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THAT MATTERS.**



AMAP
*Advanced Metals
and Processes*



FAST HOT FORMING LINE FOR ALUMINIUM

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Motivation

Aluminum for light weight design

Actual process for Aluminum

FAST Technology

Production equipment



01

MOTIVATION

FAST HOT FORMING LINE FOR ALUMINUM



Motivation



- Lightweight design for car bodies is still one of the highest automotive market needs to date, but there are several aspects to be considered for proper material selection...



Performance



Manufacturing Availability



Weight



Corrosion



Strength



Painting



CO₂ Footprint



And More!

- Lightweight design for car bodies is still one of the highest automotive market needs to date, but there are several aspects to be considered for proper material selection...



•02

ALUMINUM FOR LIGHT WEIGHT DESIGN

FAST HOT FORMING LINE FOR ALUMINUM



Aluminium in the Automotive Industry



- Jaguar XJ 8 First all-Aluminium Car body
- 2 Schuler hydraulic press lines for Aluminium production
- AL 5000 for structure and AL 6000 for surface



FAST HOT FORMING LINE FOR ALUMINUM



Smart Press Shop for Production of Aluminum parts



- Highspeed Production of aluminium parts
- Fully automatic and connected production
- Metris IIOT Solutions for Quality and Maintenance





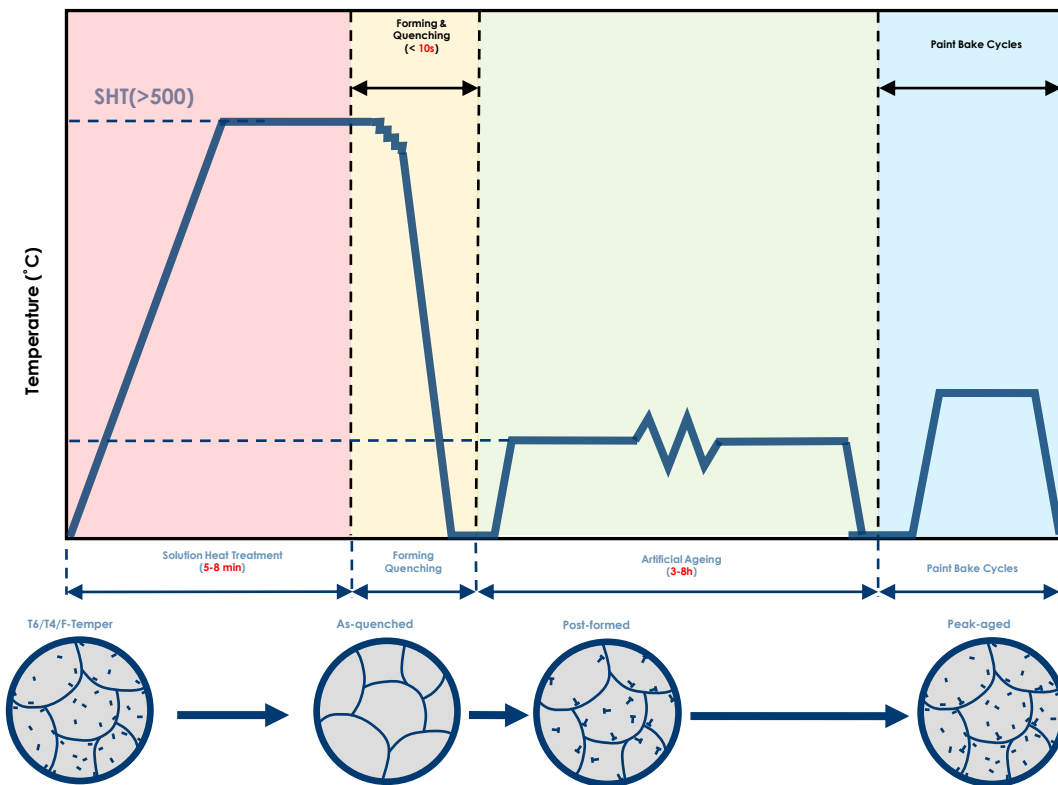
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ACTUAL PROCESS FOR ALUMINUM HOT FORMING

