



**MACHINES FOR THE
APPLIANCE INDUSTRY**



Keep Cool

Solutions for the Appliance Industry

One of the major lines of our forming technology is machinery for the production of refrigerator components. Whether for refrigerators or for freezers, inside or outside, single or combined units, even complex shapes and designs can be

handled thanks to KIEFEL high-performance automatic forming machines providing the smartest solutions. One single sheet of plastic is all it needs to form a refrigerator door or inner liner.

Appliance Industry and Technical Components

- Refrigerator inner liners
- Refrigerator door liners
- Housing components
- Bathtubs
- Inserts for industrial use
- Casing components



Inline Forming Machines for Inner Liners

KIV/KID-Series

Convincing technology with strong advantages

- Servomotors and three-phase motors performing all process-relevant movements
- Quartz or ceramic heating elements with CLOSED LOOP temperature control by means of pyrometer to ensure a constant sheet temperature
- Control and proportional valves for the regulation of vacuum/compressed air and un moulding air
- Laser sensors precisely defining the pre-stretching height of the plastic sheet

- Inline peripheral trimming for inner and door liners, separation cut for all applications
- Combined solutions for door and inner liner production

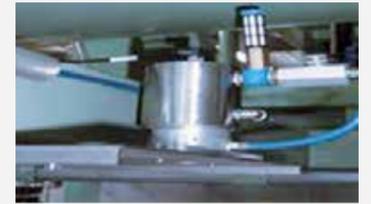
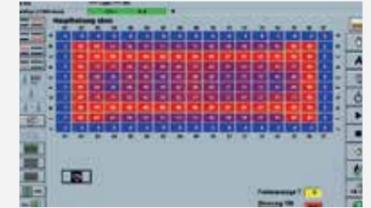
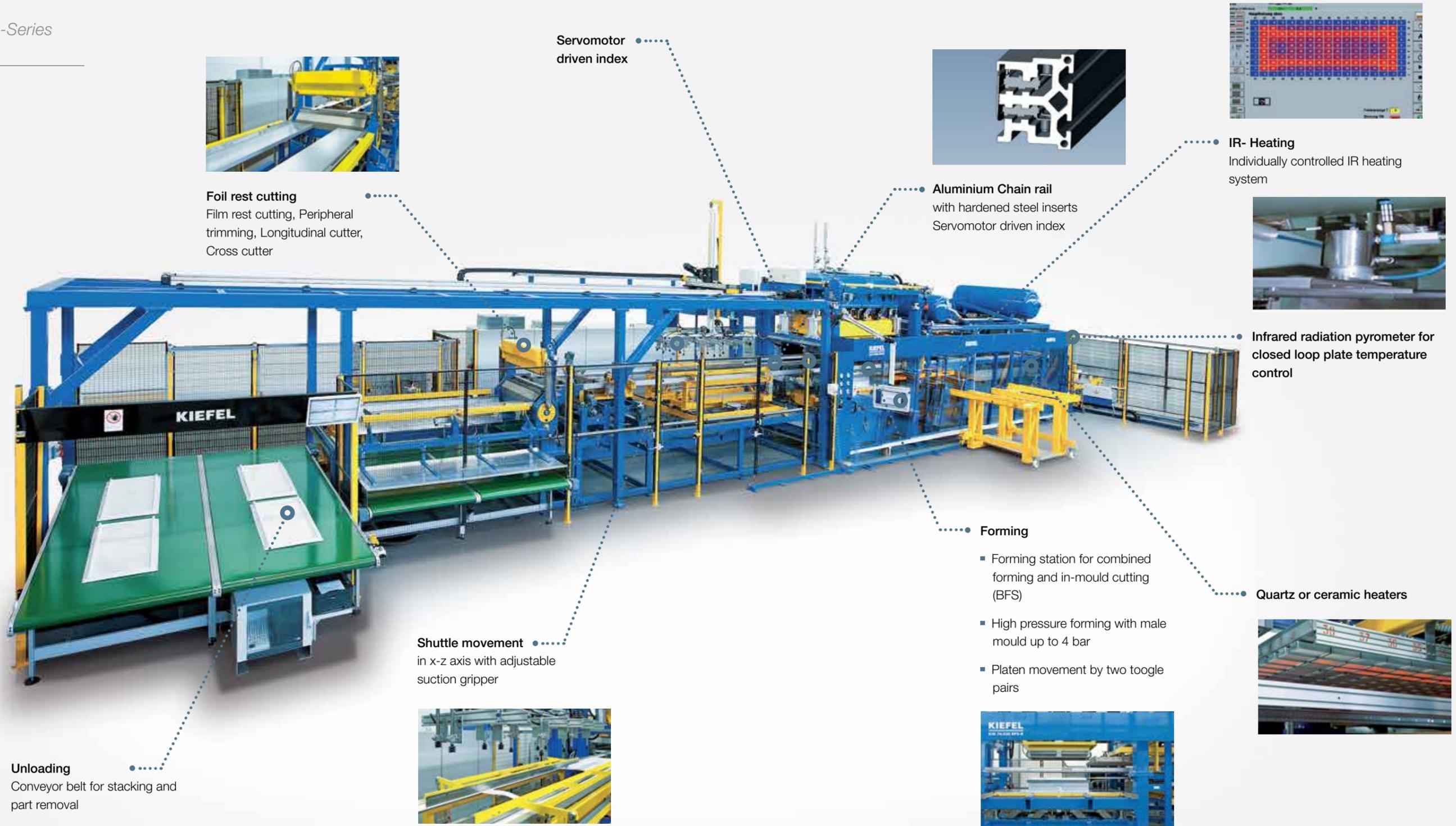
Special table-to-table locking system (KIEFEL patent) for compressed air forming allowing up to 2 bar pressure for efficient forming/cooling.

