Improvements of wet chemical etch equipment (SAT) to support Infineon Zero Defect Strategy

Dr. Ursula Meyer; Infineon Austria AG

AGENDA:

- **Equipment Improvement - Motivation**
- **Levers & Modifications**
- **Targets & Results**

Our Team

- **Gerhard Wahl**; equipment engineer & system expert
- **Willi Schwarz**; process engineering
- **Ursula Meyer**; process engineering & project management
- **Michi Holzinger**; APC expert
- **Gernot Auer**; IT and system integration
- **Dieter Frank & Team**; IT

SAT equipment improvement - motivation

High throughput tool

SAT: **S**pray **A**cid **T**ool

Critical process application

Processes:

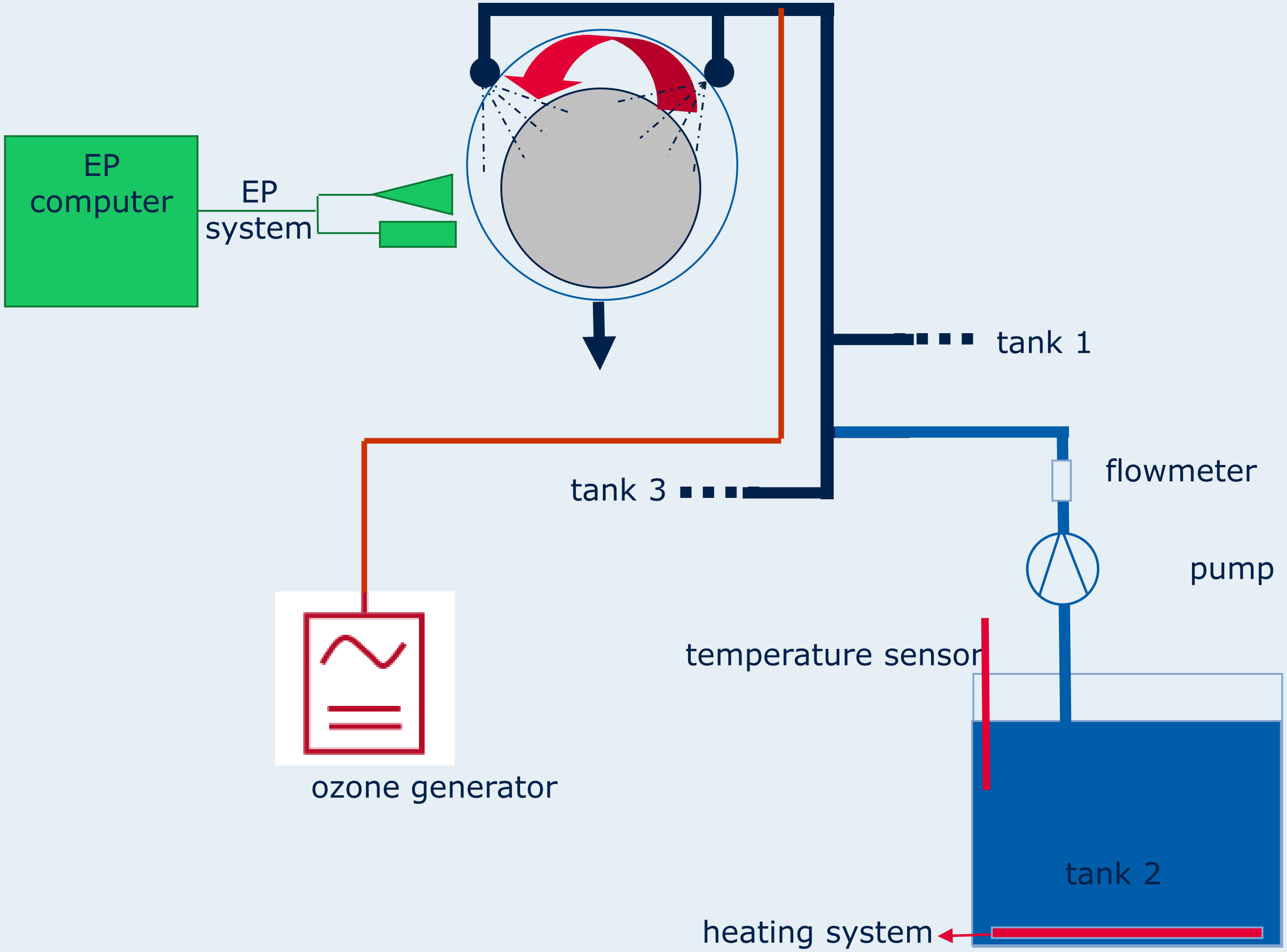
- Etching: Al, Si, Cu, W, TiW
- Resist removal
- Rinsing & Drying

Poor performance

Challenges:

- **Process stability**: cpk 30% below target
- **Equipment stability**: Unscheduled down > 10%
- **Wafer scrap**: 300% above target