FAST HOT FORMING LINE FOR ALUMINUM



Actual Process for Aluminum Hot forming



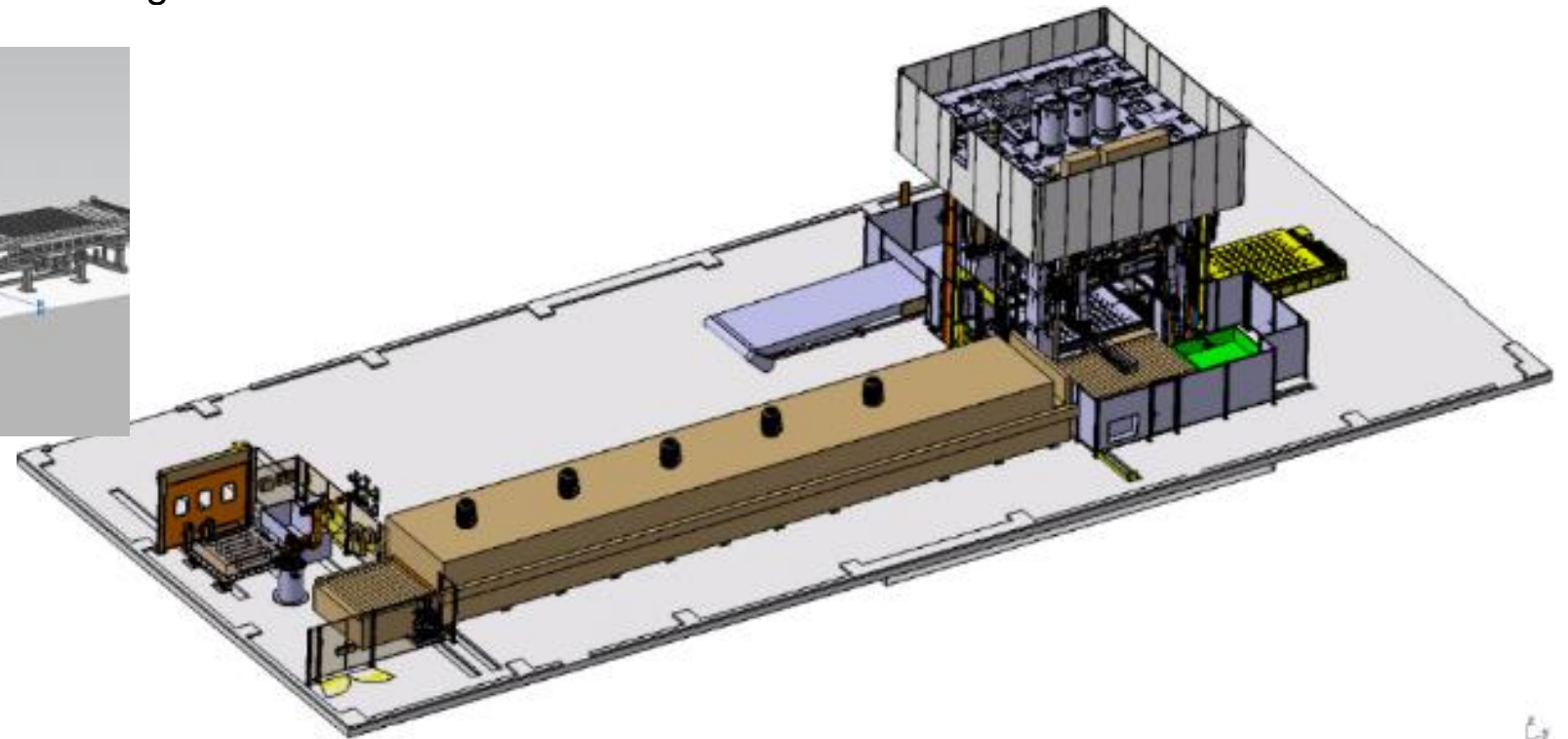
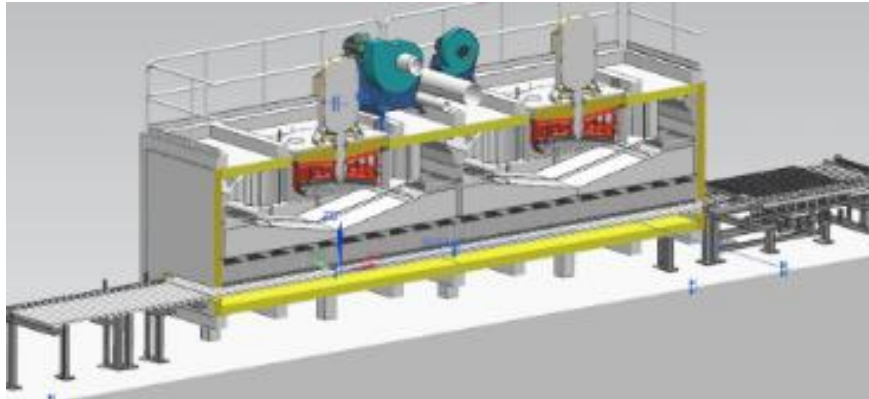
- Solution heat treatment at 500 °C for 5-8 min in a jet-heating furnace
- Transfer to press
- Forming and cooling
- Unloading and intermediate storage
- Aging at approx. 200 °C for 3 – 8 hours depending on material
- Additional aging during paint bake cycle

