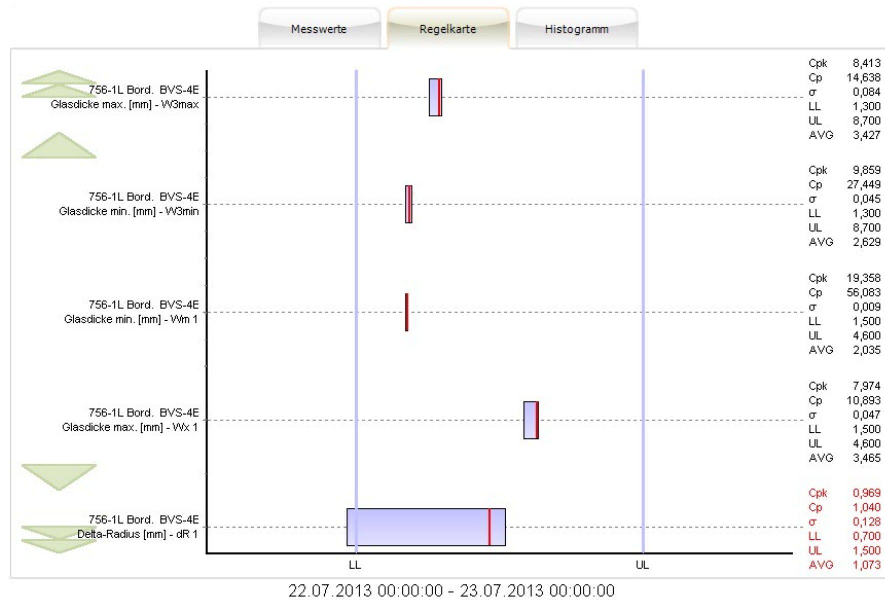


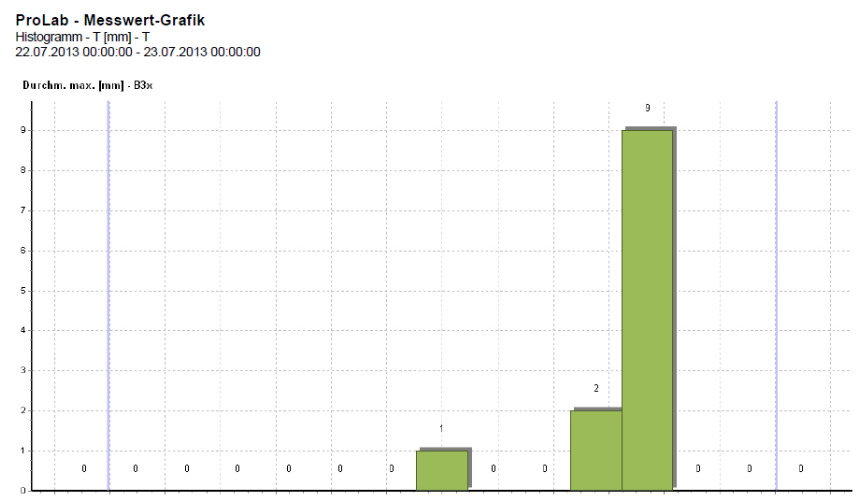
Statistics (1/2)

Capability of the Process Overtime (CPK)

The Numerical and graphical analysis of an individual measurement location or a particular cavity can be analysed.