SAT equipment improvement - motivation



Levers, Modifications & Targets

Levers & Modifications

- Bearingless **pumps** adapted and installed

- New **sensors** integrated for temperature, chemistry, flow
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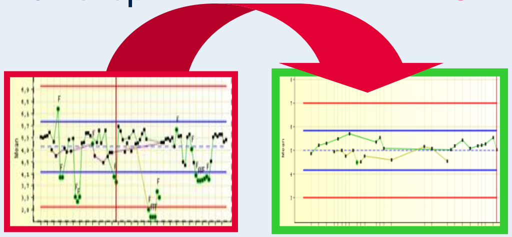
TARGETS & RESULTS

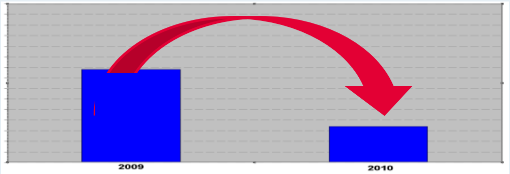
- **Process stability**

  Improve cpk +20%



- **Equipment stability**

  Reduce Equipment Down -50%



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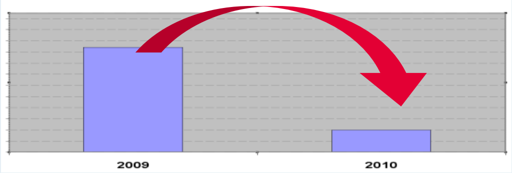
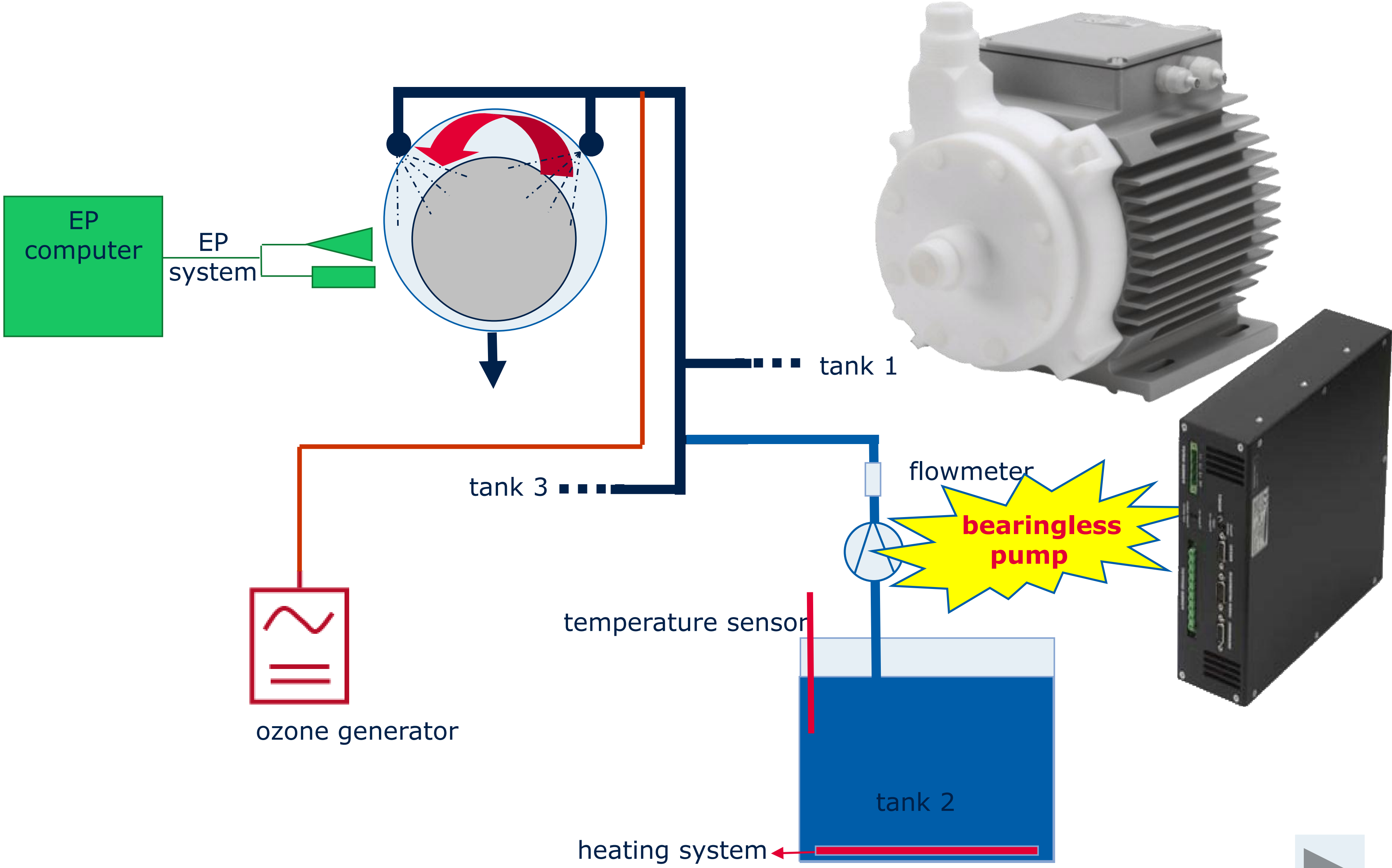


