

# Fully automatic lines for chemical strengthening of glass



Source: Tata



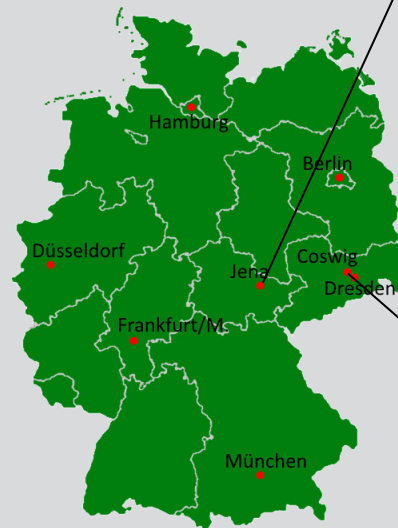
Source: Mercedes



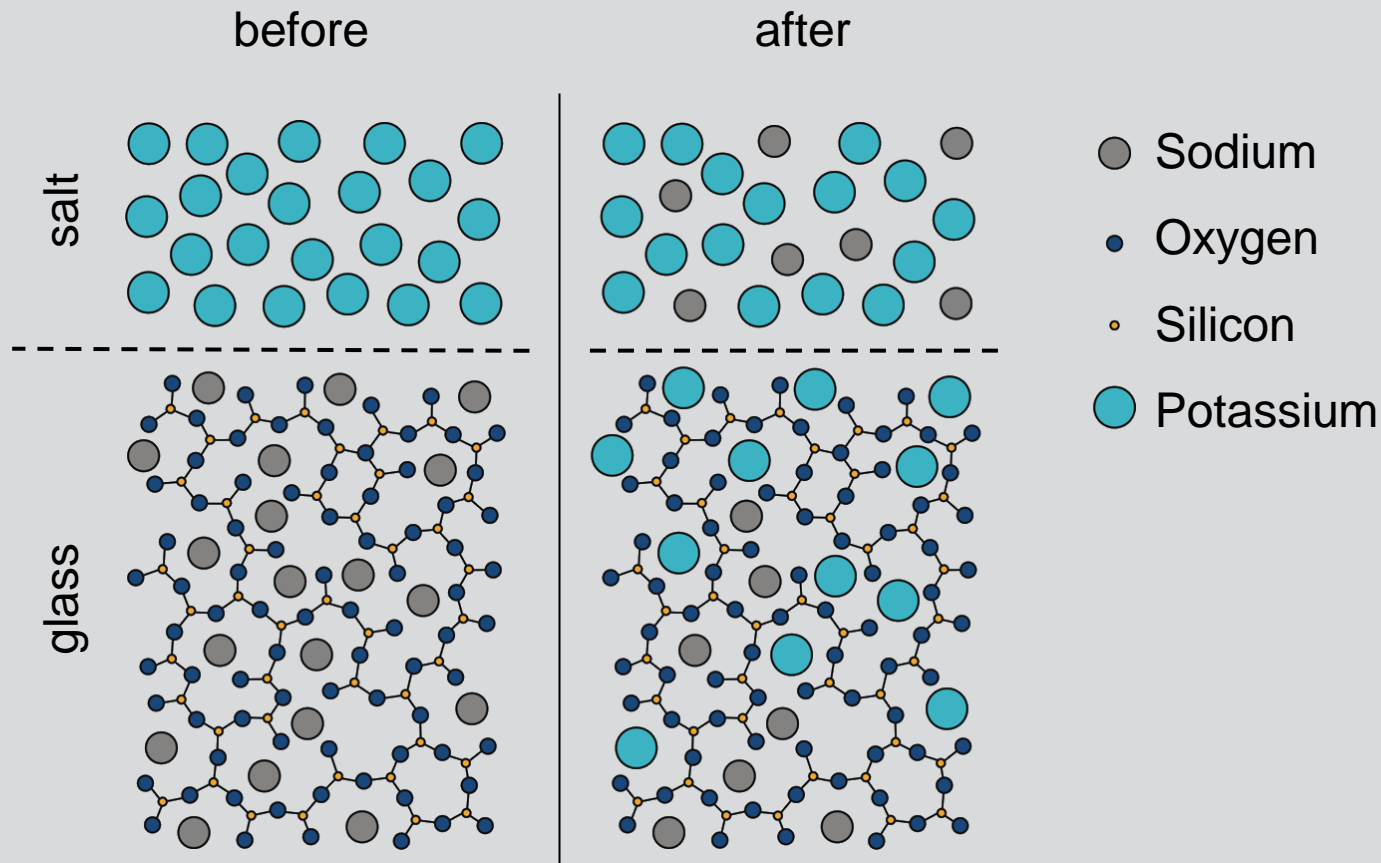
Source: Tesla

## HISTORY of JSJ-Group

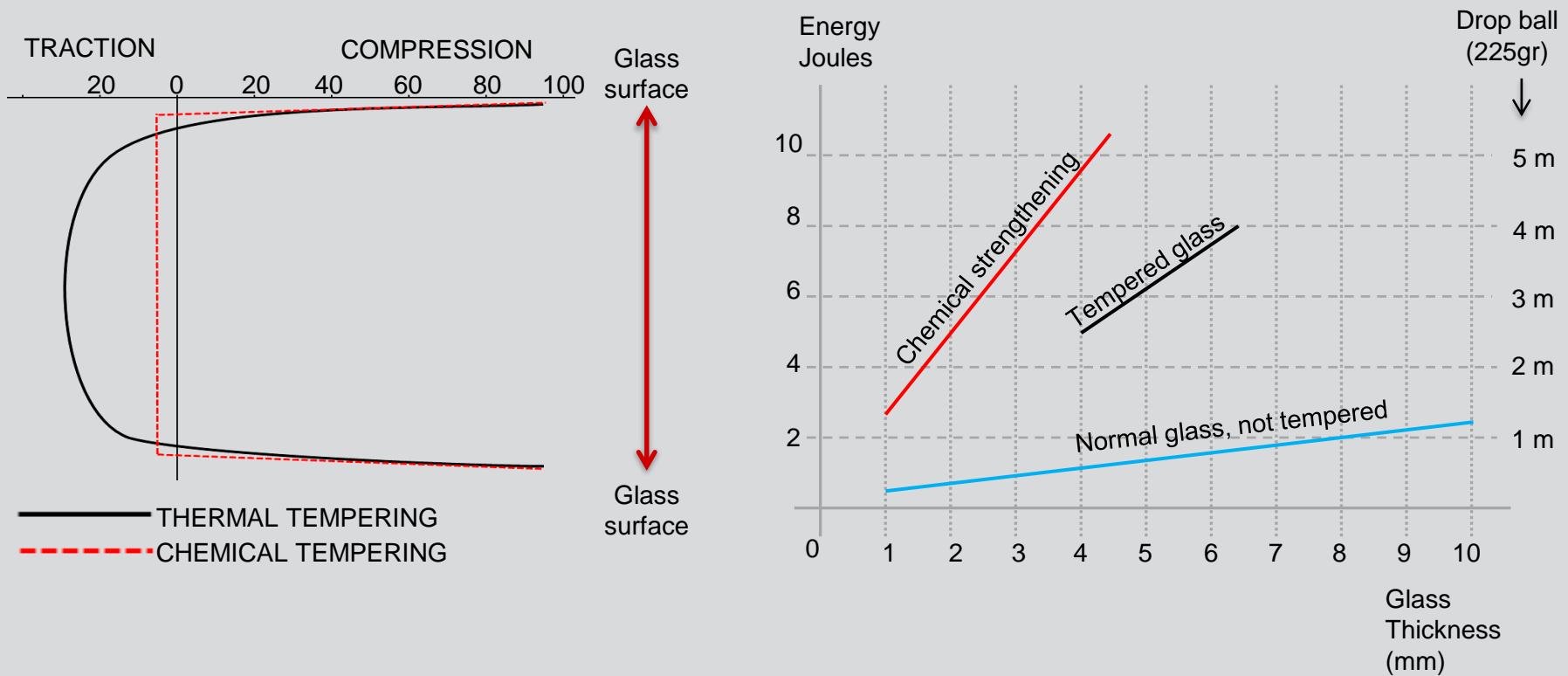
JSJ Jodeit, Jena	1991
(EFR, Glass activities)	2009
(IGM, Tube drawing)	2012
Glamaco, Coswig (founded in 1957)	2014
JSJ Glass Technology (Shenyang), China	2018



