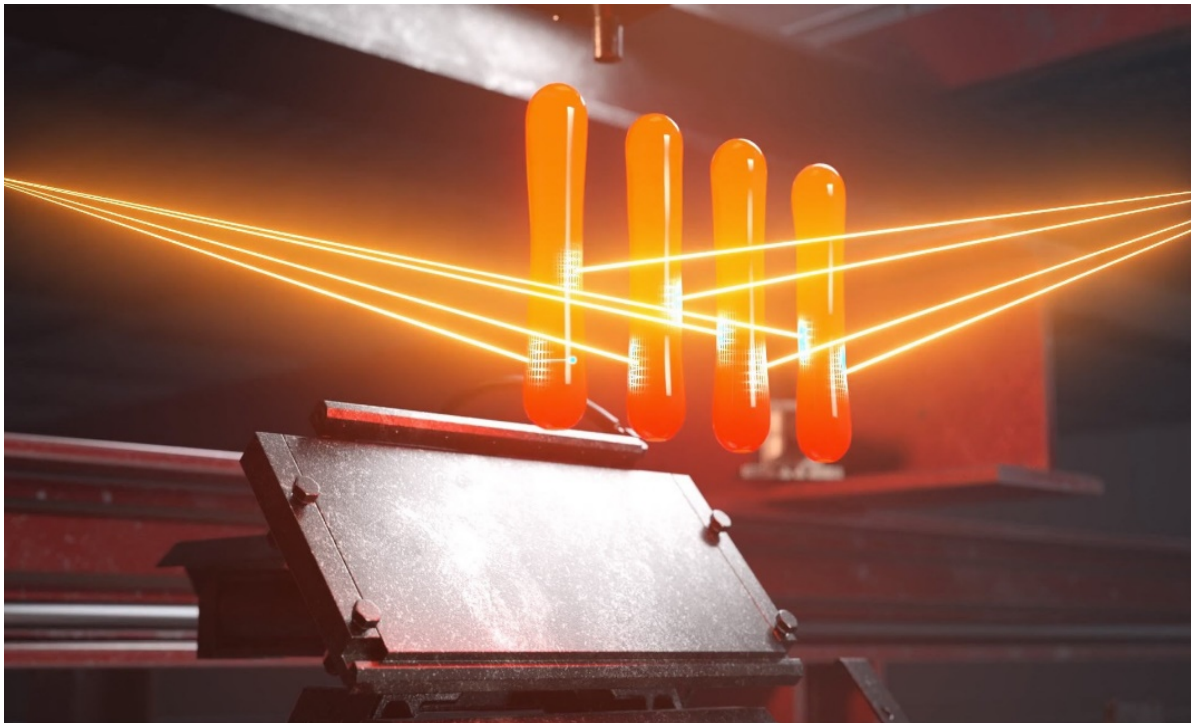


Technical News Bulletin

Planegg, February 2019



GobRadar

- Real time online measurements
- Improved stability
- Process automation

Introduction

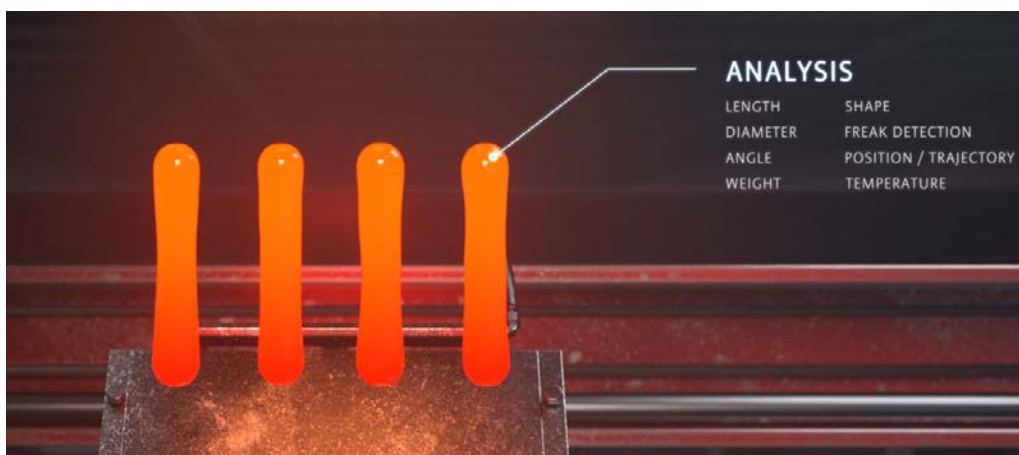
GobRadar is a camera-based gob observation and measurement system (sensor) providing a number of measurements for each and every single gob such as weight, length and shape allowing closed loops like **closed-loop weight control**.