Complex and In-Depth Hardware Modification at SAT1D



EP computer

EP system

tank 1

flowmeter

bearingless pump

tank 3

temperature sensor

ozone generator

tank 2

heating system

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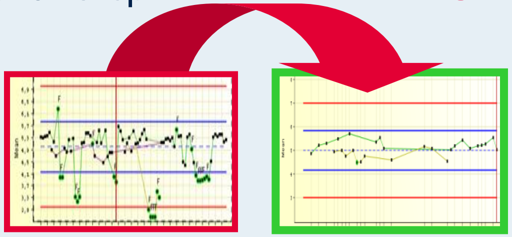

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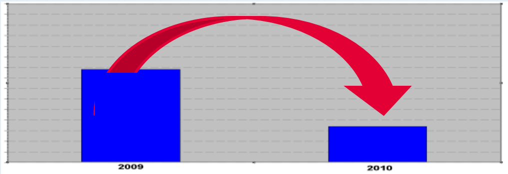

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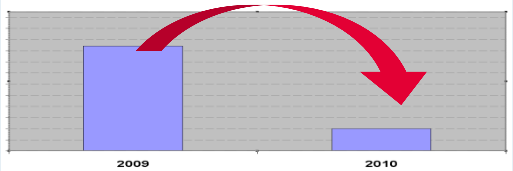

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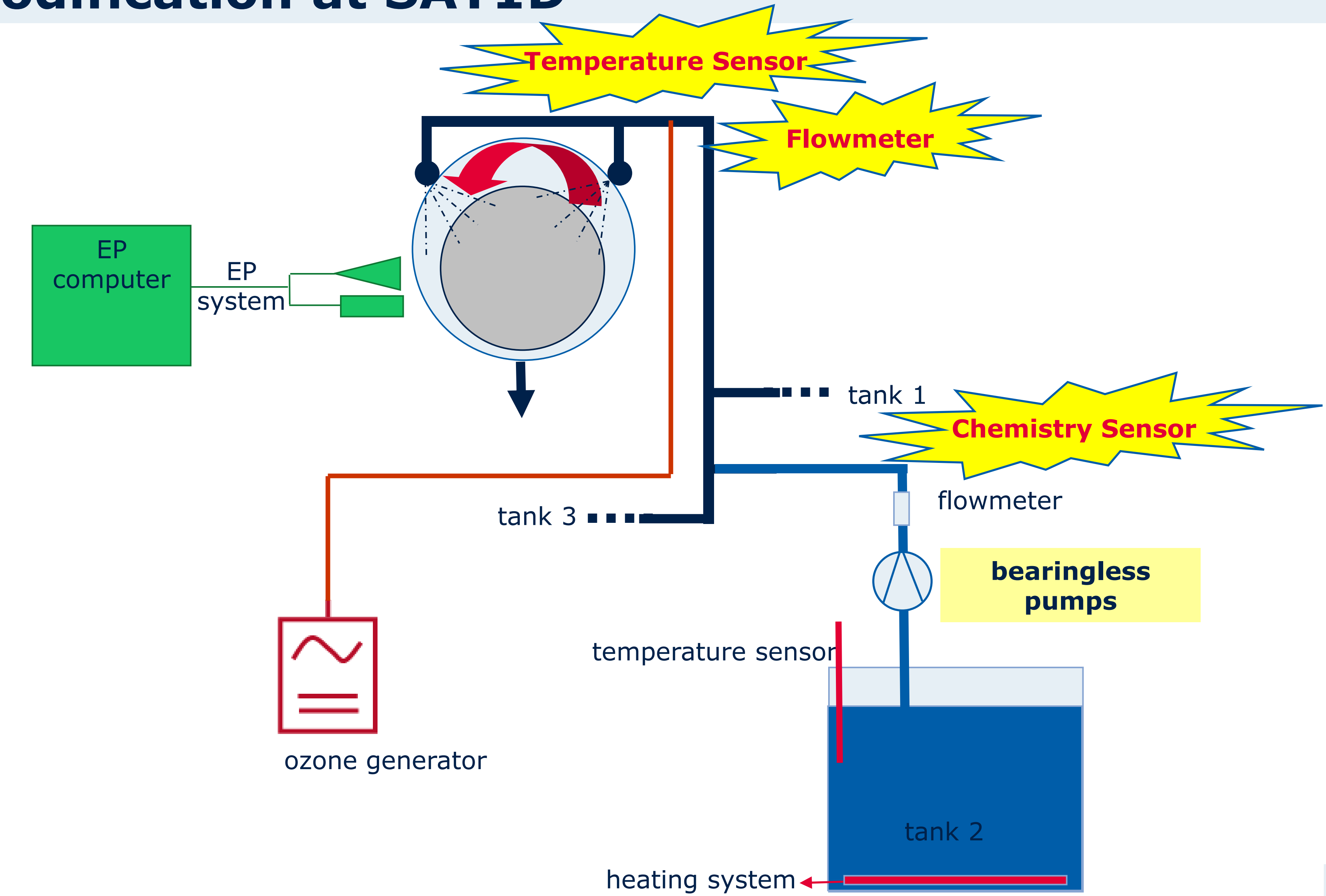