## Principle of chemical strengthening of glass: Ion exchange in a salt bath at 380°C to 450°C

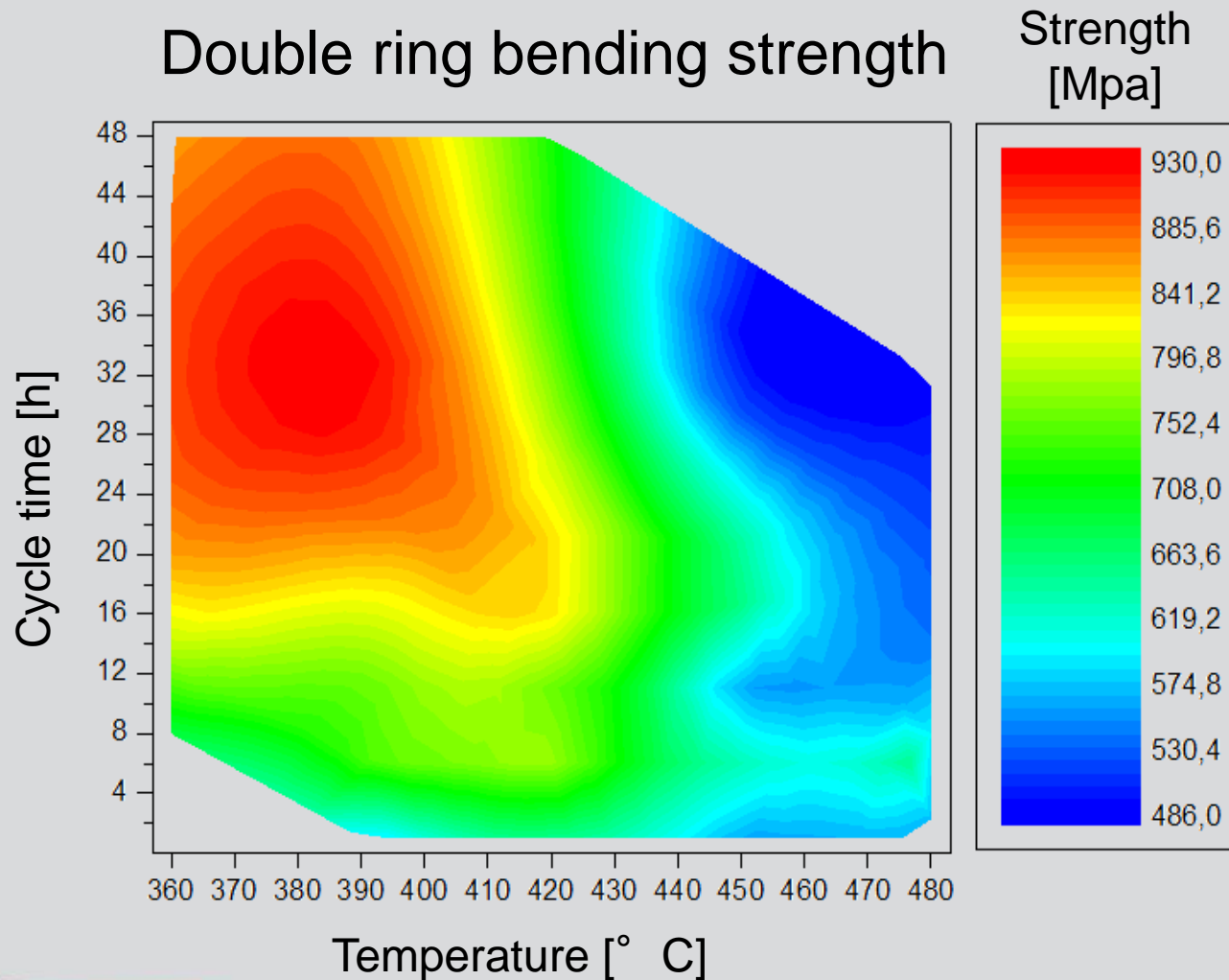


## Characteristics

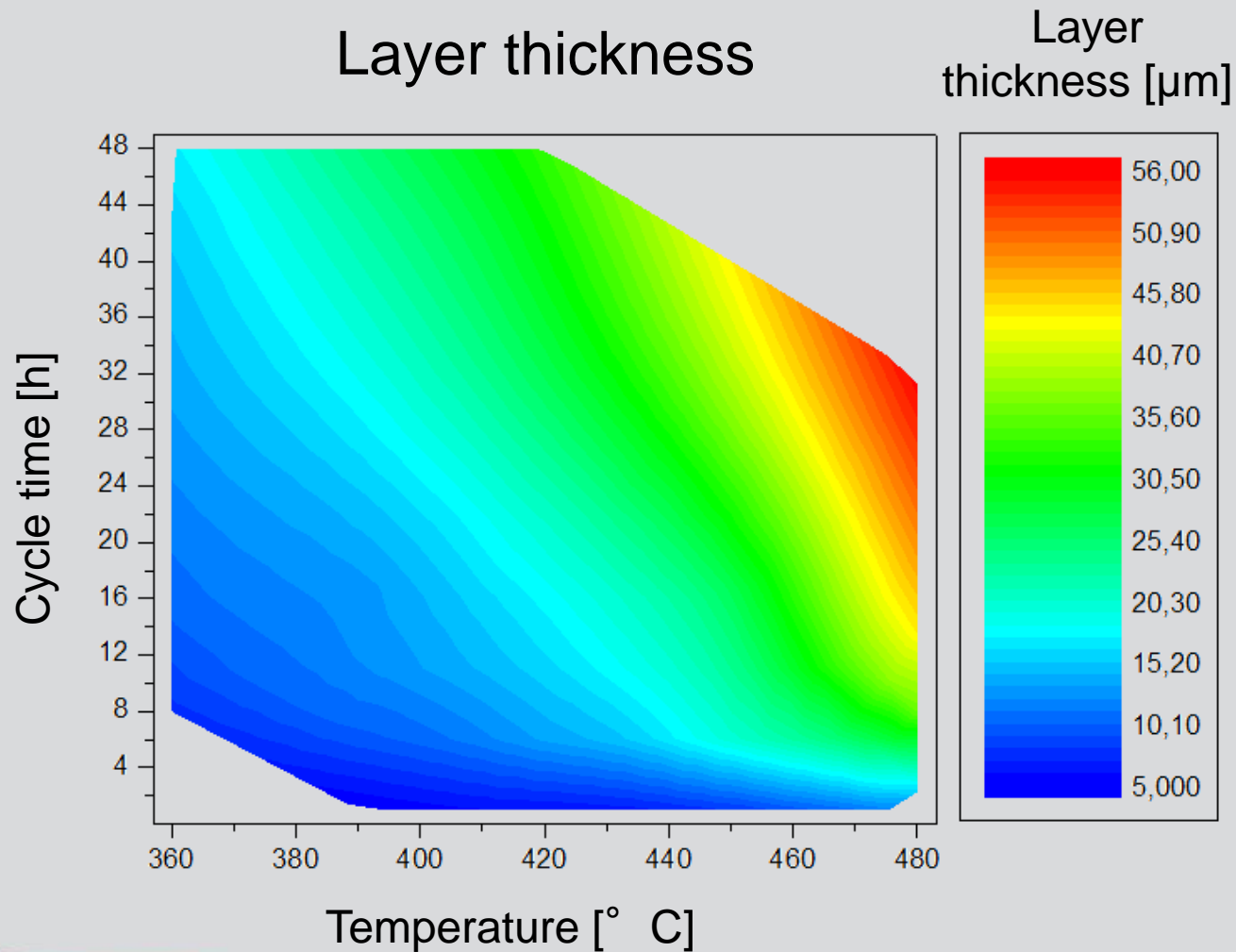


Values of CS by

Double ring bending strength



Values of DOL by





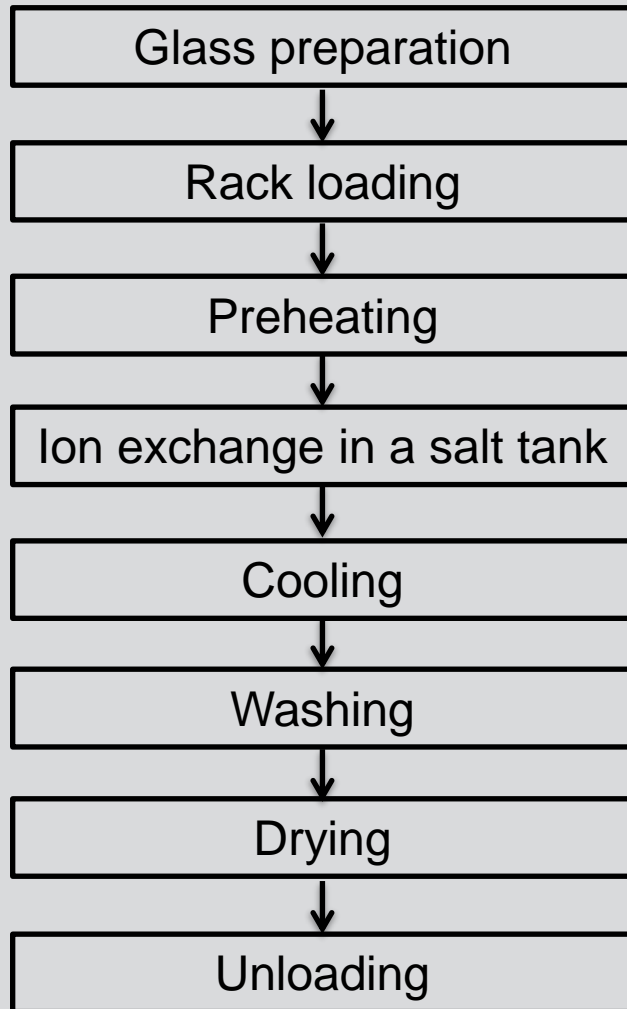
## **Advantage of chemical strengthening**

- High resistance against mechanical impact
- High resistance against scratches
- No optical distortion
- Tempering of thin glass possible

