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Zukunft aus einem Guss

Die Casting Technology

Production of Die Castings made of Zinc-, Magnesium- and Aluminium Alloys

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German Day - Ankiros, Istanbul (Turkey)

November 11th, 2006

Oskar Frech
GmbH + Co. KG

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D-73614 Schorndorf-Weiler

- About us
- What is Die Casting?
- Cold Chamber Die Casting
- Hot Chamber Die Casting
- Magnesium Hot Chamber Die Casting
- Automation

Our History Since 1949!

- **Foundation: 1949 by Oskar Frech**
- **Origin: Tool shop**
- **Medium-sized company**
- **Employees Frech Group world-wide: approx. 680**
- **Assembly plants in Germany (3), Spain, China, USA**
- **14 Sales branches world-wide**

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Tel :(216) 369 95 93
Faks : (216) 369 91 58
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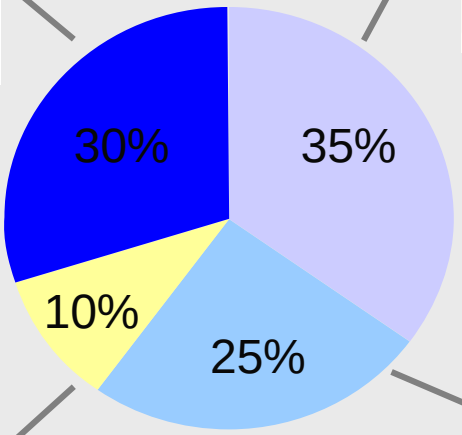
Product Lines

Cold Chamber

Hot Chamber

Die Casting Dies



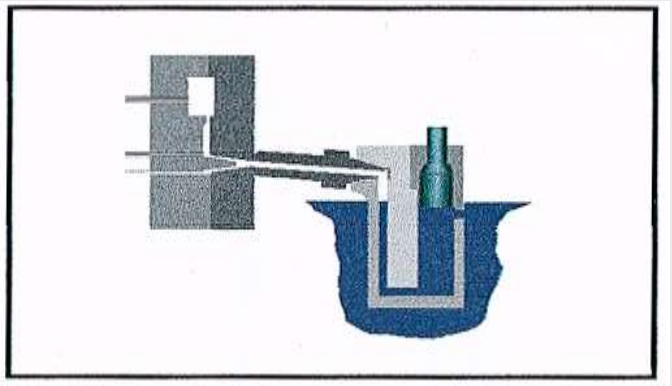
Overhauling and Service

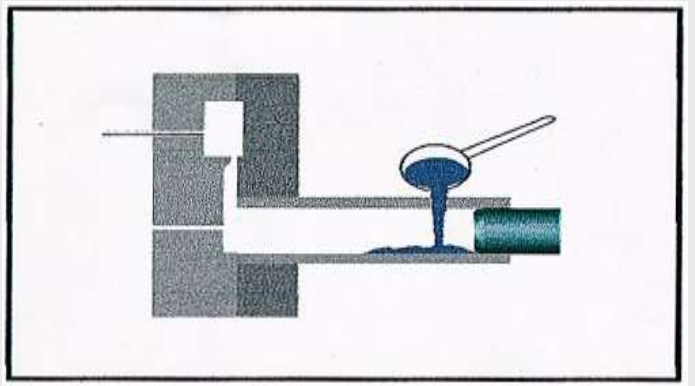
What is Die Casting?

Die casting is a casting process, where the liquid or semi-liquid metal is injected into the die with high pressure.

Die casting is the shortest way from liquid material to a ready casting.