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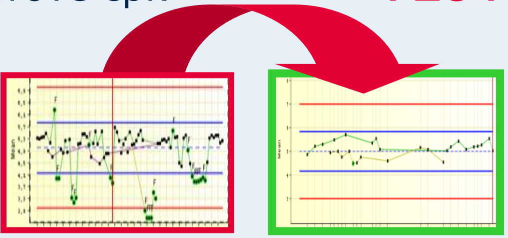

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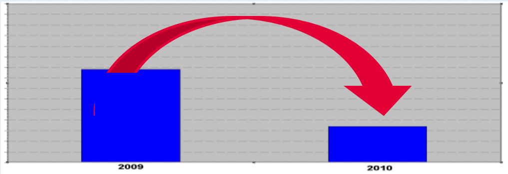

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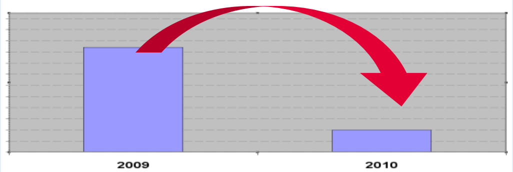

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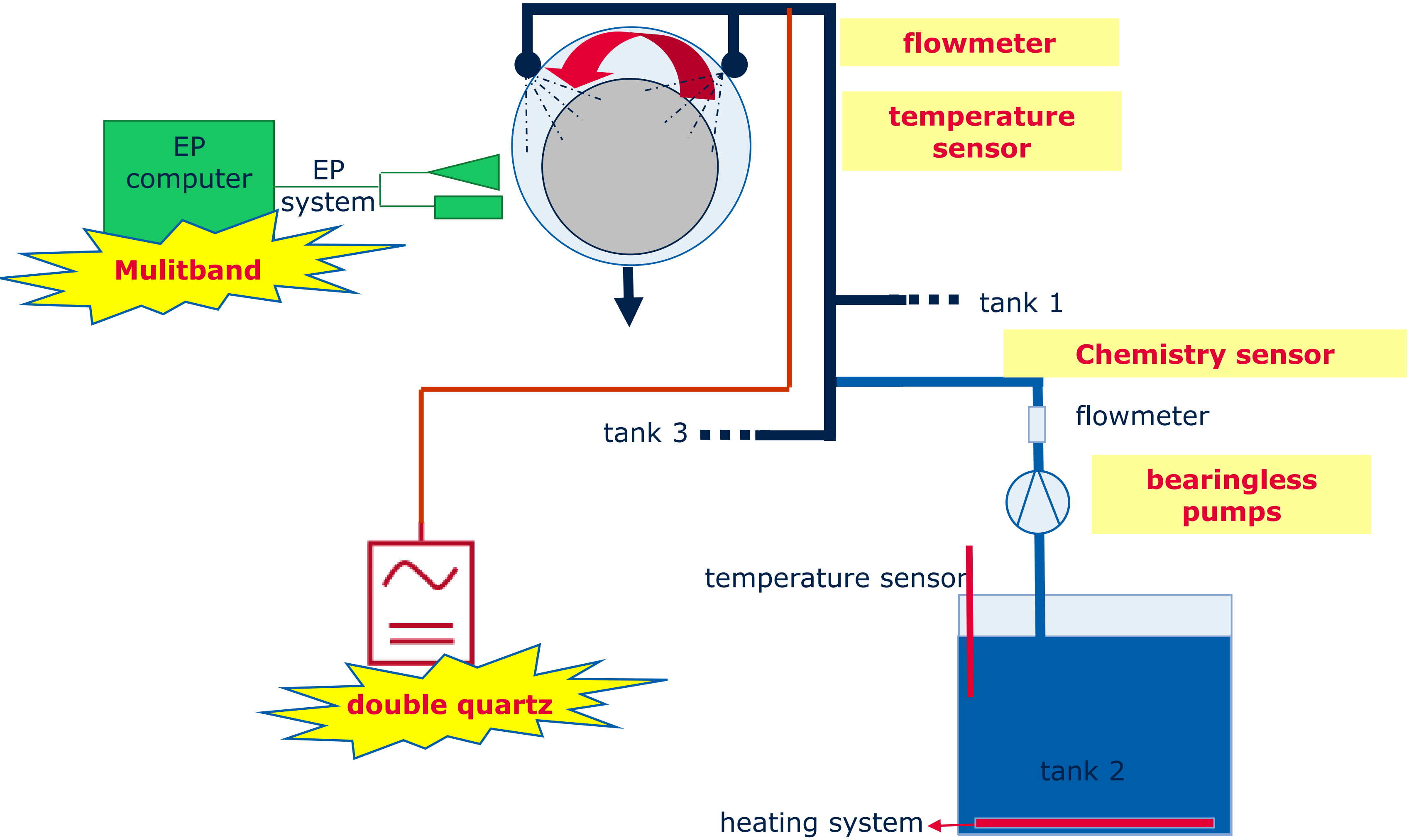