FAST HOT FORMING LINE FOR ALUMINUM



Actual Process for Aluminum Hot forming

Jet-Heating furnace for fast and effective heating of aluminum blanks



Example of traditional hot stamping line for aluminum



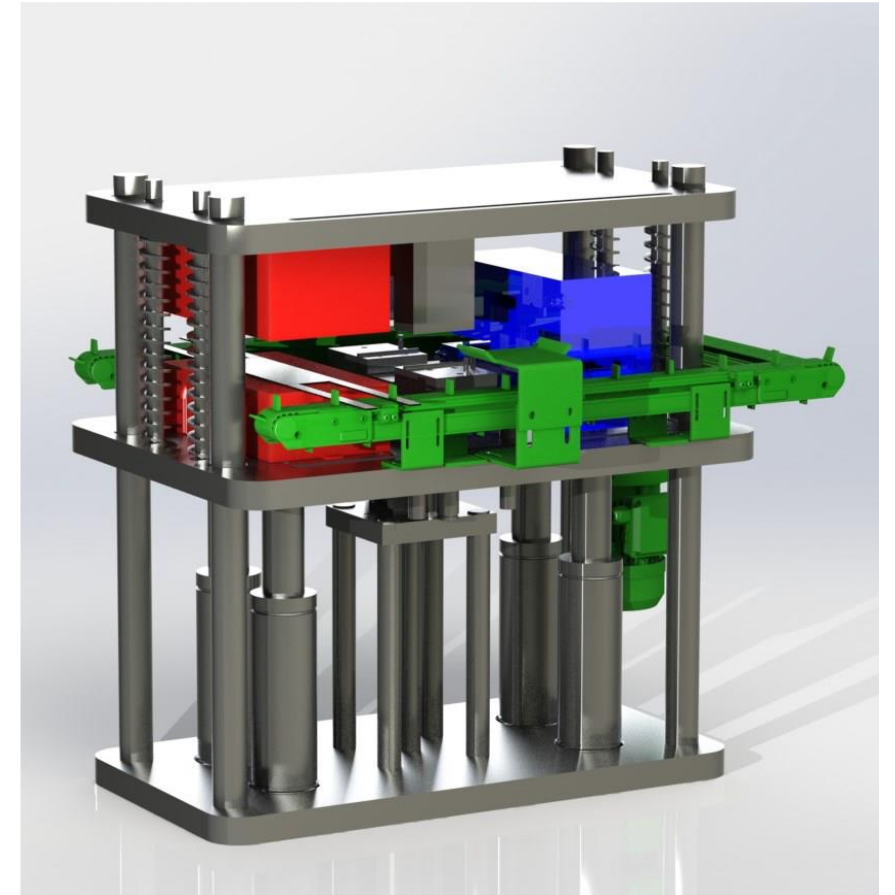
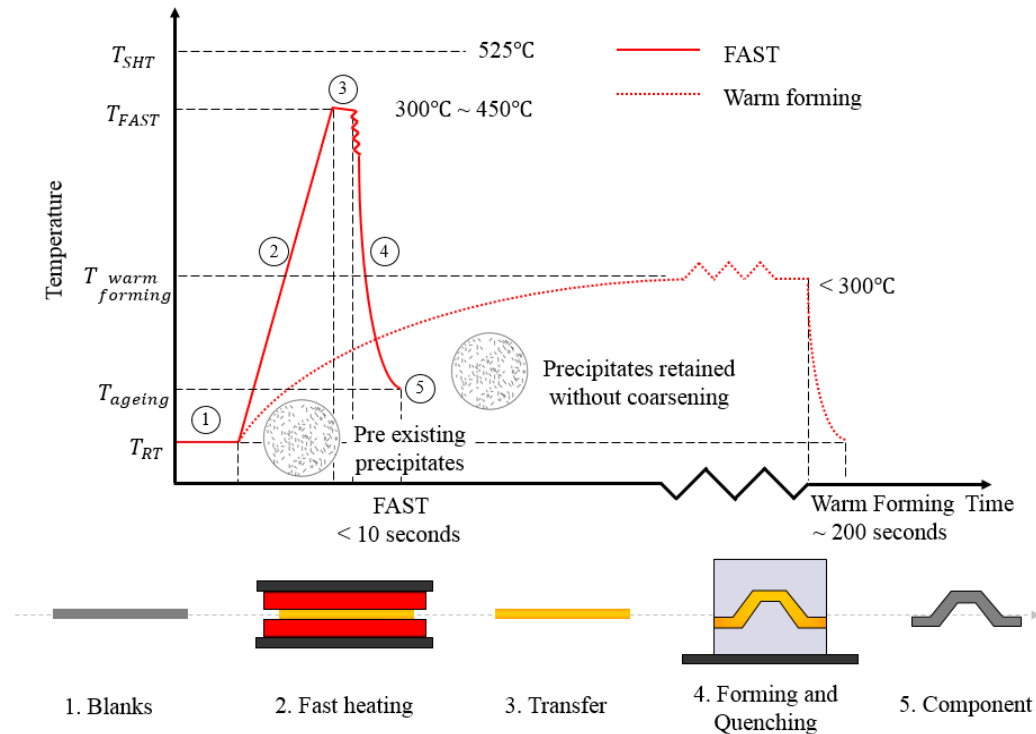
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FAST TECHNOLOGY