## **Applications**

- Display and cover glass
- Car interior
- Automotive glazing (light weight)
- High speed trains and cars
- Boats and Yachting
- Military applications
- Security glass and fire protection doors
- Architectural glass
- Aircraft industry
- Table ware
- Optical glass

## Technological process





## Cross section

### 1. Rack:

carry the glass sheets  
clip solution (patent-registered)

### 2. Preheating / Cooling chamber:

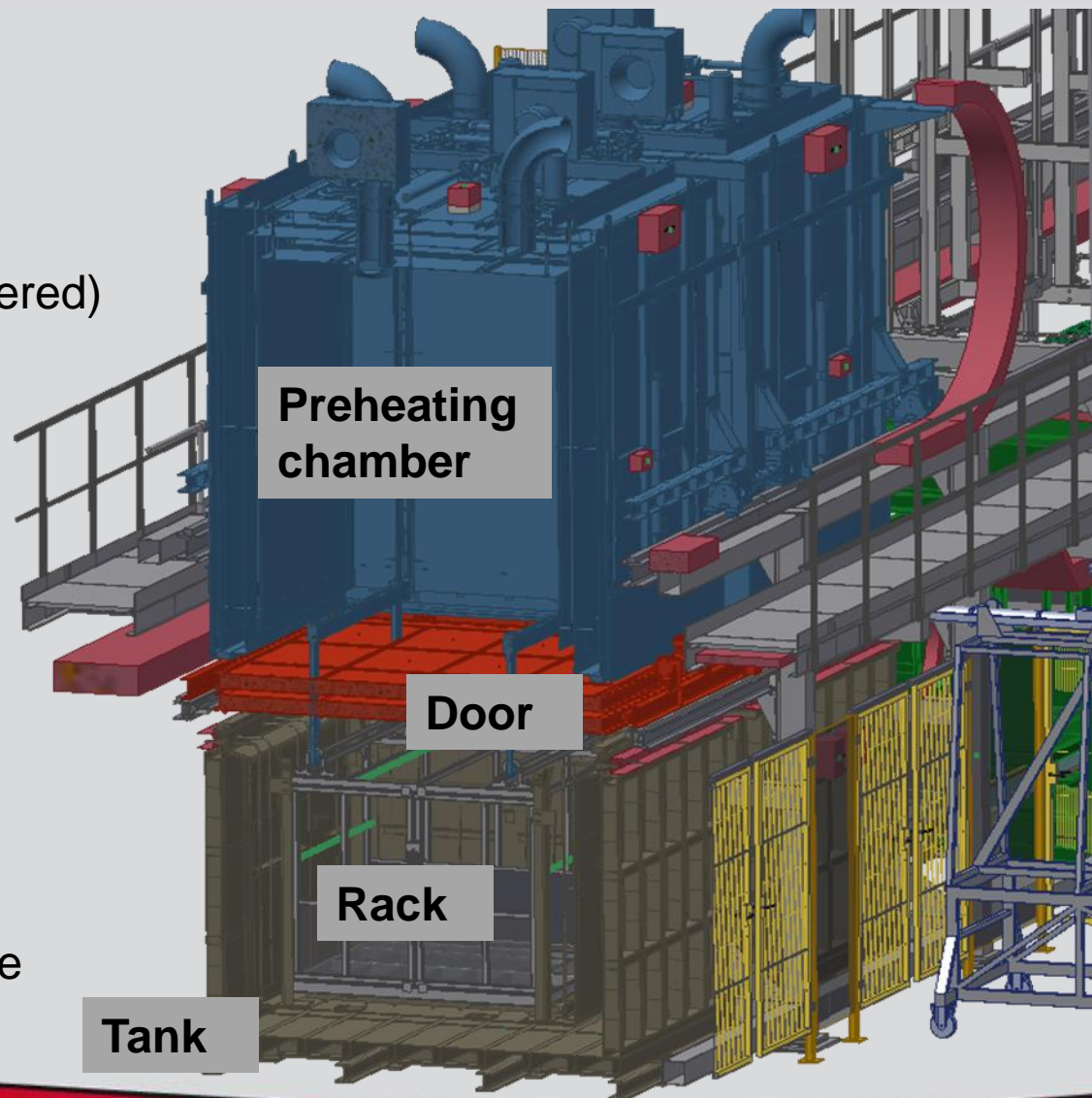
electric heated oven with  
forced air convection