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temperature sensor

Chemistry sensor

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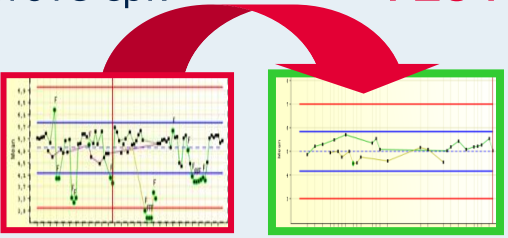

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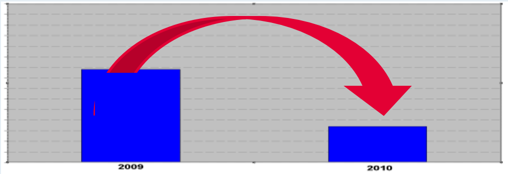

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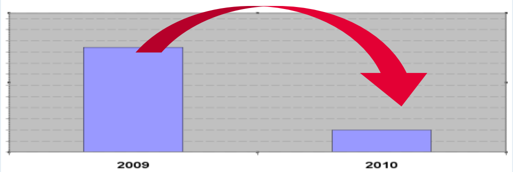

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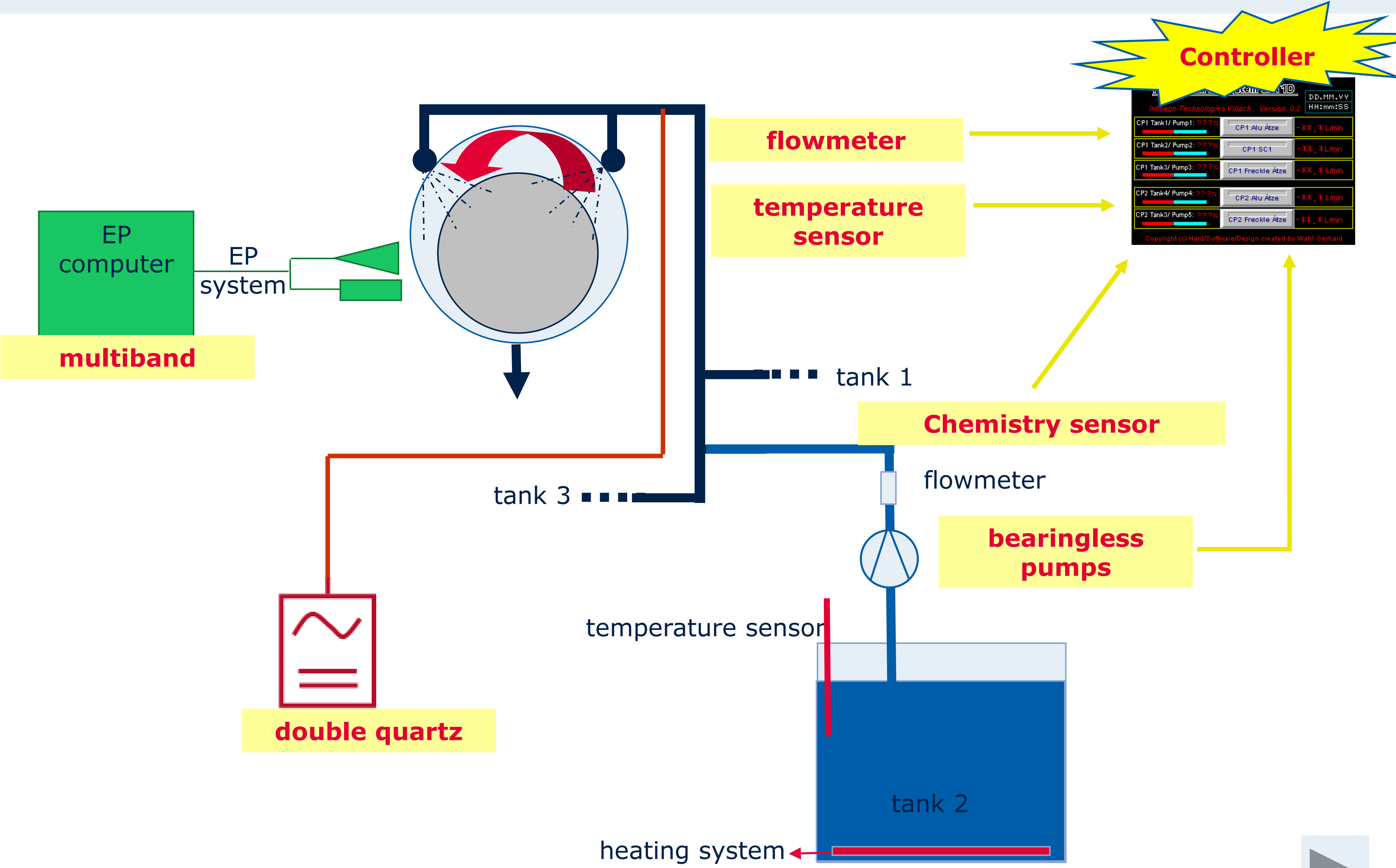