Two separate high-speed matrix cameras in cooled housings are installed on the feeder platform monitoring the gobs just after the cut. These images from two angles are used to create a 3d-model of each gob.

The real time data acquired includes:

- Weight
- Length
- Diameter
- Angle
- Position
- Trajectory
- Shape
- Freak detection
- Temperature

GobRadar is suitable for all manufacturing processes and can offer automatic weight control in Blow & Blow where the PPC weight control is not usable.



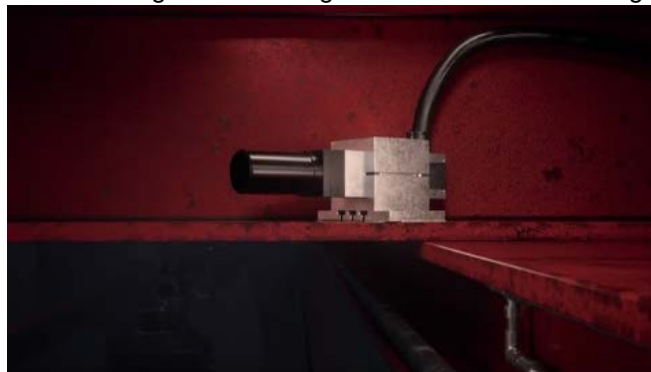
Each gob is taken into account in real-time. **Closed-loop weight control** stabilizes the process and herewith avoids problems related to weight deviations. Reducing weight deviations can eventually also save glass. Monitoring of all process relevant parameters in real-time allows to detect trends and to further optimize the production.

With the GobRadar and FlexIS additional future closed-loops will be enabled.

Only **GobRadar** will work seamlessly with these new advanced technologies.

System Description

The camera housings of the **GobRadar** are specifically designed to withstand the harsh environment in the feeder area. The cooled camera housings avoid soiling of the camera lens through a special design and flushing with air. The unique optical inlet from cameras virtually



design, protecting the contamination, makes the maintenance-free.

The two cameras are installed at a 90° angle to obtain images to create a real 3d model of the gobs (angles from 70° to 110° are possible, different distances to the gobs for the two cameras are also possible). The two cameras achieve an almost 360° view of the gob and avoid false measurements that can destabilize the process (bending to the far side of the camera).

All connections from the cameras run through cable hoses and end in a connection box located on/or close to the feeder platform. From this connection box all cables lead to the dedicated **GobRadar** processing computer in the IS control room.

The GobRadar interfaces with any line information system, the PPC or an existing scale. It is delivered with its own dedicated scale to obtain gob weight information in one of two versions, either an integrated weighing station or a separate touch screen and scale.

In addition to the dedicated touch screen the **GobRadar** web user interface can be displayed and used over an Ethernet connection or wireless on a mobile device.

With the appropriate hardware the **GobRadar** can control the tube and all needles for optimal automated weight control.

The **GobRadar** standard delivery consists of

- Two camera units
- Camera mounting brackets
- Connection box
- GobRadar control cabinet

One of two touch screen and scale options are included in the standard delivery:

- Option: Scale station (scale and touch screen integrated into one complete station)
- Option: Separate touch screen (with mounting arm) and separate scale