The 2 Procedures of High Pressure Die Casting are: Hot and Cold Chamber Process





Hot Chamber

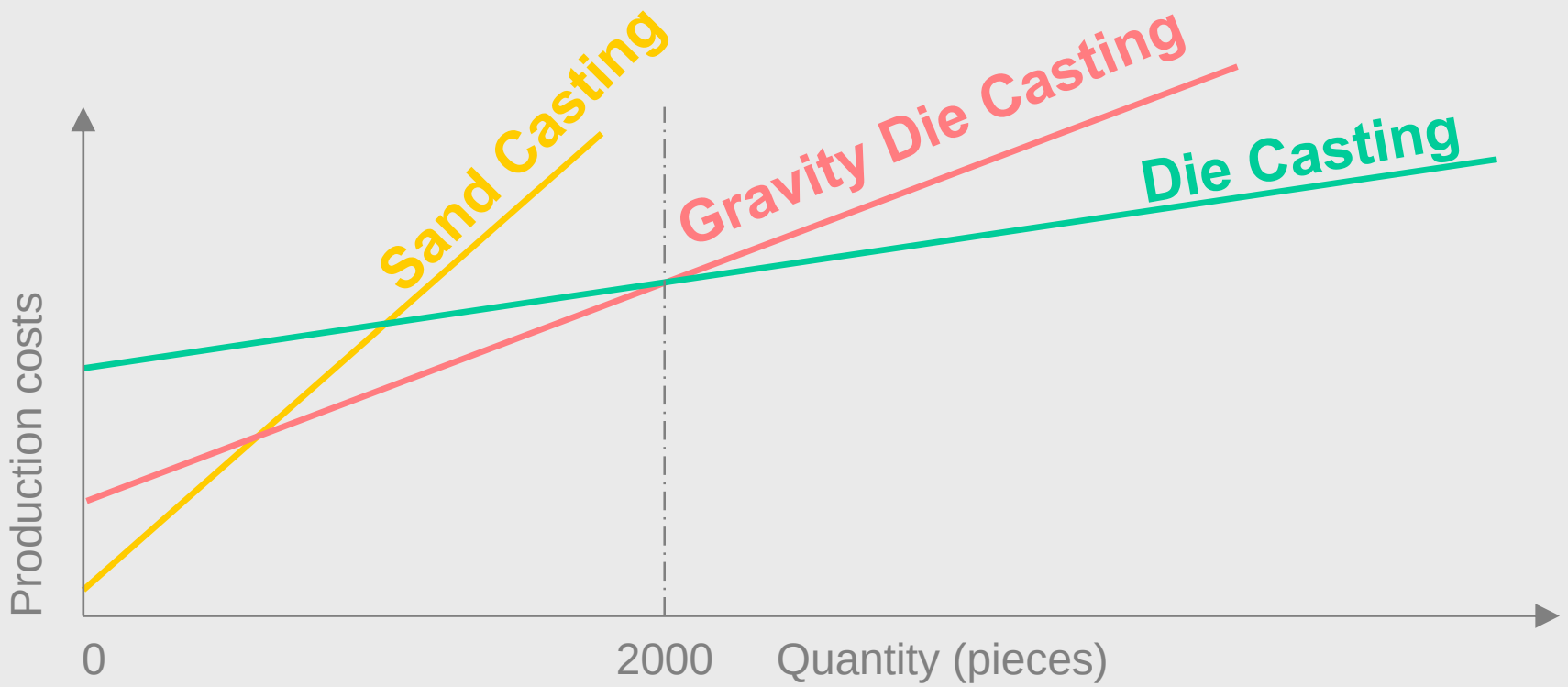
Cold Chamber

Economical Advantages of Die Casting

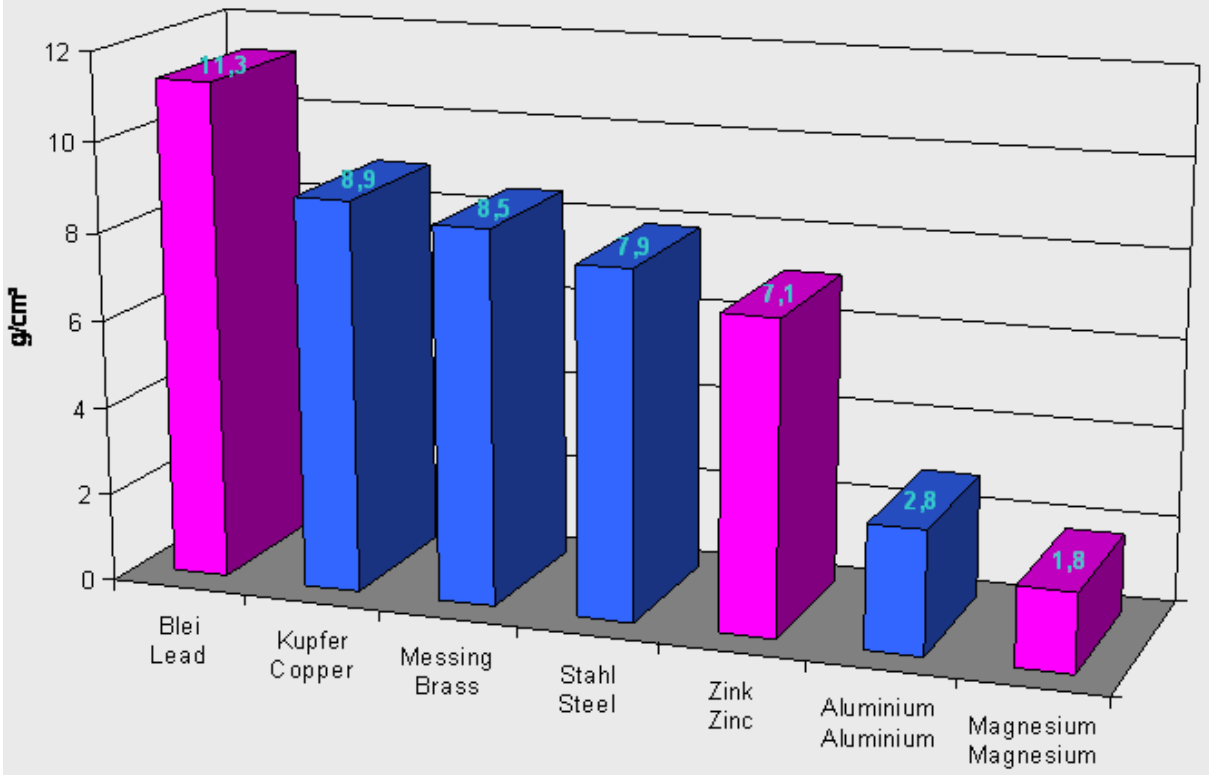
- Saving of weight and material
- Precision and compatibility
- Reduced secondary machining process
- Clean surface