FAST HOT FORMING LINE FOR ALUMINUM



new Process developed at the Imperial College London

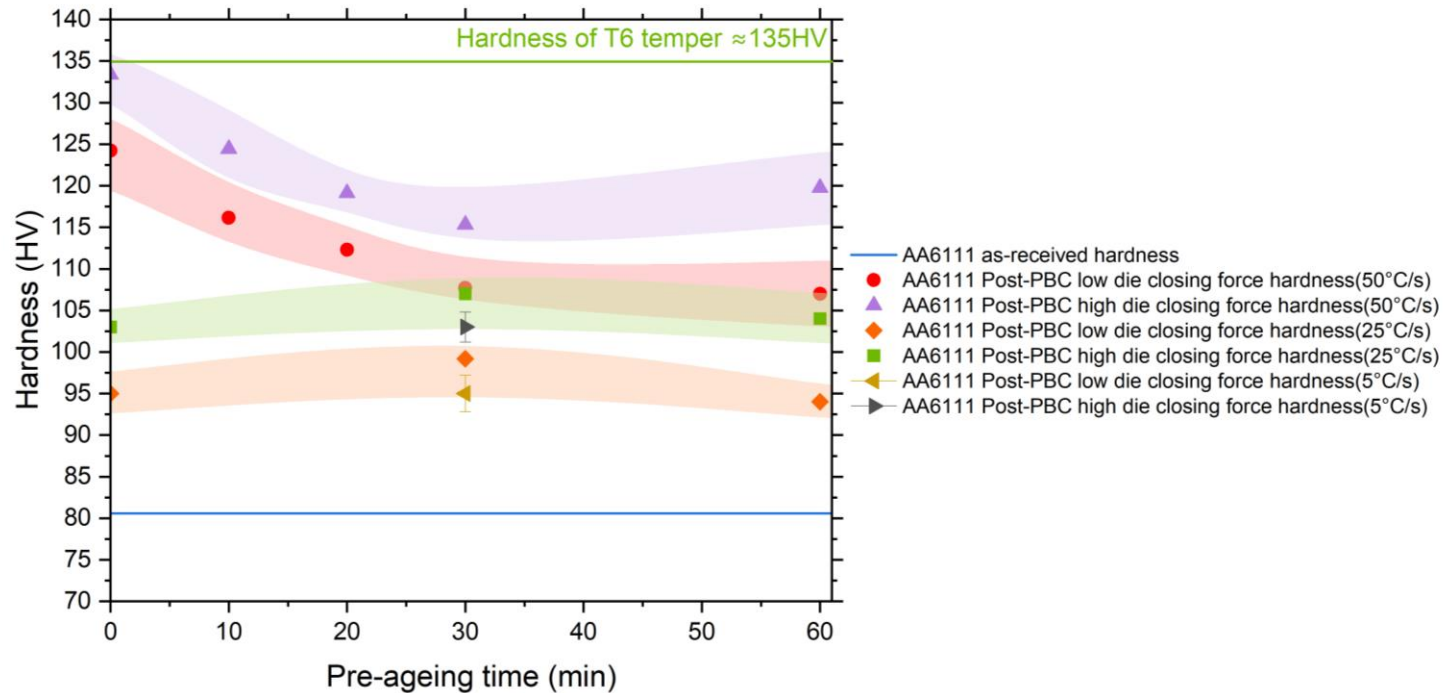


FAST: Fast light Alloys Stamping Technology

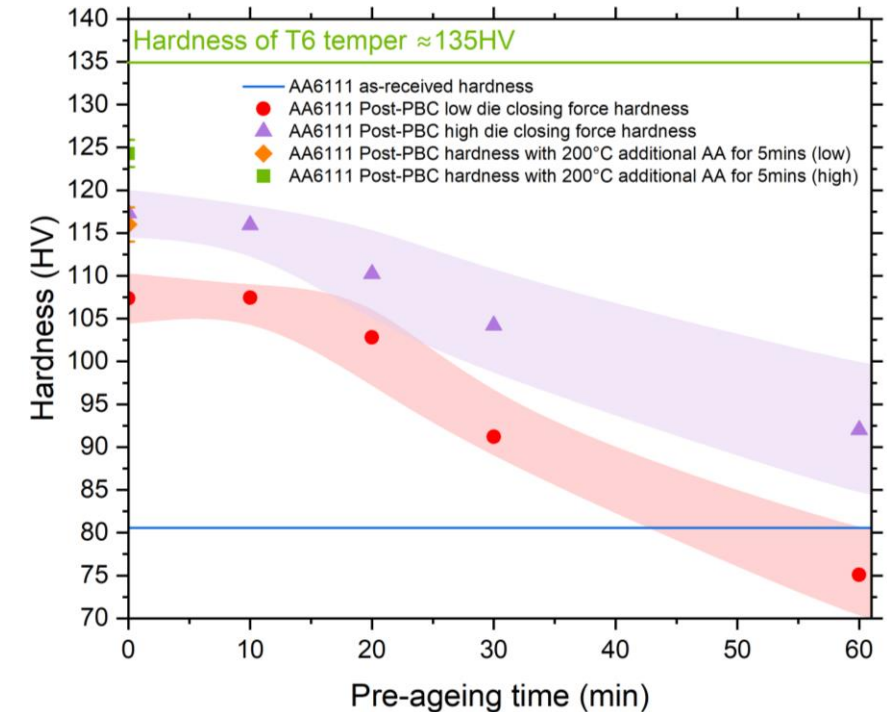
FAST HOT FORMING LINE FOR ALUMINUM



Possibilities for variation of Parameter



Forming at 300 °C
Post-form-PBC strength of AA6111
ranged from 95 to 133 Hv.



Forming at 500 °C
Post-form-PBC strength of AA6111
ranged from 75 to 120 Hv.

FAST HOT FORMING LINE FOR ALUMINUM



Industrialization at the ACS in Attendorn

- Parameter:
- Material 6XXX TX temper
- Thickness = 2 mm
- Heating temp = 330 °C
- Heating time = 4 s
- Transfer time = 2 s
- Forming temp = 320 °C
- Part temp after quenching = 60 °C