Distribution charts clearly shows where the process is within the set tolerances

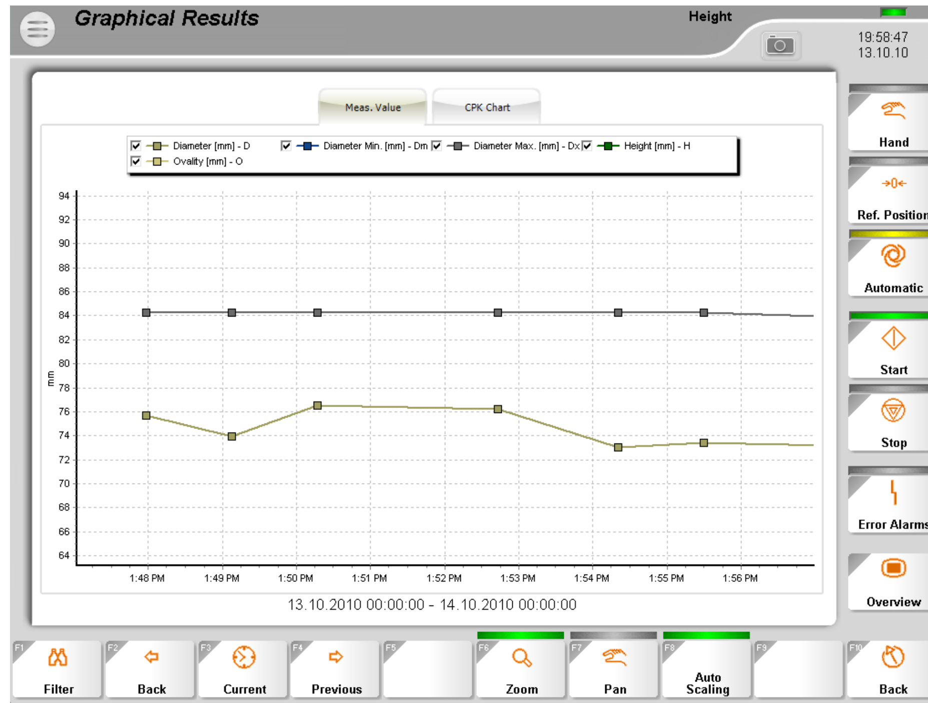




Statistics (2/2)

The "History" is a graphical display of the collected data over time

Possible to display and compare against other moulds or simply view trend over time.