- Casting of holes, break-outs and fonts
- Cost saving due to automation

Production Costs for Complicated Die Casts

Incl. accumulated costs for the die, at different production values



Alloys and their Specific Gravity



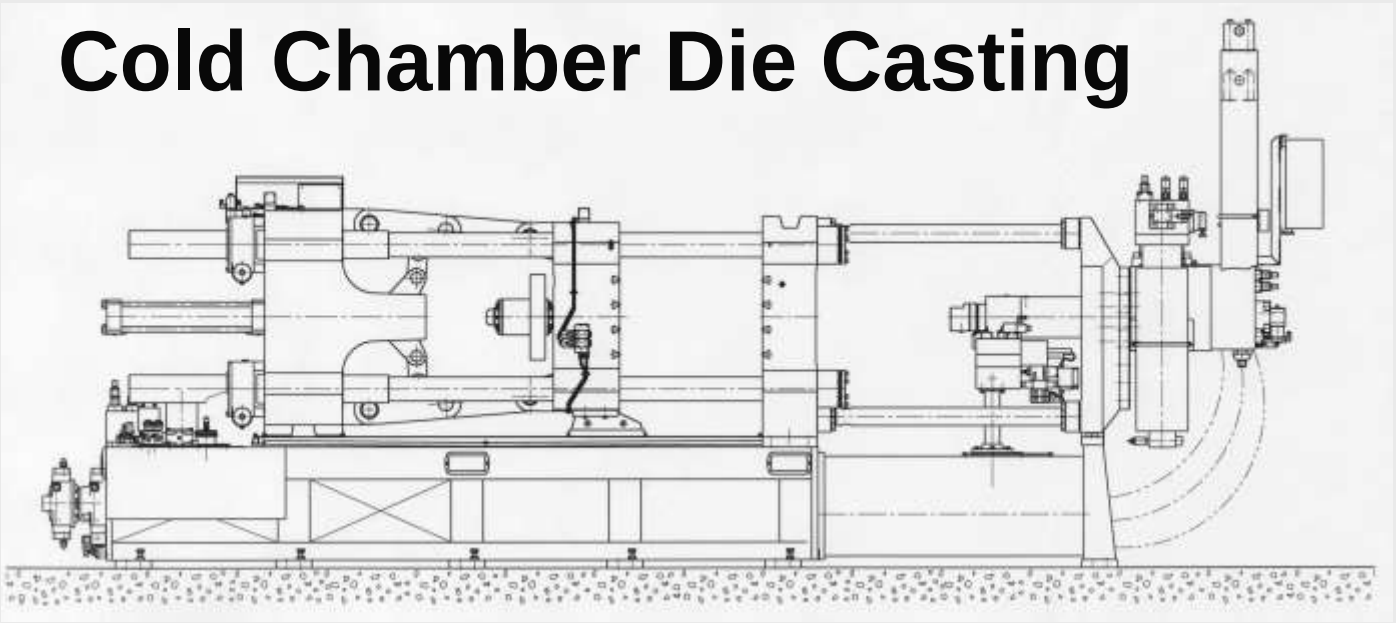
Die casting alloys such as zinc, aluminium and magnesium are distinguished by their extremely low specific gravity.