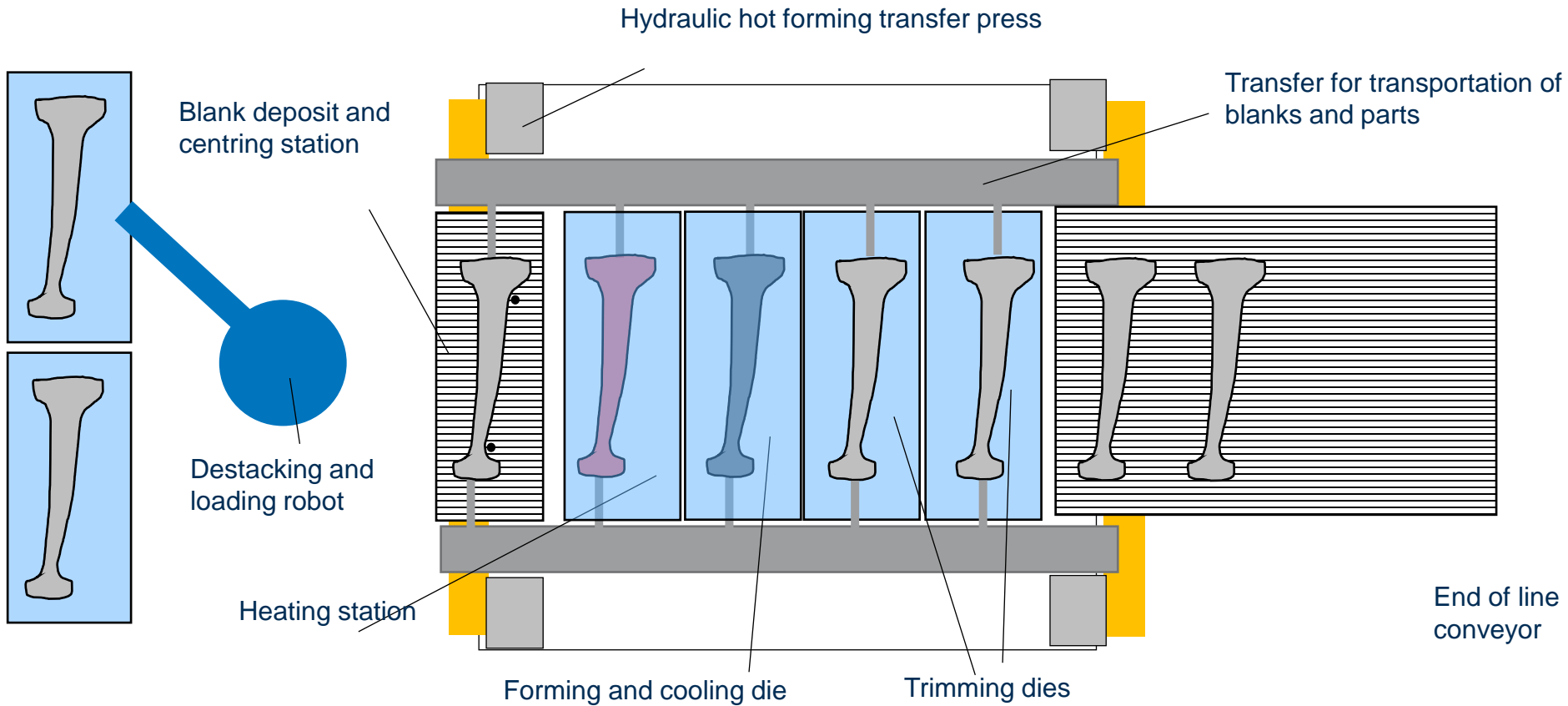
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PRODUCTION EQUIPMENT