### 3. Door:

covers the tank and the  
chamber

### 4. Tank:

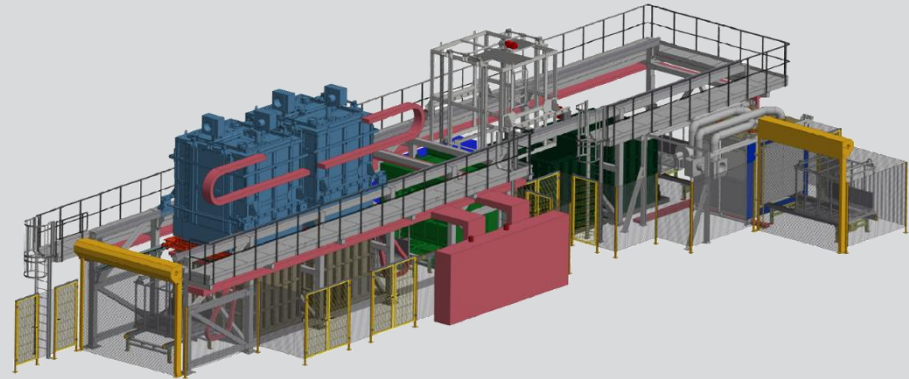
includes the heating for the  
molten salt  $\text{KNO}_3$



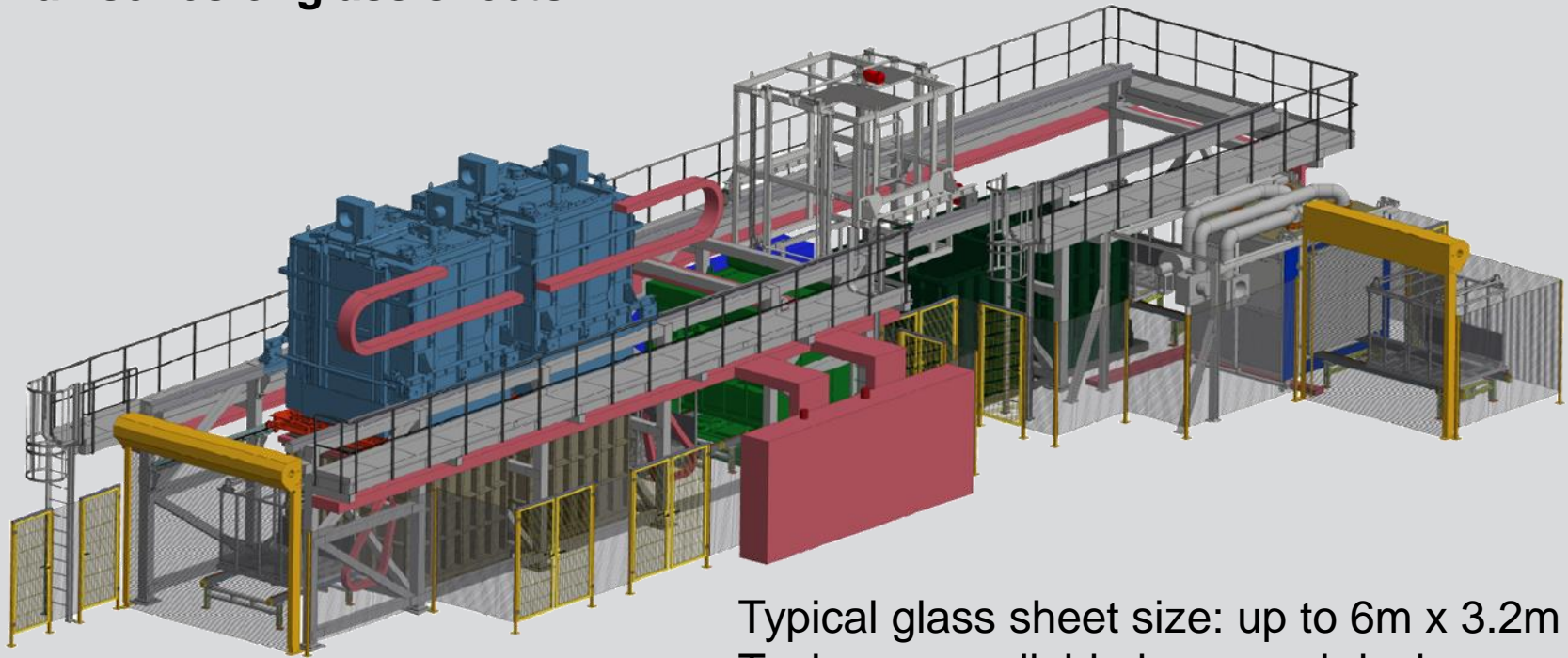
## CHEMICAL STRENGTHENING OF GLASS

Our chemical strengthening lines are noted for their

- functioning and robustness
- low energy consumption
- high degree of automation
- ease of operation
- low maintenance cost



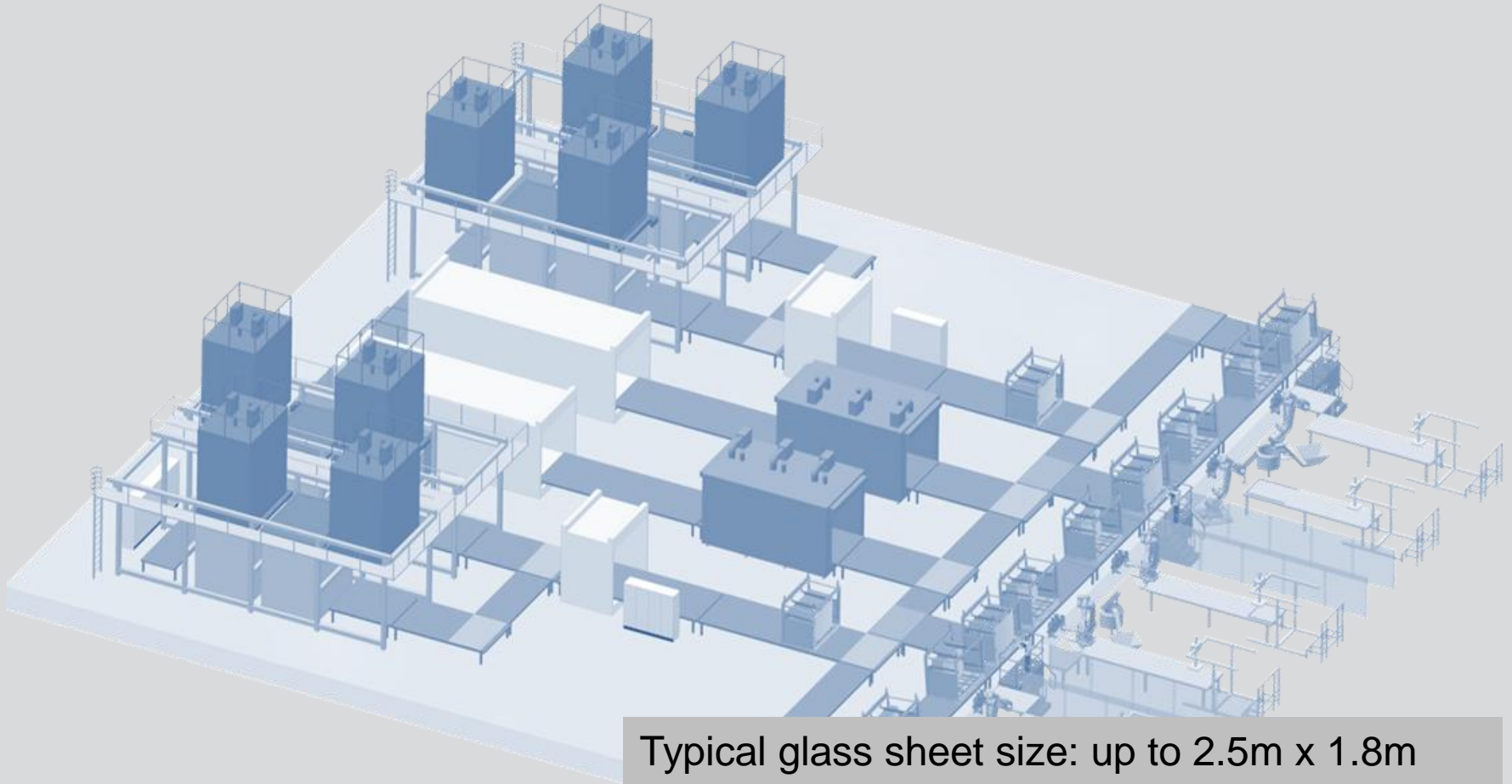
**Fully automatic batch process  
capable for single glass sheets and  
small series of glass sheets**



Typical glass sheet size: up to 6m x 3.2m  
Tanks are available in several design  
sizes.