Due to this they are ideal for using at high volume production.

Fields of Application are:

- Automotive Industry
- Mechanical Engineering
- White Goods
- Power Tools
- Electro and Computer Industry
- Fittings for Doors and Windows
- Toys
- Costum Jewellery

Cold Chamber Die Casting

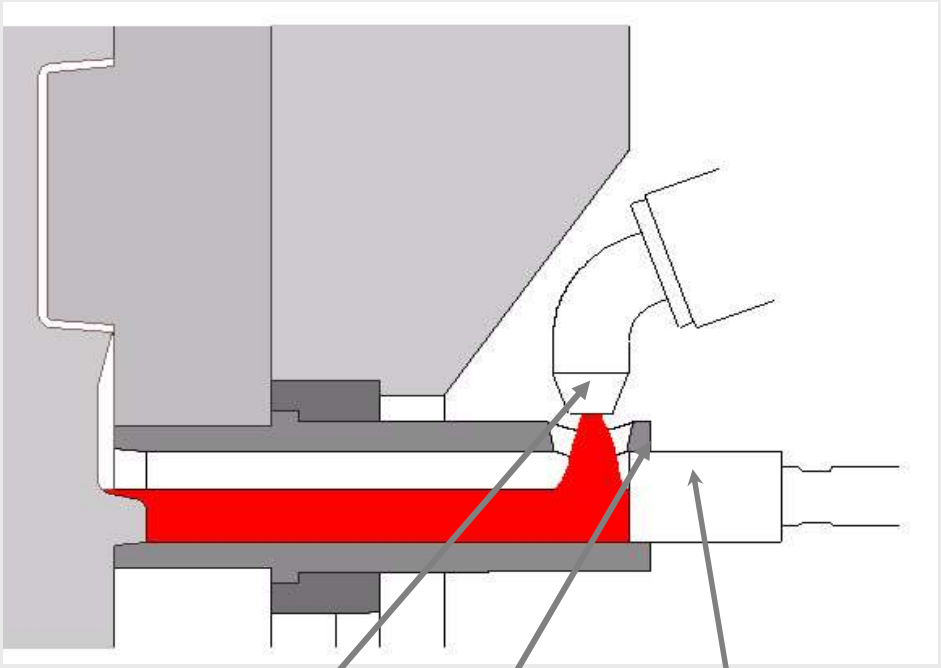


The machine basically consists of:

- locking unit with toggle lever interlock and ejector unit
- machine base with integrated energy lines, also used as tank
- horizontal multi-phase injection unit
- control unit

Cold Chamber Die Casting

The injection unit is the main part of the machine. Within milliseconds the die cavity has to be filled.



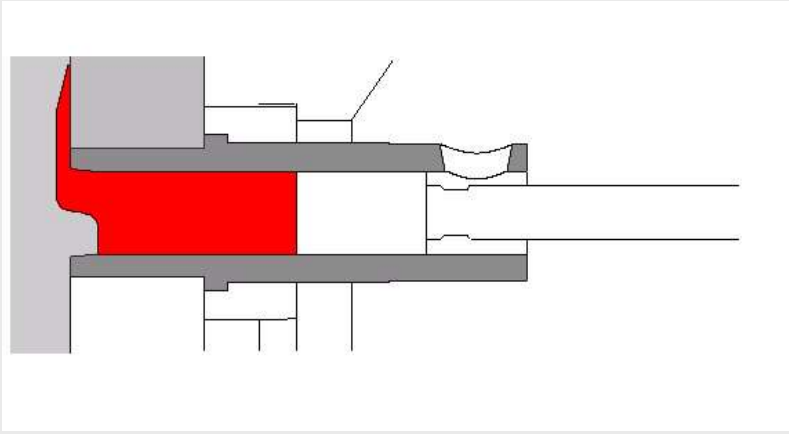
Temperature of metal approx. 680 °C inert gas