FAST HOT FORMING LINE FOR ALUMINUM



Production principle is a classic 3-axis transfer process

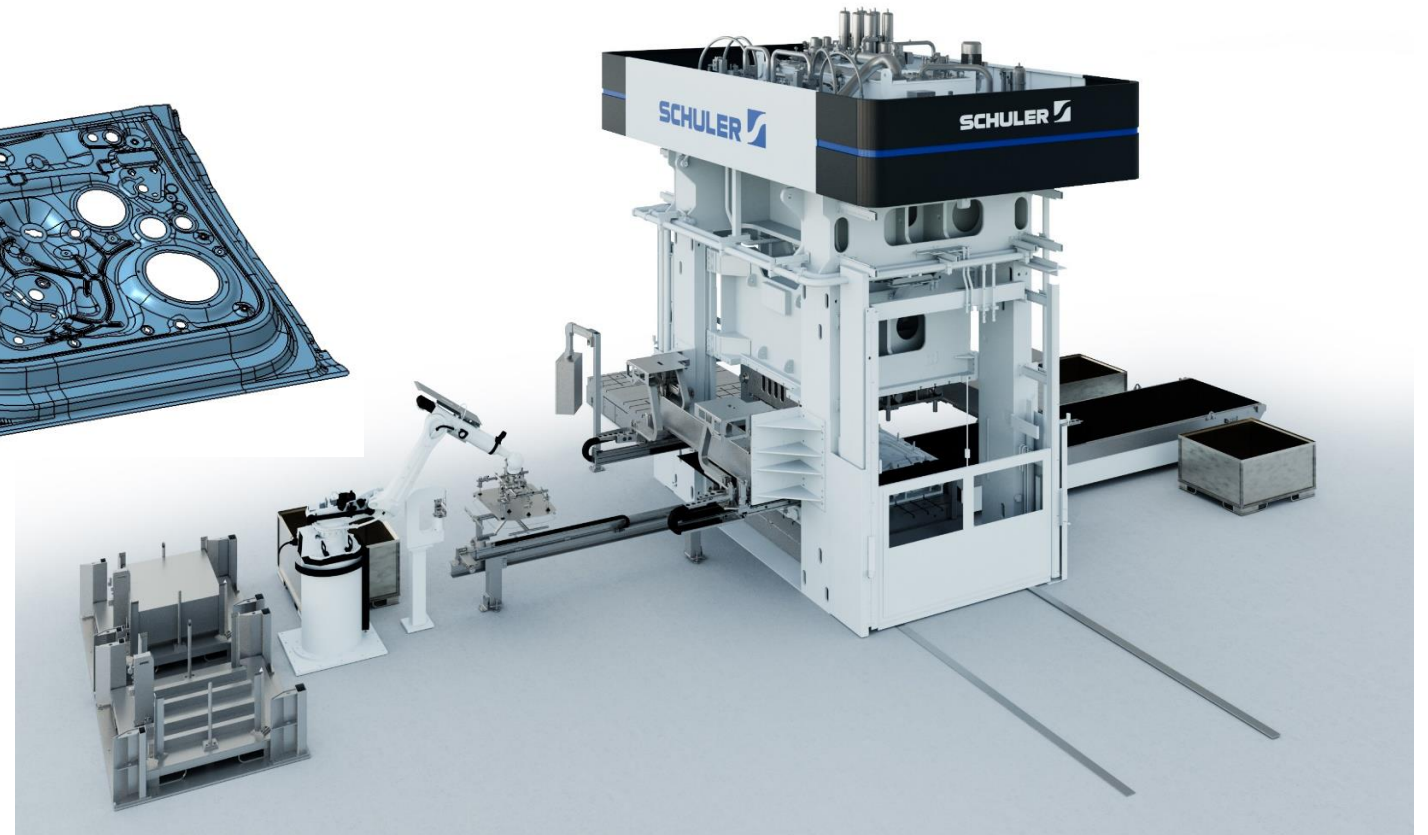
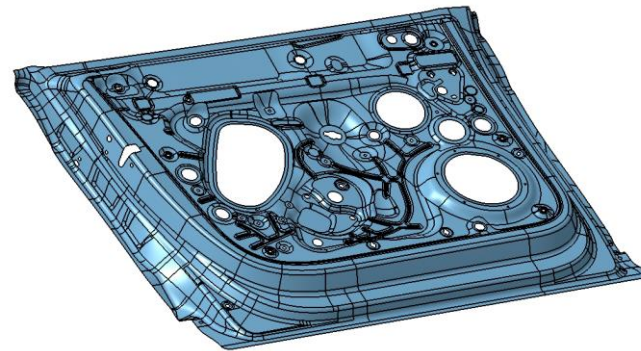


FAST HOT FORMING LINE FOR ALUMINUM



Layout of first production line

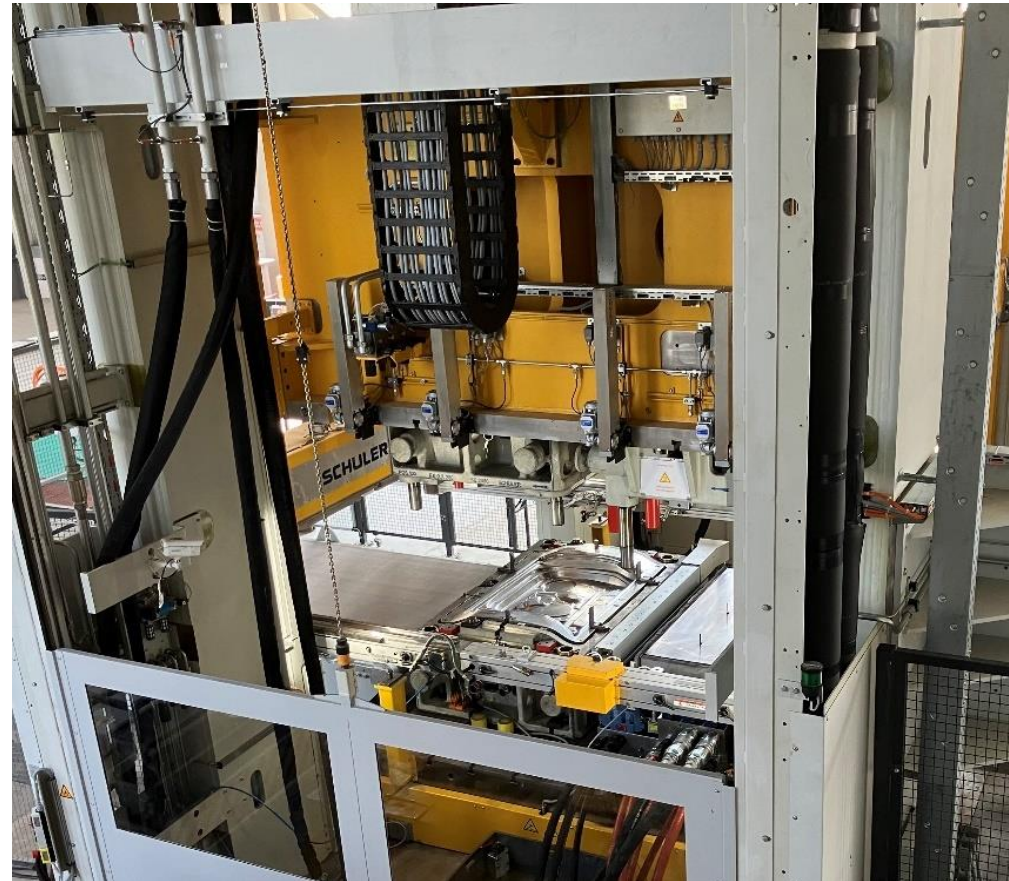
- Hydraulic transfer press WHC 1200 3.0 x 3.0
- 3-Axis transfer system
- Destacking robot
- Marking station
- Feeder
- End of line conveyor
- Forming and quenching die
- Heating plate
- Lubrication unit