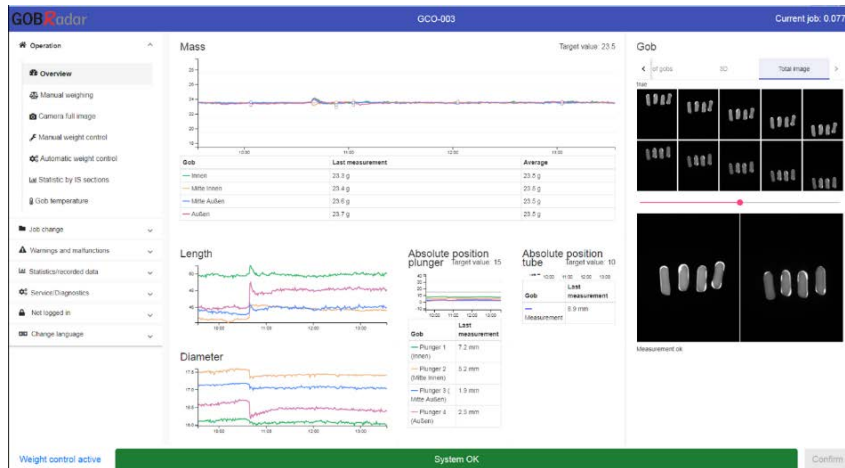
Available as option:

- Option: Needle Adjustment Drives
- Option: Interface to PPC

User Interface Screens

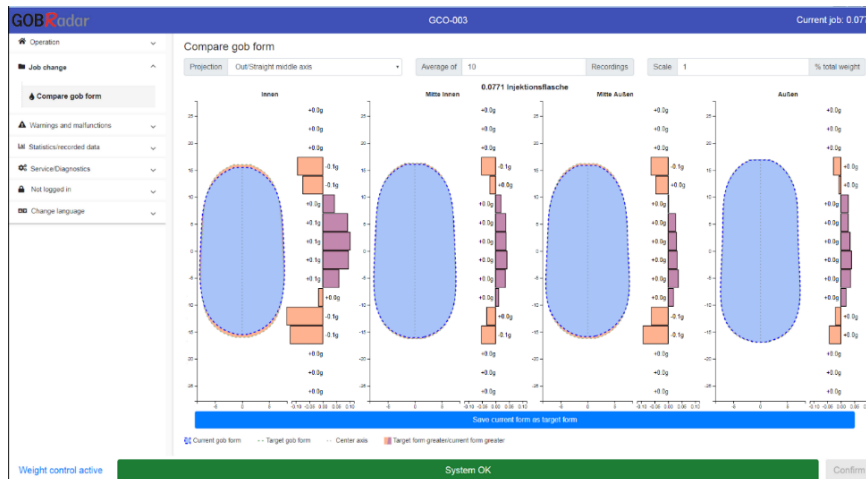
The user interface is web based and can be displayed on a wide range of devices.

Main Screens - One or more main screens can be configured by the customer to display relevant process parameters. One screen is mostly configured to show mass, length, diameter and closed-loop control signals. The user can view the 3d-model of the gobs from all angles.