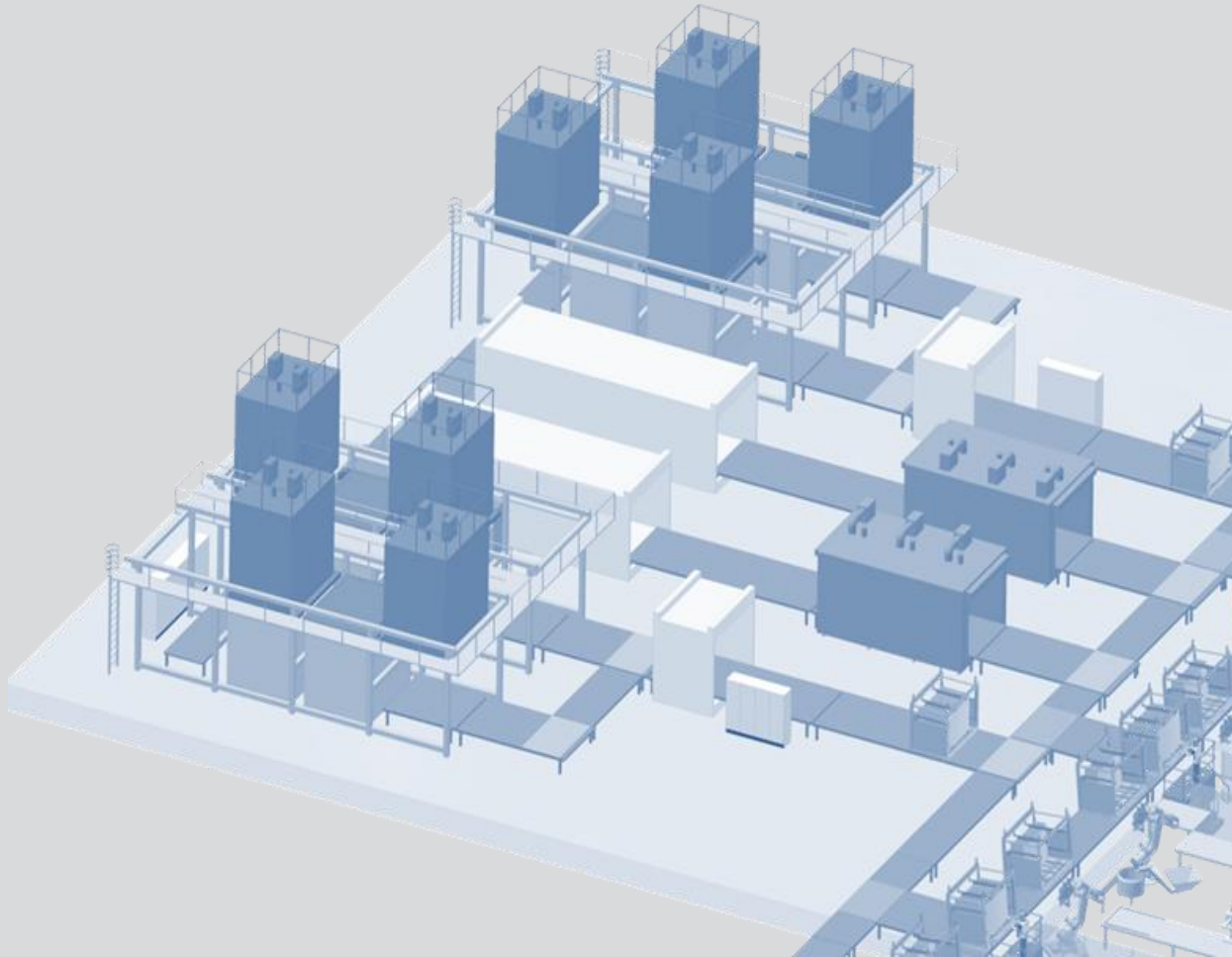


## Layout: fully automatic lines for mass production in automotive glass



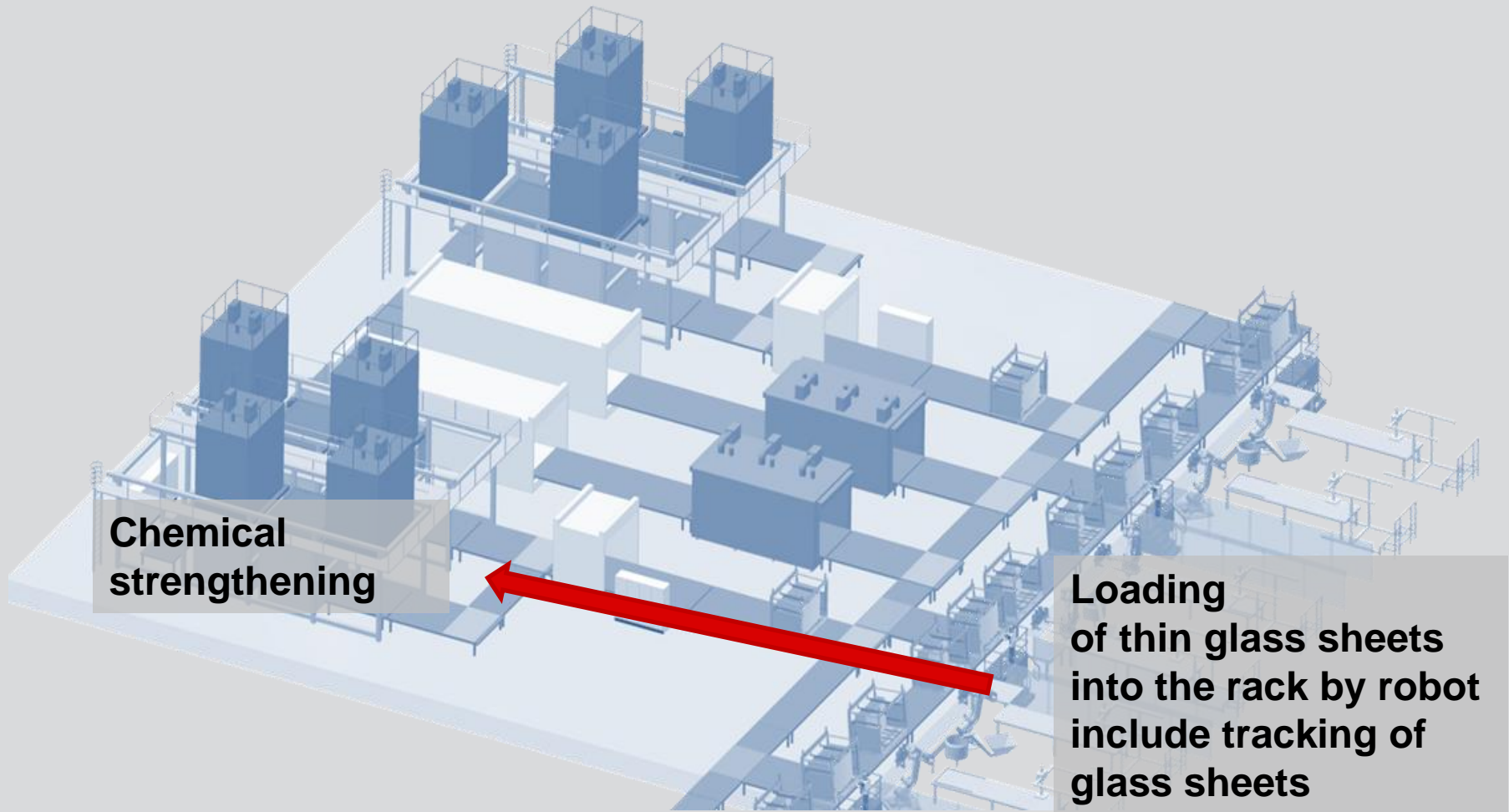
Typical glass sheet size: up to 2.5m x 1.8m  
Tanks are available in 3 design sizes.