FAST HOT FORMING LINE FOR ALUMINUM



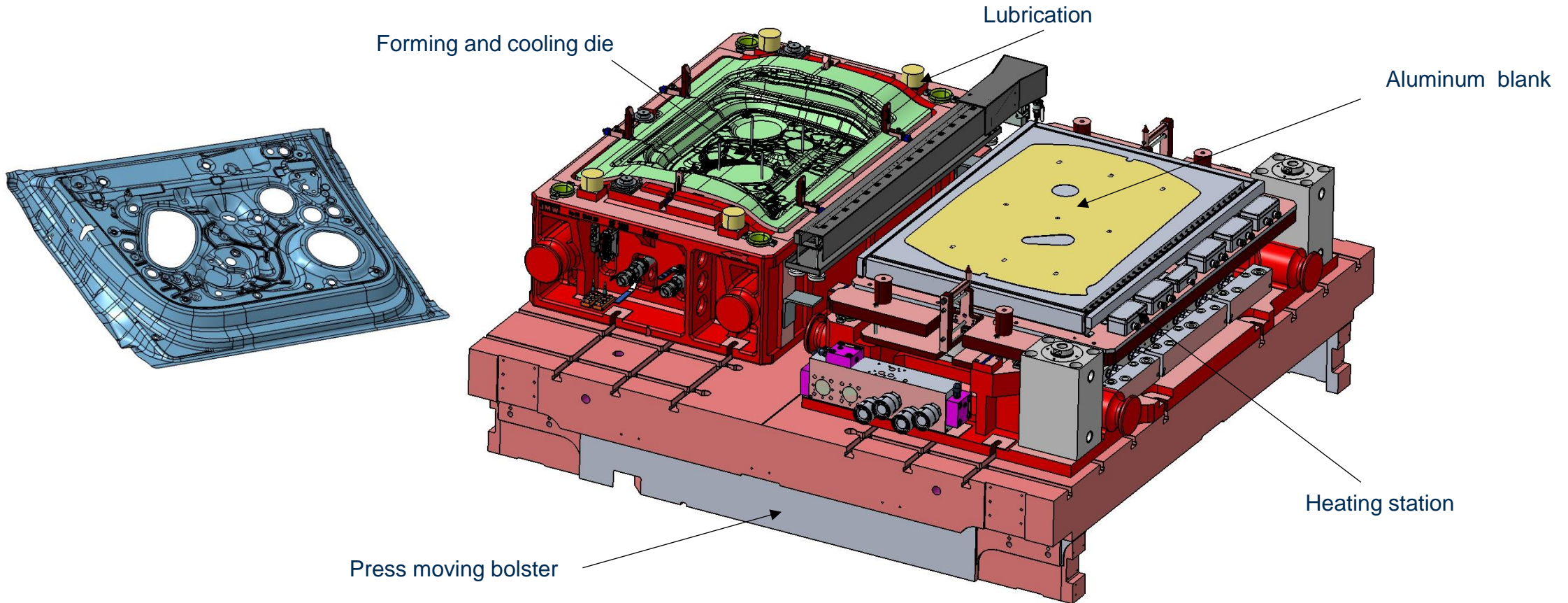
Layout of first production line ready for production in 2025