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multiband

Chemistry sensor

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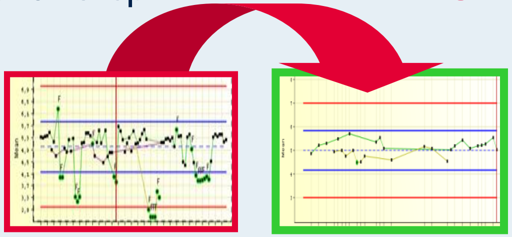

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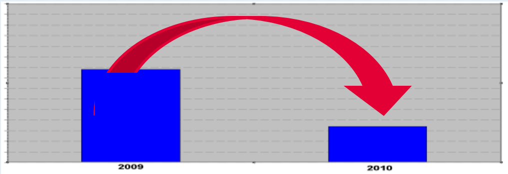

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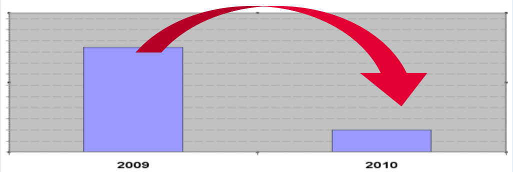
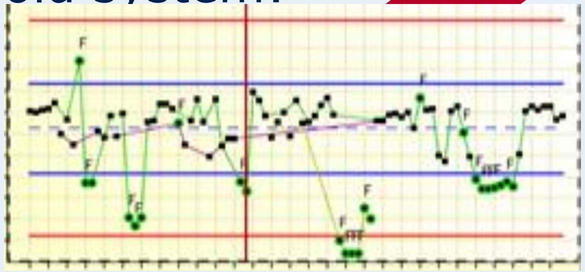
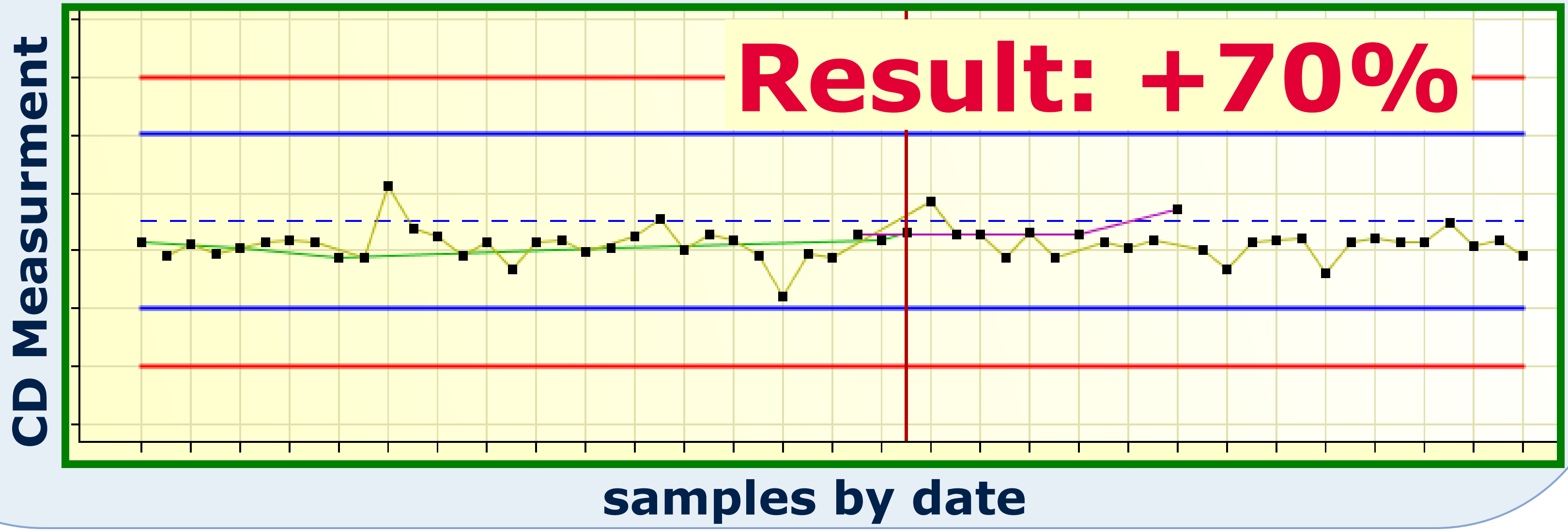


Results
process uniformity - cpk

Target +20%

old system:





Result: +70%

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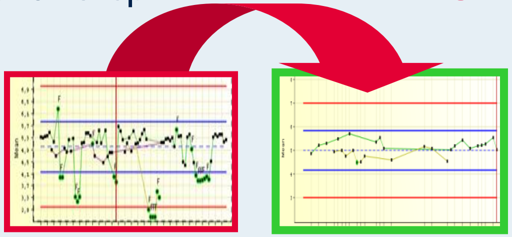

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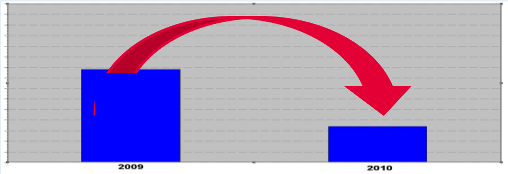

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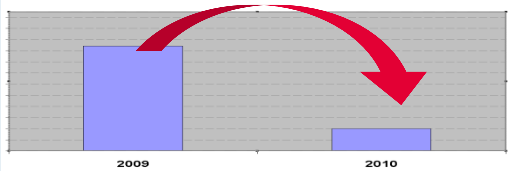

Results
Equipment Performance

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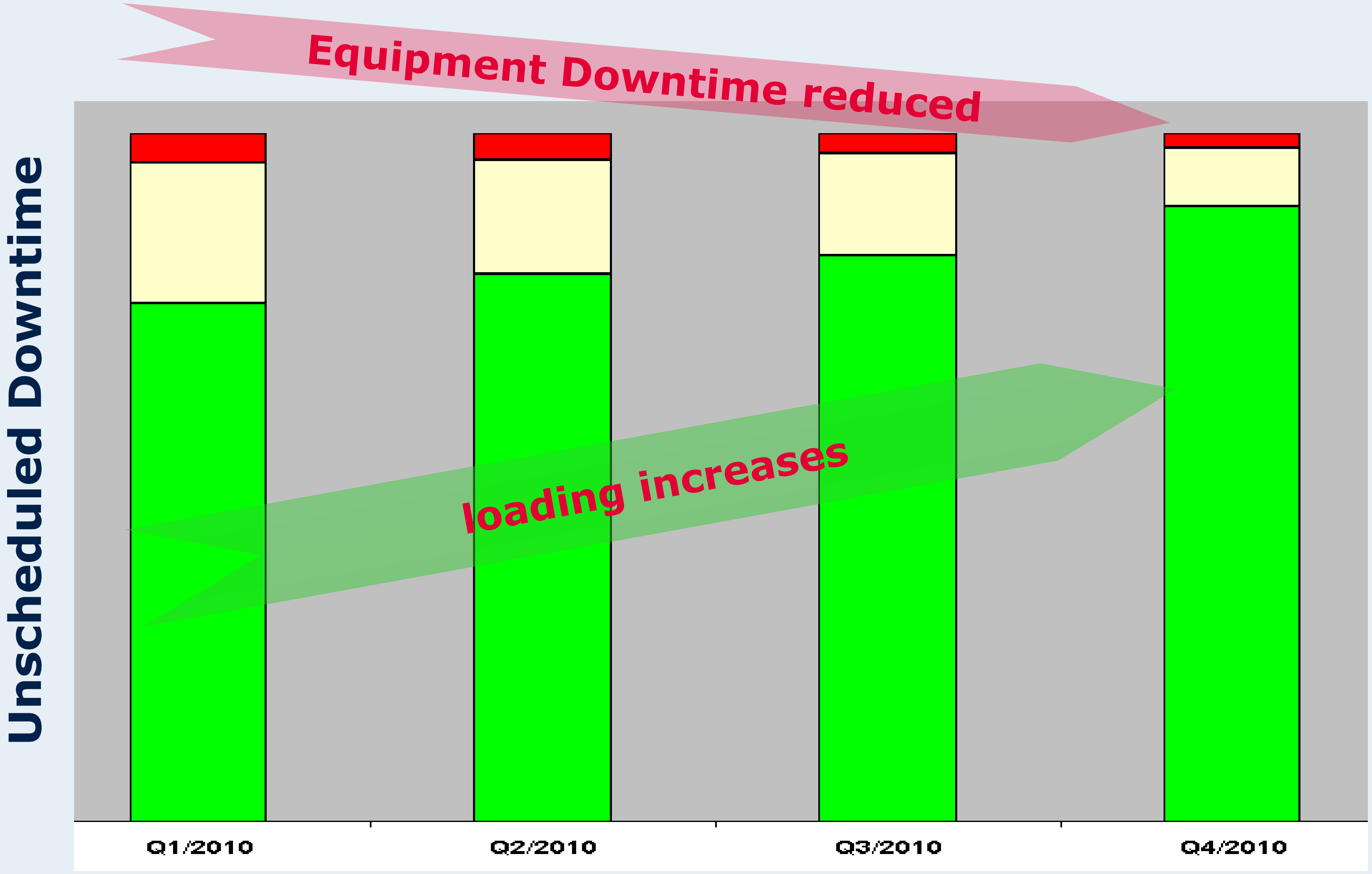