Concept Highlights

- Fast movements and optimized cooling reduce machine and cycle times to a minimum > high production yields
- Low energy consumption thanks to motor drives and quartz or ceramic heating elements > low production costs
- Minimised sheet formats and maximum waste reduction guaranteed by chain-guide conveyor and automated start sequence > savings on raw materials
- Pressure bell approved by Finite-elements-method for 2 bar operation
- No need for manual finishing of cut products thanks to high cutting accuracy > savings on labour costs and time
- Machines can be adapted to work with existing production tools > reduction of tool investment costs
- Fast tool-change system permits rapid product changeovers > higher productivity (good part to good part < 12 min)
- Modern connection to KIEFEL service centre > short reaction times minimise machine downtime
- Custom made downstream transportation system possible

High Pressure Inline Forming Machines for Door Liners.

KID-BFS-Series





Material-Saving - Time-Saving - Highly Productive

Thanks to our high-pressure forming technology



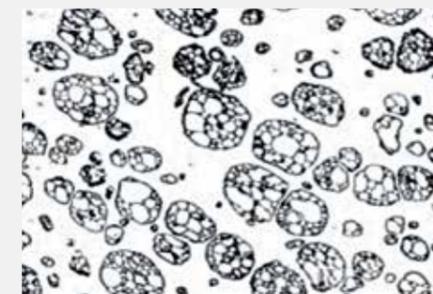
Cycle time saving:

approx. 10s (HIPS, 1.4 mm thickness)
allowing an up to 65 % higher output

Material saving:

up to 20 % compared to standard vacuum forming machines

Increase of tensile strength due to "cold" forming



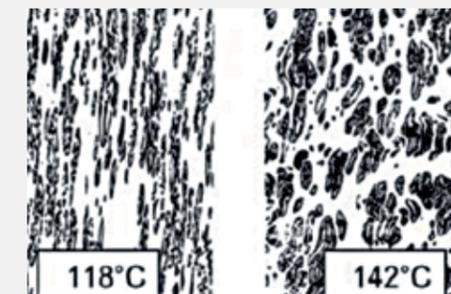
Original morphology PS 486 M (extruded)

Accurate trim:

Forming and trimming in place in one station

Long lifetime of knives:

Modernised punching system for an extra prolongation of knife service life



formed with different temperatures

Low Energy Consumption

Thanks to motor-driven movements



Energy Savings

Energy consumption of the drives has been reduced to a minimum. Highly efficient electrical drives perform the energy-intensive movements.

Quartz or special hollow ceramic heating elements allow energy savings of up to 25% compared to standard ceramic heaters.

Forming station

Patented locking system for pressure bell

- For pressure forming
- Inflatable membrane
- Low stress for clamping frames
- Possible use of vacuum forming frames

Unloading station

- Motor-driven with vertical and horizontal axis
- Gripper frame with vacuum grippers

Trimming station

Motor-driven single guillotine or double guillotine shears

- Low peripheral trimming times: 27 s with single guillotine, 17 s with double guillotine shears
- Linear movement for precise peripheral trim

Motor-driven separation cut

- Cutting of double and triple case liner
- Motor driven fixture in feed direction – one knife set variable cut size -
- Linear movement for precise peripheral trim

Piercing press

- Hydraulic-driven upper table - 20 tons
- Motor-driven shuttle

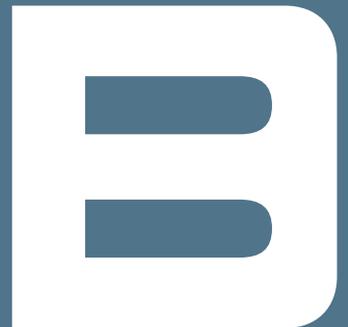


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KIEFEL is a world leader when it comes to the design and manufacture of machines used to process plastic film materials. The company offers core expertise in the fields of forming and joining technologies. As a supplier to reputable manufacturers in various sectors, KIEFEL GmbH services customers in the automotive, medical technology, refrigerator and packaging industries. The headquarters of KIEFEL GmbH is in Freilassing/Germany. The company also runs its own network of sales and service centres in the United States, France, the Netherlands, Russia, China, Brazil, Indonesia and India, and is represented by sales partners in more than 60 countries worldwide. KIEFEL GmbH is a member of the German Brückner Group, a worldwide leading supplier of plastics machinery.