## Layout: full automatic lines for mass production



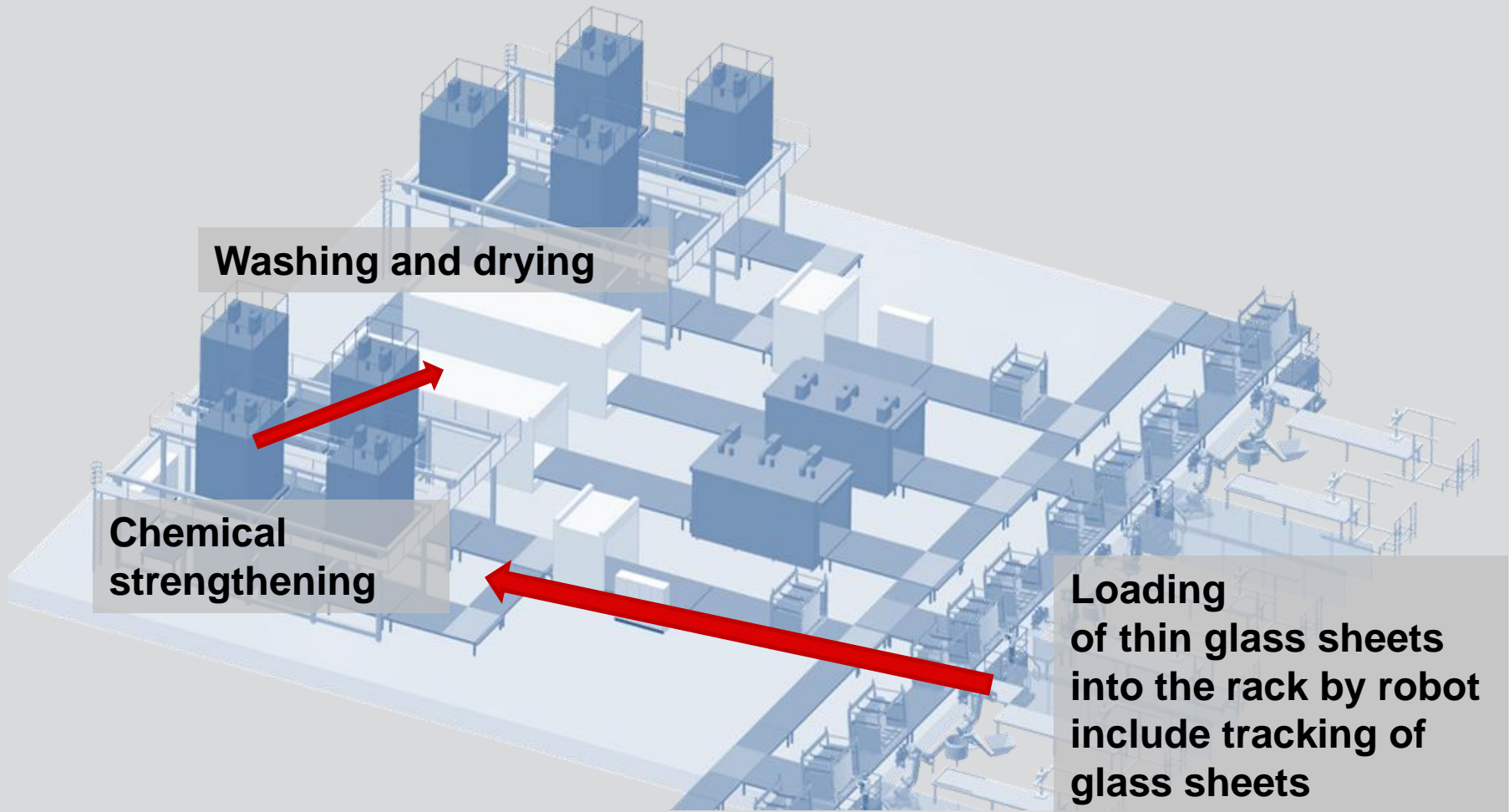
**Loading  
of thin glass sheets  
into the rack by robot  
include tracking of  
glass sheets**

