Billions to gain
Introduction to XPAR Vision

- Global container glass industry
- Hot End inspection and forming process control
- Development and implementation – customer support

- Innovative & technology leader
- Decades of experience
Introduction to XPAR Vision product portfolio

IR-D
Hot end infrared camera solution for inspection, process monitoring and quality control
Introduction to XPAR Vision product portfolio

IGC
Hot end solution for monitoring and automated controlling the weight of the gob for process and quality control
Introduction to XPAR Vision product portfolio

Gob Assist
*Hot end* camera solution for monitoring and controlling the gob loading for process and quality control

BTC
*Hot end* sensor solution for monitoring and controlling the temperature of the blank mould, neck ring, plunger, gob and parison
Introduction to XPAR Vision product portfolio

XMIS
SQL database solution for hot end analyzing and reporting
Factual information is a pre-condition for
- developing **XPERT**
- automation
Billions to gain
Agenda

- (F)actual gains achieved with the use of XPAR Vision product portfolio
  - New technology creates new possibilities
- Future outlook re: forming process control
- Predict potential gain globally → what the container glass industry can/should contribute to “efficiency for survival”
XPAR IR-D: InfraRed Dual camera system
XPAR IR-D capabilities

Product focus
- Bird swing
- Thin spot
- Thin bottom, neck, wall
- Chacked neck
- Wedged bottom
- Freak
- Stuck ware
- Inclusion
- Shape
- Verticality
- Fin

Process focus
- Swabbing
- Loading
- Section performance
- Ware handling
- Cooling
- Speed
- Mould condition/design
- Gob temperature
- Section stop-start
- Job change
XPAR IR-D gains

- Improved ware spacing

1% – 4%
XPAR IR-D gains

- Reduced held ware / blocked ware / resorting

50% - 80%
XPAR IR-D gains

- Reduced specific rejects produced → improved process performance, reduced sections stops, improved quality

Customers reclamations
Cost of poor quality
2% - 10%
XP AR IR-D gains

- Time gain due to fast intervention → improved process performance, reduced section stops, improved quality

Customers reclamations
Cost of poor quality
2% - 10%
XPAR IR-D gains

- Improved swabbing → consistency amongst operators

Health Safety Wellbeing

1% - 2%
XPAR IR-D gains

- Improved job change → shorter ramp up time
  - Transport screen → reject stuck ware
  - Overview screen → react on alarm
  - Machine graph → stabilize machine
- Hand over

1% - 2%
XPAR IGC: Infrared Gob weight Control system
XPAR IGC capabilities

- Automated control of weight of all gobs - operator independent
- Accurate weight control < 0.5% of the weight
XPAR IGC gains

- Reduce weight variation: glass usage, defects, stable forming process

  ➔ 0.2% – 0.3% accuracy
  ➔ reduced weight variation from 1% to 0.4%
XPAR GA/BTC

- GA: Gob Assist
- BTC: Blank side Temperature Control
XPAR GA capabilities

- Position into the blank mould
- Speed
- Length
- Shape
- Diameter
- Orientation
- Time of Arrival (T.O.A.)
XPAR GA capabilities → gob length

Length, shape and diameter can be very different when they arrive at the blank.
XPVRA GA capabilities → gob length

- Gob length strongly relates to friction
- Critical point of friction: the curve at the entrance of the deflector
- Effective remedies:
  - Lubrication/swabbing
  - Coating
  - Construction
- When to do what?

- Other learnings
  - Length → shape → diameter
  - Friction relates strongly to speed and time of arrival
    - Low friction → high speed and early TOA
    - High friction → low speed and late TOA
Effect length on quality

- When the length is shorter it will have an impact on the shape. The gob will deform.
- A shorter length, a bigger diameter and a lower speed will result in a change in the forming process in the blank.
- Due to the change of the input (gob) the gob falls not as deep as normal in the blank.
- The IRD control chart will show more variation at several zones and the bottom intensity will increase while the intensity in the neck zone will decrease: the glass distribution changes.
Effect length on quality

The bottom intensity changes due to the shorter gob and will affect the Verticallity of the bottle
XPAR GA gains

- Length, shape, diameter (speed, ToA)
  - Less uncontrolled sections stops
  - Improved material life time
  - Improved quality

- Position
  - Improved material/coating life time
  - Reduced swabbing
  - Improved quality
XPAR GA gains

- Improved efficiency
- Improved quality
- Improved know how
- Reduced operator workload
- Improved safety
XPAR BTC capabilities

- Blank half’s
- Neck ring’s
- Plunger
- Gob
- Parison
XPAR BTC capabilities

Plunger temperature
day/night

Left blank day/night:
5% difference gives different
glass distribution!

Parison day/night: glass
thickness bottom changes >
10%
XPAR BTC gains

- High accuracy measurement
  - Timing + Position

- New improvements are within reach
  - Controlled glass distribution
  - Improved quality
  - Light weight
  - No surprises

TBD
Better control leads to....

- Reduction of customer complaints
- Reduction of weight
- Increase of speed
Weight gains

* Relative glass thickness fluctuations in the same section plane of different, randomly taken glass bottles

Prof. Dr.-Ing. H. Hessenkemper, Glas- und Emailtechnik (TU Bergakademie Freiberg)
Summary statement

(F)actual gains achieved with the use of XPAR Vision product portfolio

- Improved ware spacing: 1% - 4%
- Reduced held ware / resorting: 50% - 80%
- Reduced specific rejects produced: 2% – 10%
- Time gain due to fast intervention: ---
- Improved swabbing: 1% - 2%
- Improved job change: 1% - 2%
- Reduce weight variation: 1%
- GA → zero defects production: 2% - 4%
- BTC: TBD
- Customer complaints: !!
- Weight / speed gains: !!
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Miminizing human dependency
Minimizing human dependency: XPERT

List of Actions
Role of XPERT in the XPAR picture

XPERT

IR-D  IGC  GA/BTC

Other inputs
- IS Timing
- Hpc
- Environmental parameters
Detect change from normal process

- Faulty bottles are detected automatically
- No input from user!
IR images

Good  Final blow too late  Final blow too early
BoX

XPERT

IR-D  IGC  GA/BTC

Other inputs
- IS Timing
- Hpc
- Environmental parameters
…..and more to come!!!

**XPERT**

- IR-D
- IGC
- GA/BTC

Other inputs:
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Billions to gain

ONE METRIC TON OF CO₂

HEALTH SAFETY WELLBEING
Potential potential gain globally

- With what’s available today → 5%
- Within reach → 25%
- Global market size 45 – 50 Billion
- Savings 2.5 → 12.5 Billion
sustainability goals

- Cut global energy consumption by 50%
- Reduce total carbon dioxide-equivalent emissions by 65 percent
- Increase recycled content to a global average of 60 percent
- Eliminate workplace accidents