Quater

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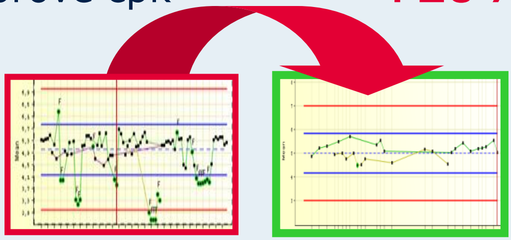

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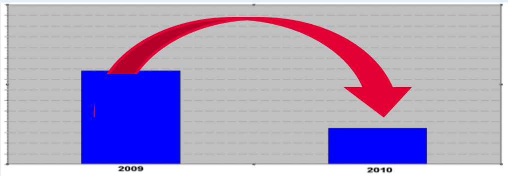

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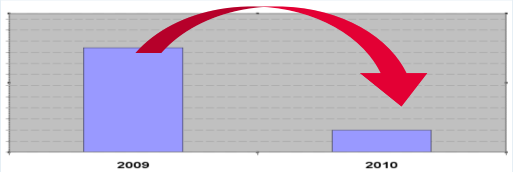
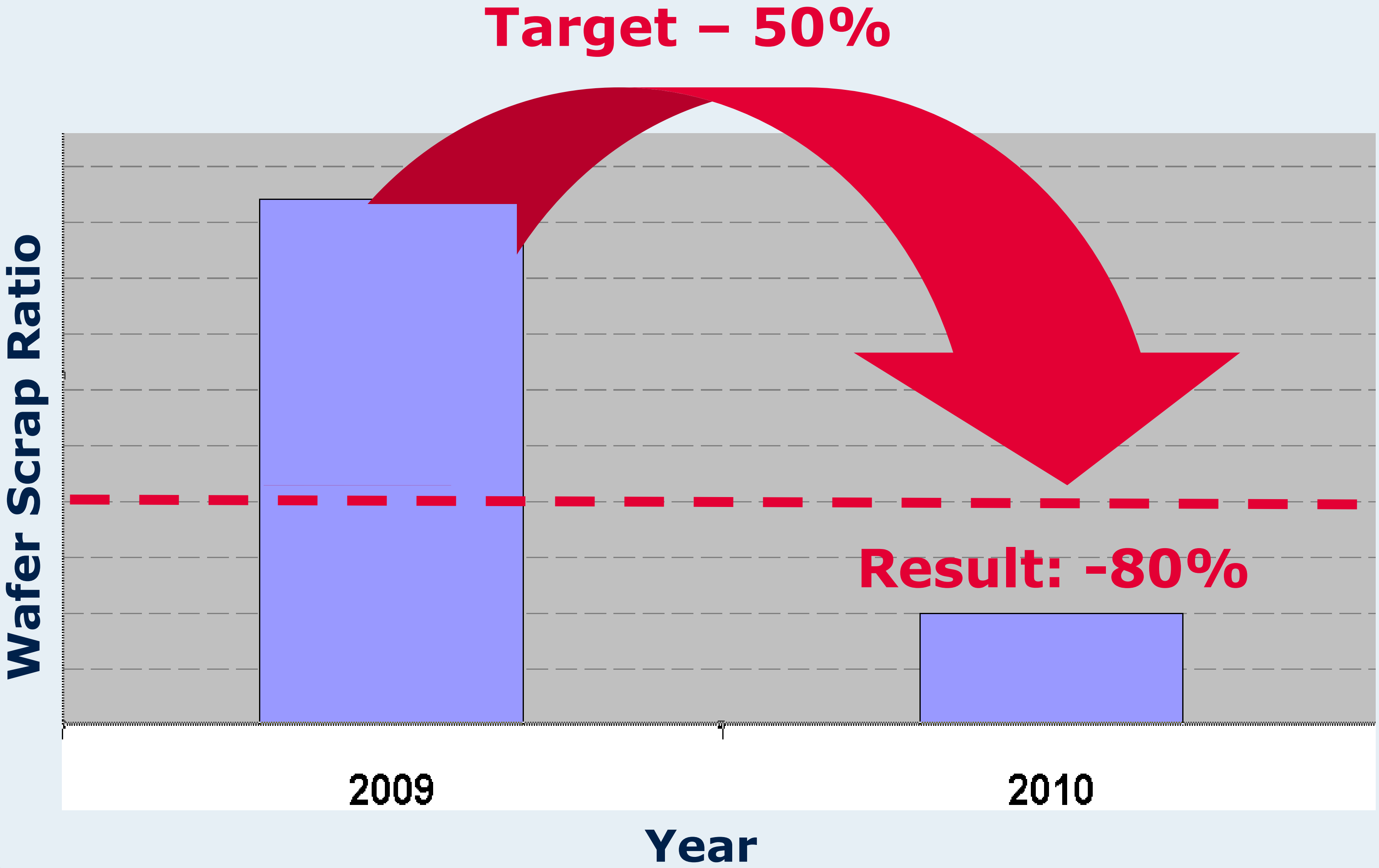


Results
Wafer Scrap



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