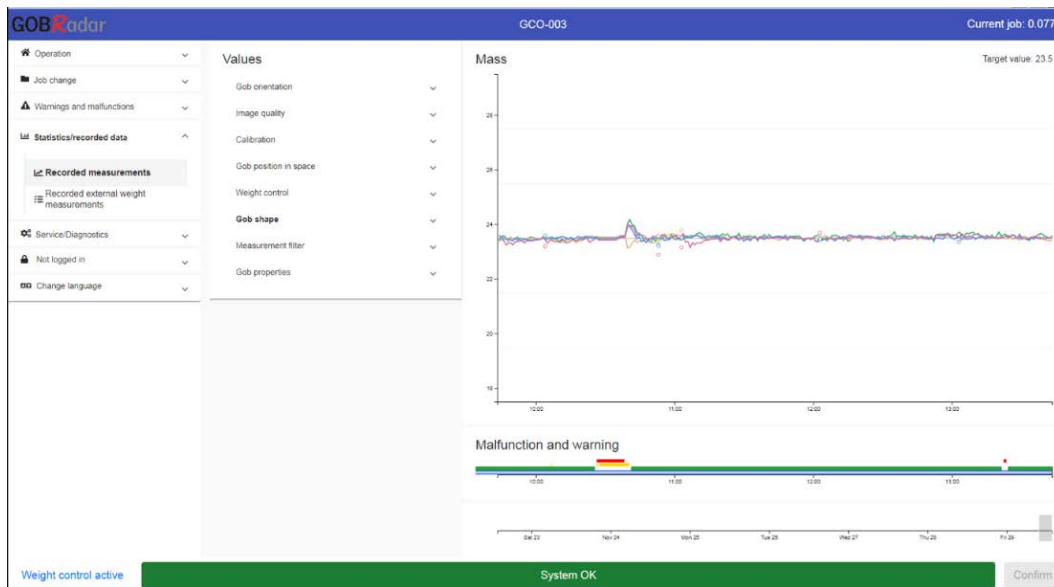


Compare gob form Screen - The shape of the gobs can be stored for reference and compared to current production. This is especially helpful during job change to reproduce the “last time best shape” but also for continuous monitoring during production.

Different sectional views can be shown (straight middle axis, front, side, max. curvature).



Statistics Screens - A wide range of parameters are recorded and statistics can be displayed for further analysis. Malfunctions and warnings are stored and shown on a clear timeline for reference.



GobRadar fully supports **multi-weight production** and can help reduce job change times significantly.

Closed-loop weight control – Comparison of the gob weight using only manual weight measurement and **GobRadar** with continuous weight measurement and adjustment.



Availability

GobRadar can be integrated into all new projects and also be installed in virtually all existing installations. Existing drives can be used under certain conditions.

Installation Requirements

Control cabinet

Electrical power 230VAC 50/60Hz

To be installed in air-conditioned room (HxWxD: 935x600x385mm)

Connection box

Compressed air, cooling water *

Camera brackets

Must be bolted or welded to a solid structure

Scale station

Electrical power 230VAC 50/60Hz

Touch screen

Electrical power 230VAC 50/60Hz

Scale

Electrical power 230VAC 50/60Hz

Signal Exchange

At least the shear cut signal must be provided and additionally at least the main timer for multi weight. Integration depends on FlexIS version and can also be done for legacy controls (e.g. T600).

(*) for detailed specs please refer to the product manual

Summary

- **GobRadar** measures important properties of each gob (weight, length, diameter, temperature, ...)
- Enables **closed-loop weight control** improving the process in real-time
- Typically allows to keep the weight within 0.25% (typically $\pm 0.5g$)
- Continuous measurements of 100% of the gobs
- High speed cameras allow operation with restricted view (only part of the gobs visible)
- Real-3d view through large view angle, 3d-model of the gobs
- Works for Press & Blow, NNPB and also for Blow & Blow
- Reduces the workload through less manual weighing
- Compares to “ideal gob shape” improving job change time
- Monitors critical parameters including limit geometry values (shape)
- Possibility to reject gobs outside pre-defined parameters
- Eventually allows to further improve the process and save glass
- Allows to identify trend developments for important process parameters
- Fully supports multi-weight production greatly improving job change time
- Interfaces with **FlexIS** and **PPC**
- Will enable further advanced applications with the Emhart **SmartFeeder**
- Quality assurance and traceability right from the start when the gobs are cut
- Innovative design to protect from contamination in the harsh conditions in the feeder area
- Intuitive web operator interface allows to display on the factory floor and on mobile devices

Features / Benefits

Features	Benefits
Real-time online measurements	<p>Continuous measurements allow insights into the process in real-time. This enables monitoring and traceability right from the start and allows to detect trends at an early stage.</p> <p>Real-time data = better process information</p>
Closed-loop weight control	<p>Measuring each gob allows to take live control over the process and not merely every time a manual weight measurement is performed.</p> <p>Improved stability = increased efficiency</p> <p>Reduced work load for the operators – less manual weight measurements</p> <p>Less demand on operator = increased efficiency</p>
Compare gob shape	<p>Comparing the gob to a previously saved “best” shape allows to reduce the job change time. Continuous monitoring ensures process stability.</p> <p>Improved job change = increased efficiency</p>
Multi-weight support	<p>Especially the demanding task of multi-weight production and job change is improved.</p> <p>Improved job change = increased efficiency</p>
Process automation	<p>A key sensor for <i>End to End</i> enabling future applications such as the Emhart <i>SmartFeeder!</i></p>