## Layout: full automatic lines for mass production

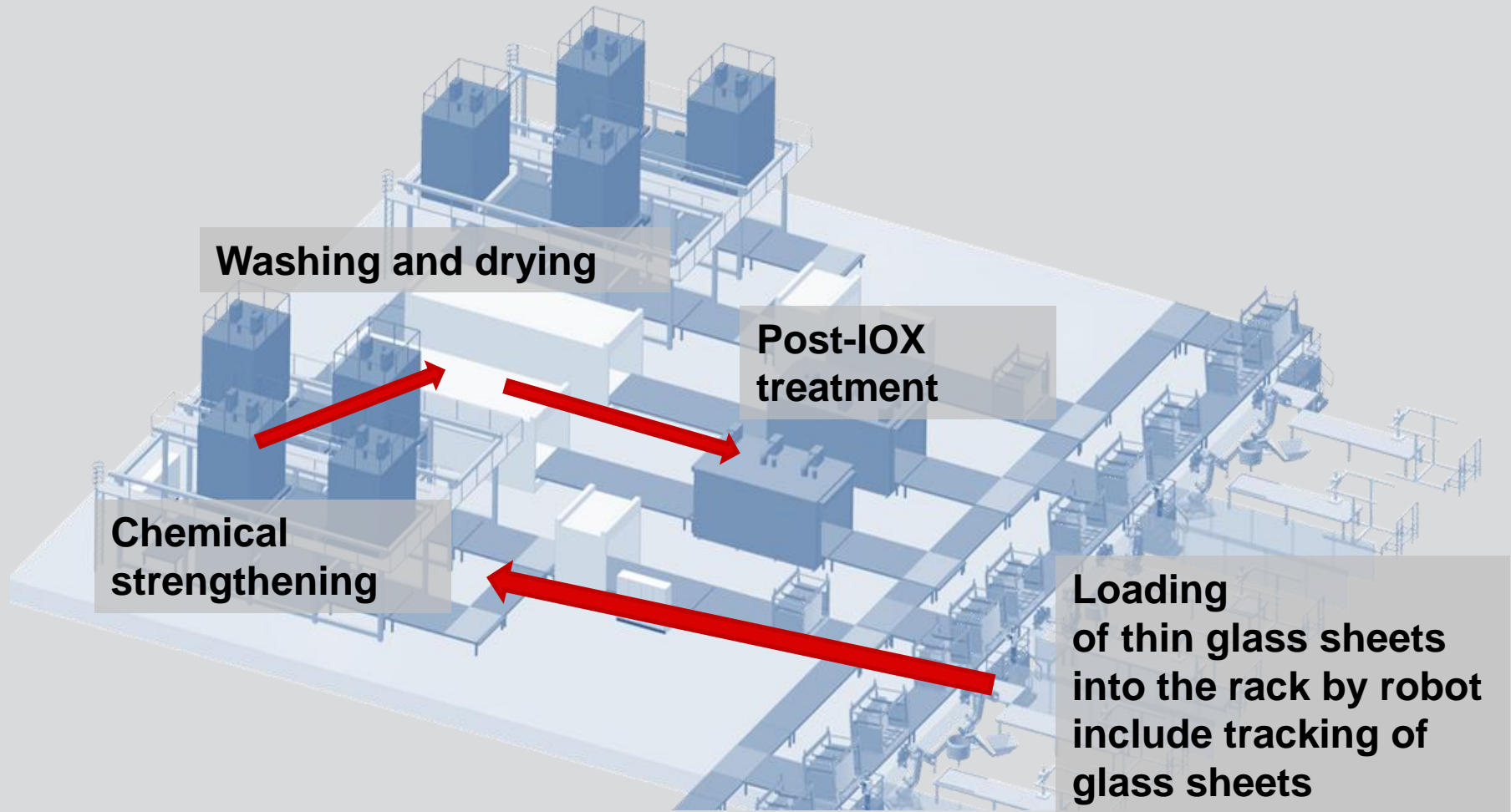




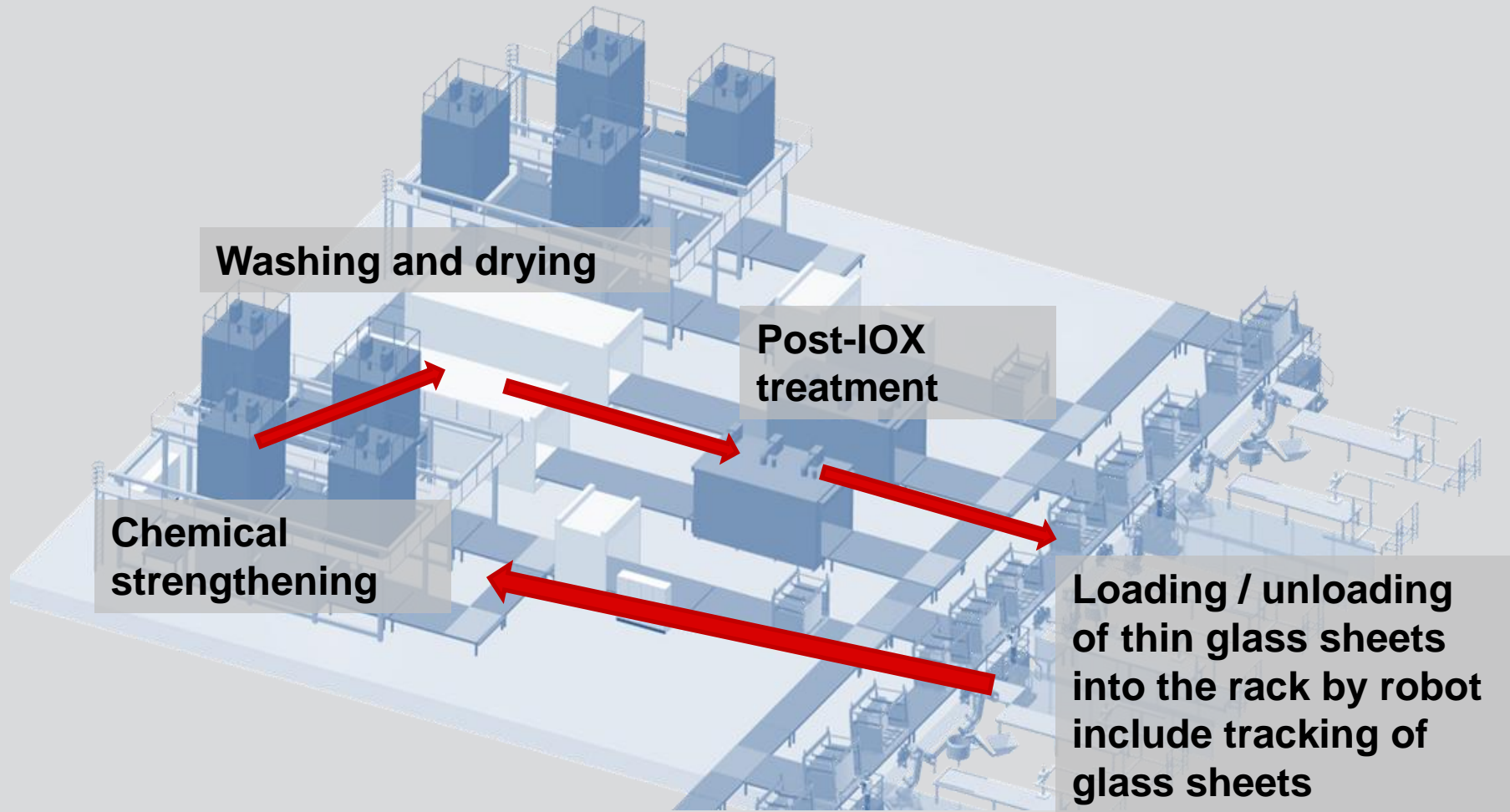
## Layout: full automatic lines for mass production



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## Layout: full automatic lines for mass production





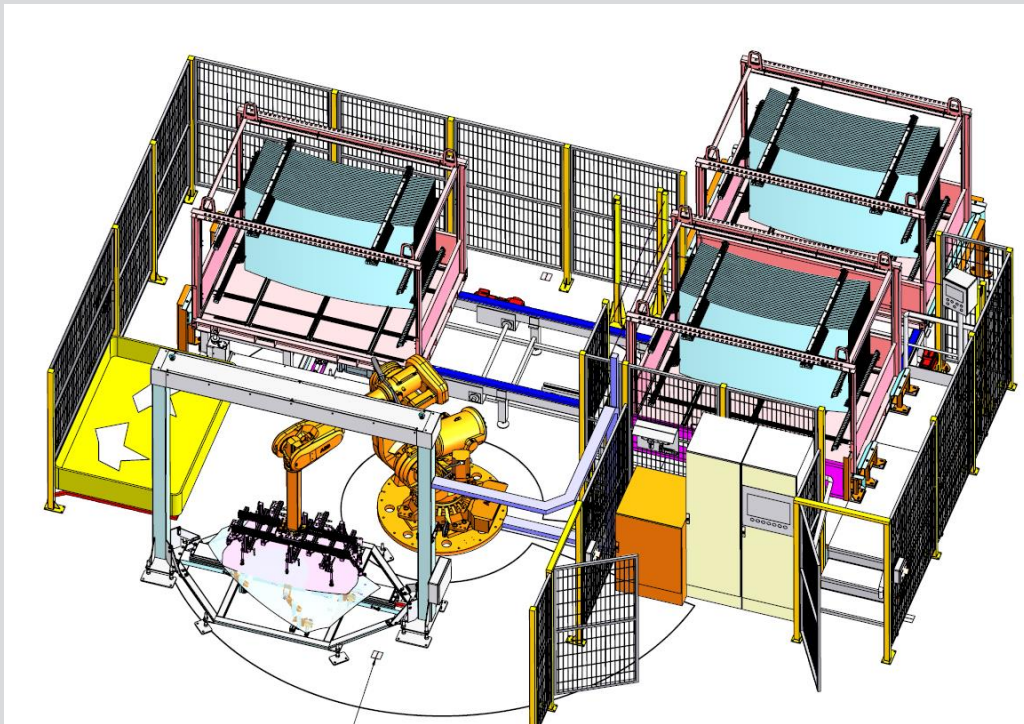
## Robot handling for thin glass application with vision system

Glass thickness: 0.5mm to 1.6mm

Glass size: up to 2200mm x 1600mm

Cycle time: approx. 30 sec/ pc.