FAST HOT FORMING LINE FOR ALUMINUM



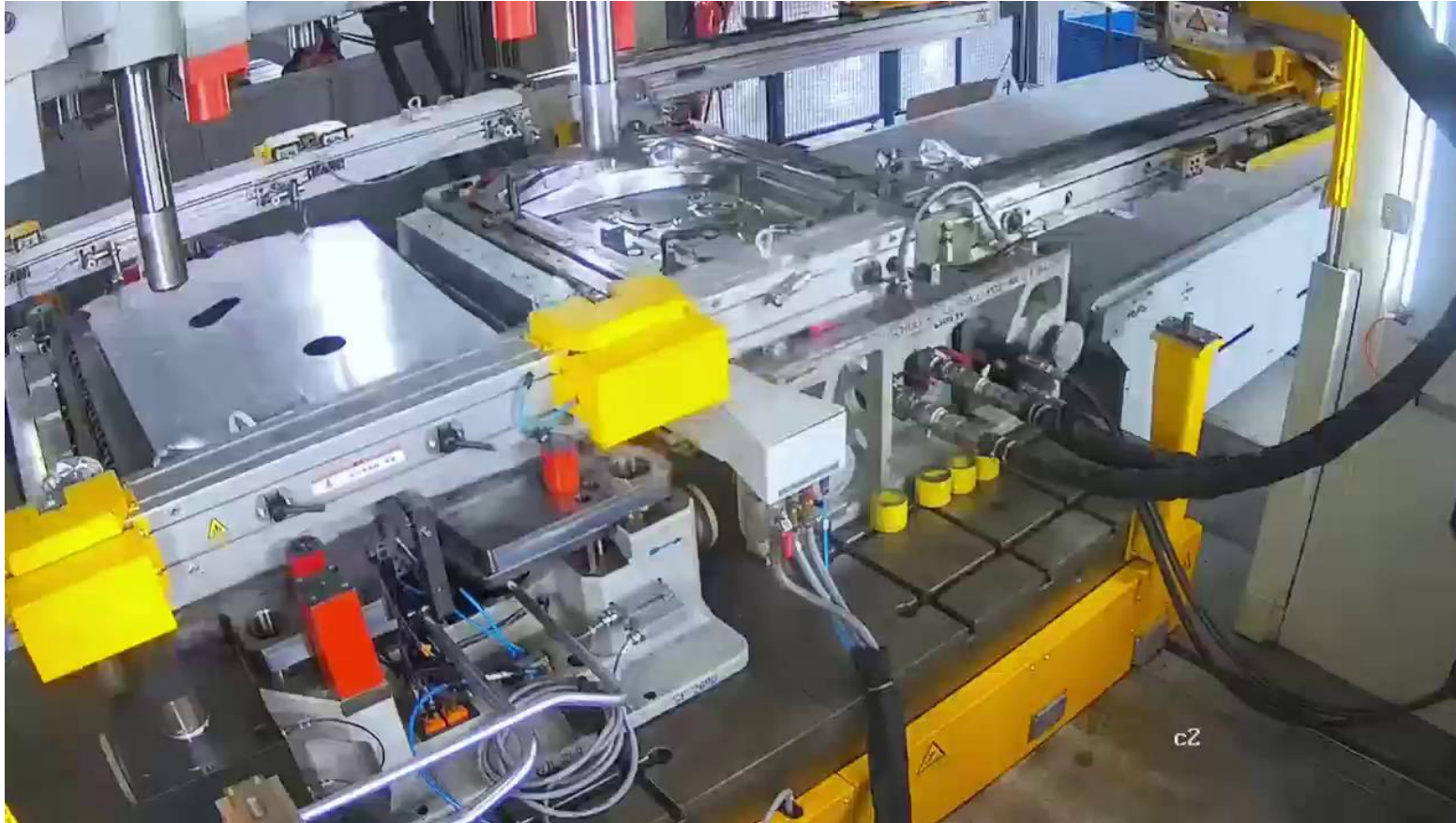
Production die set



FAST HOT FORMING LINE FOR ALUMINUM



First successfully operation at Hanlei Technologies Co., Ltd in China

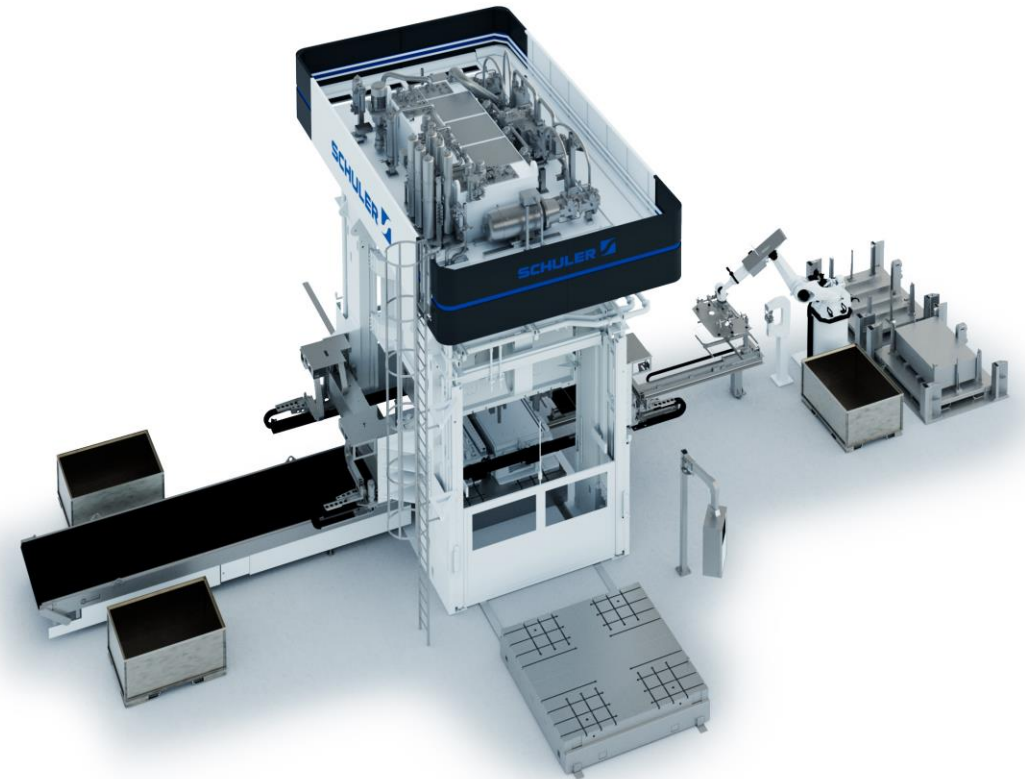


FAST HOT FORMING LINE FOR ALUMINUM



Layout of first production line

- Good formability of the material at approx. 300°C-350°C
- Fast heating in the die, no separate furnace required
- Trimming process can be added
- No post treatment (Aging) required
- Final strength of 320 N/mm² comes with the paint bake cycle after heat treatment of painted car body
- Energy saving compared to other processes with SHT up to 80%
- Fast and effective transfer process



FAST: **F**ast light **A**lloys **S**tamping **T**echnology



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