Tabulated results

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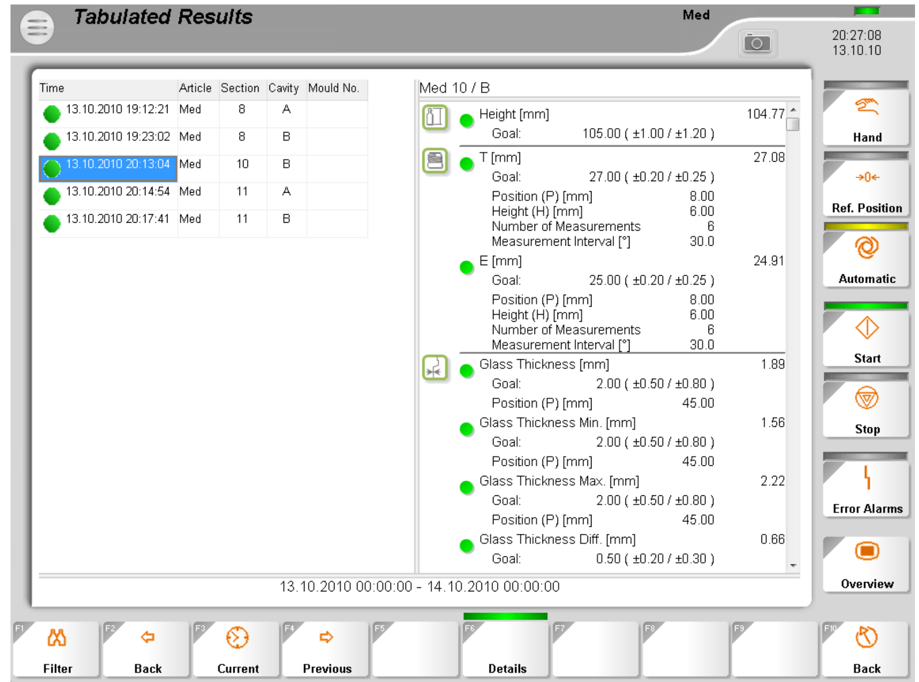
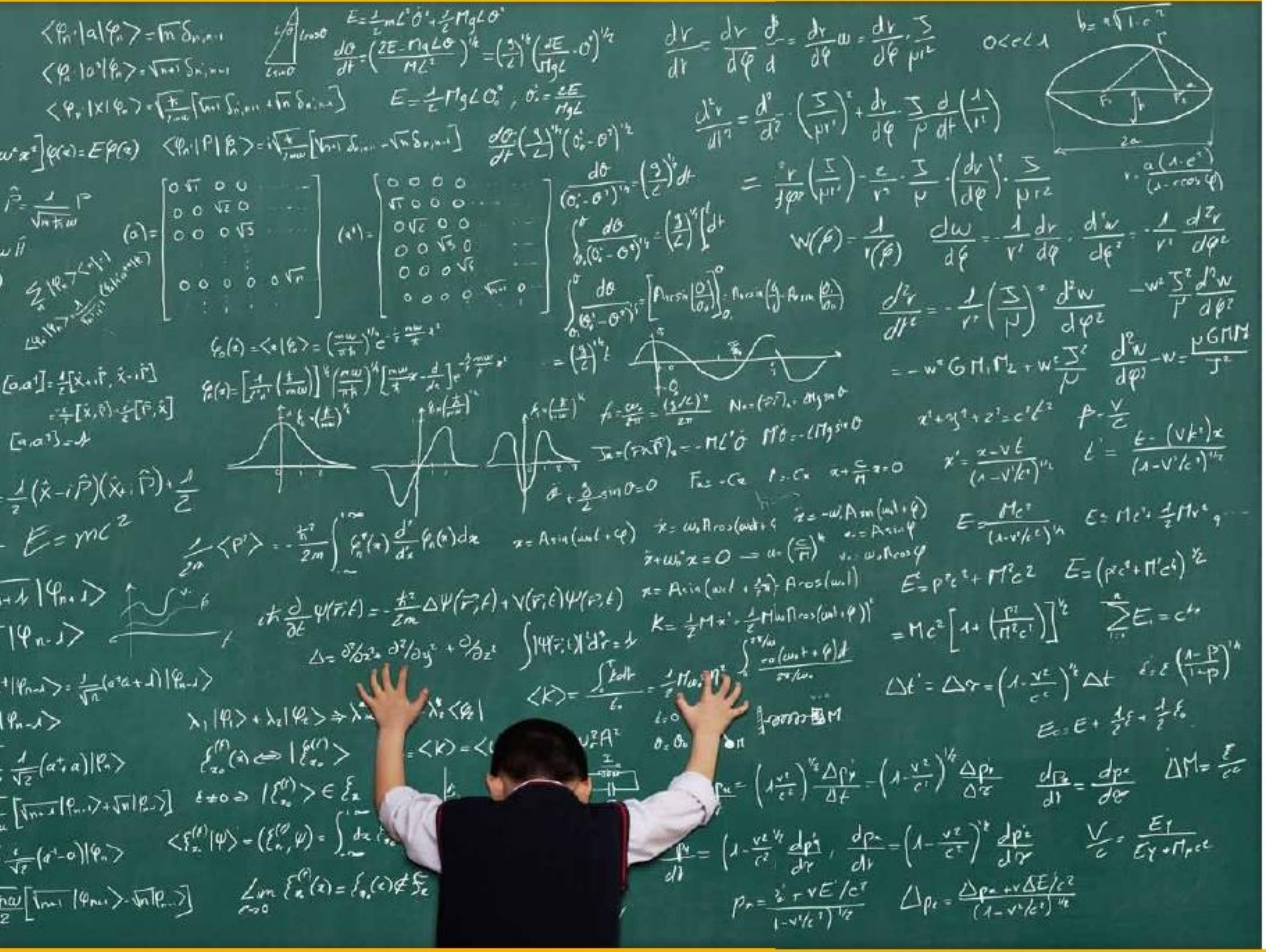
The "Tabulated" results allows the user to see all numerical value measurements in a table format

Possible to display results based on a filtered criterion



If you need to simplify your life



...it‘s time for

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hot systems