Options: de-pairing of glass sheets after bending



## Washing



Shower tunnel



Warm water

Deionized water

## Salt handling



Salt filling

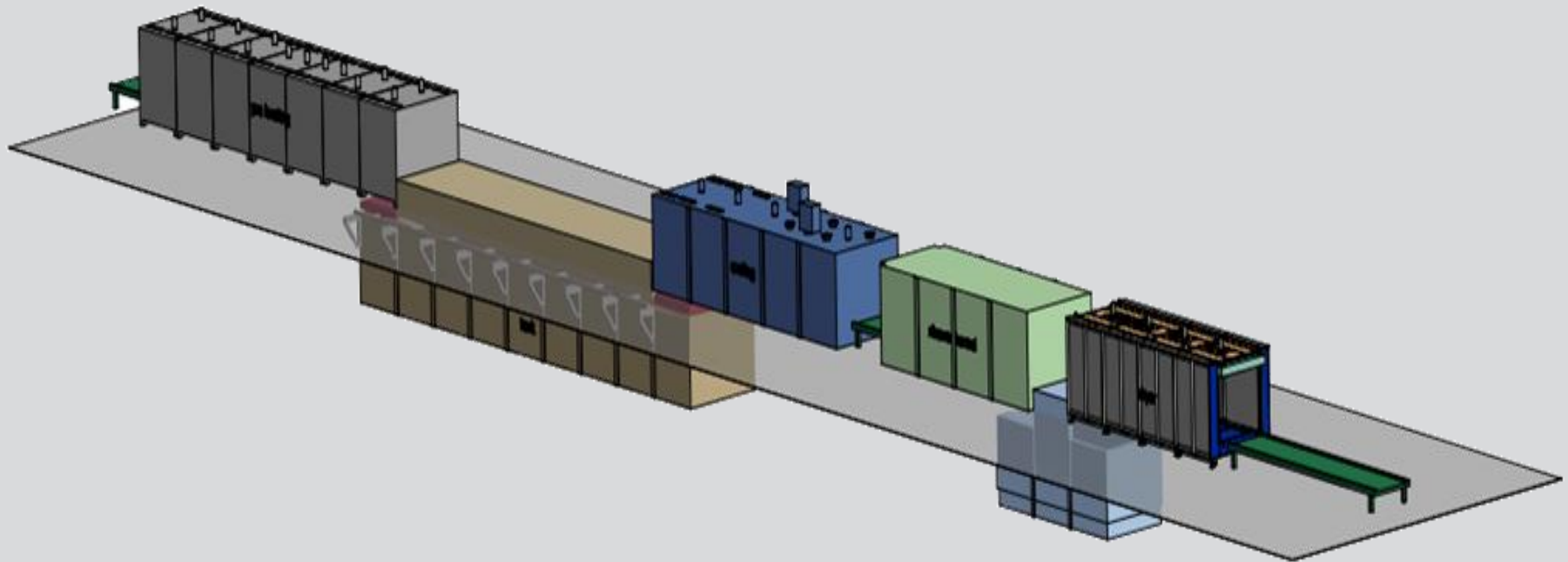


Salt drainage valve



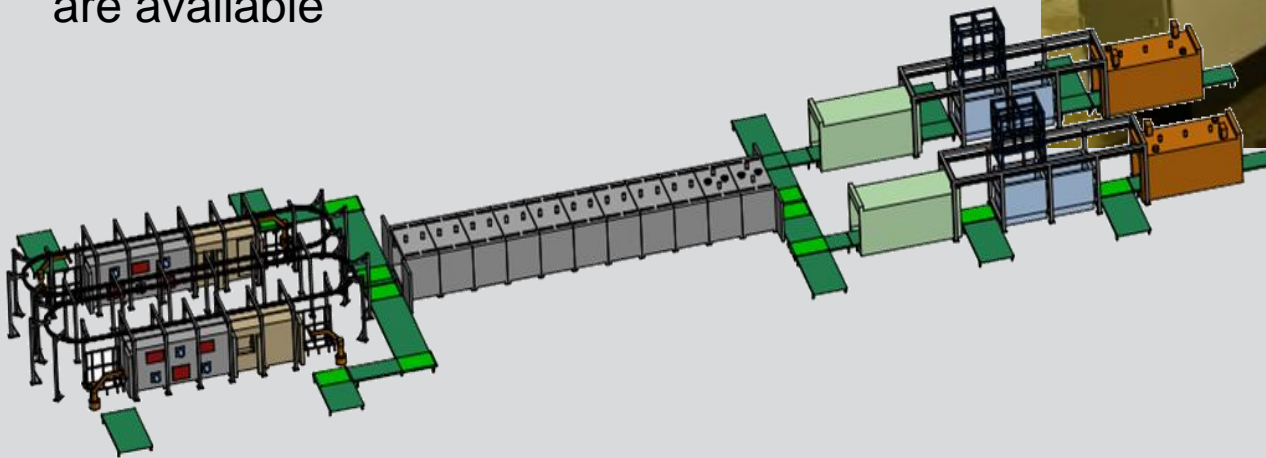
## Forecast: Continuous processing in salt bath

If the demand of automotive glass is increasing strongly then new concepts are needed. We are ready to supply.



## Research and Development

- continuous processing in salt bath
- salt regeneration
- spray coating  
new technology for mass production
- Test facilities for chemical strengthening are available



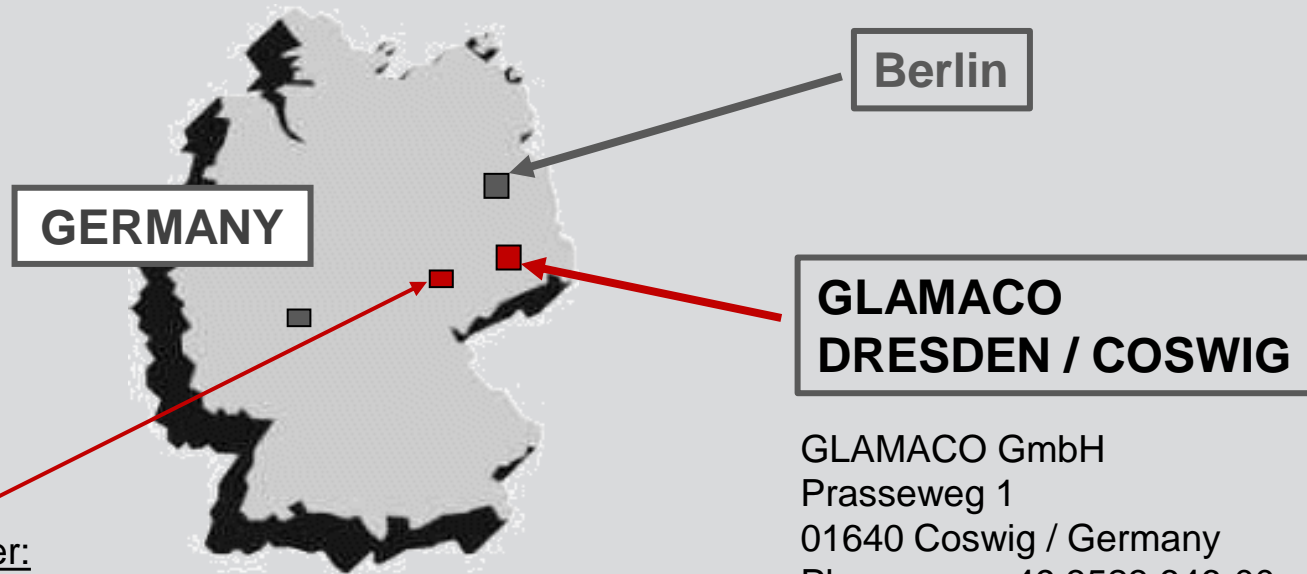
## TECHNICAL CENTER in JSJ and GLAMACO

- Glass melting services
  - Melting tests and raw material assessments
  - Melting technology investigations
  - Measurement of physical properties of glass melts (el. conductivity, viscosity)
  - Corrosion tests (refractory and electrode materials)
- Glass production on customer request
- Test facilities for chemical strengthening
- Tempering test facility
- Laser cutting test station LHC, LCC for table ware
- Laser supported bending test facility



# THANK YOU FOR YOUR ATTENTION.

See you at German Pavillion stand C43



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