Plunger lubricant

Long plunger stroke

3 phases are necessary:

- slow phase, to bring the metal to the gate
- fast filling phase
- intensification phase



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Cold Chamber Die Casting Machine

from DAK 250-34 to DAK 2300-275

DAK 1100-112

Maintenance:

- user-friendly
- compact construction
- clean appearance

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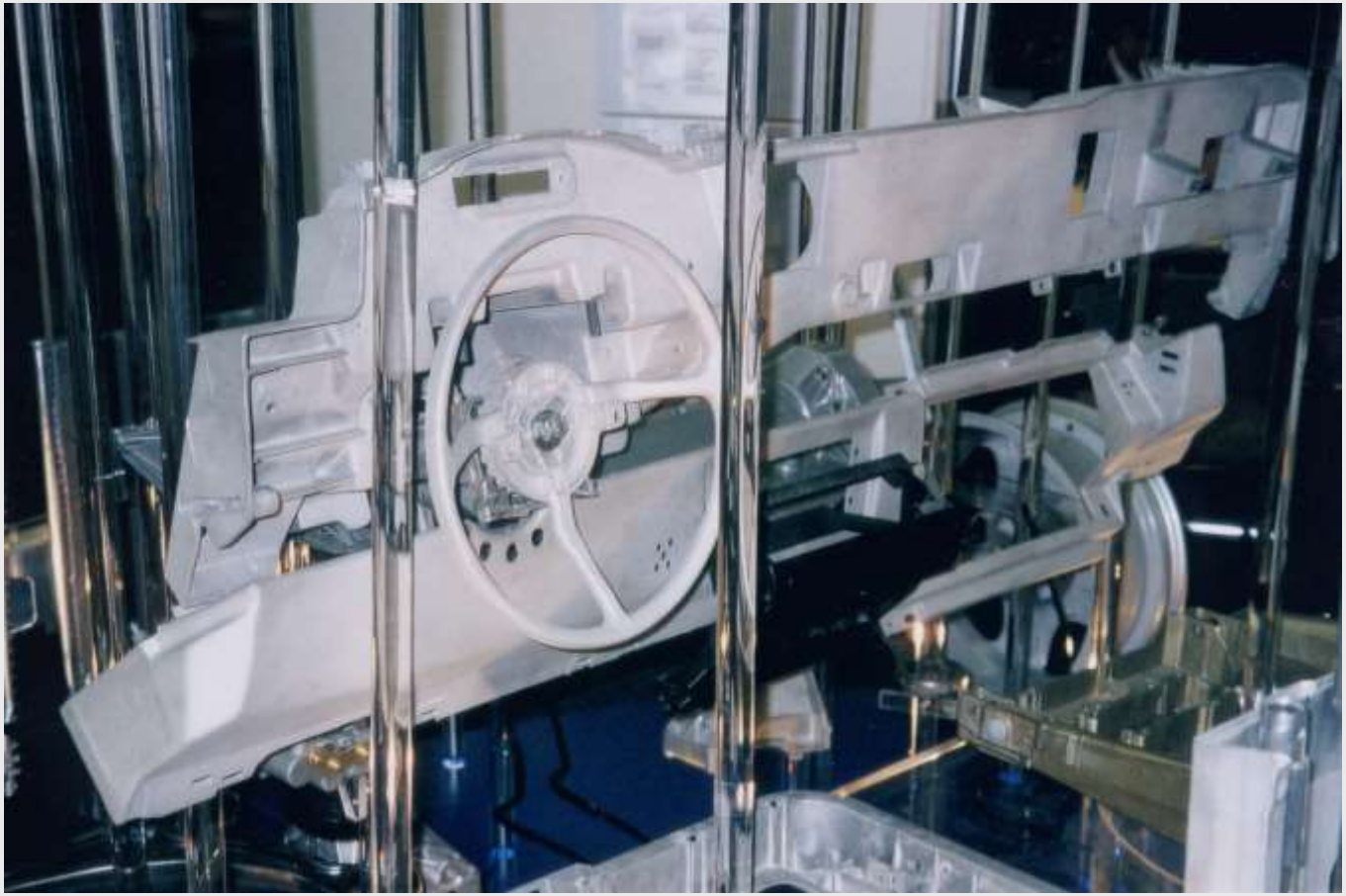
Cost-Saving Production with High Technology and Innovation

Seat Frame

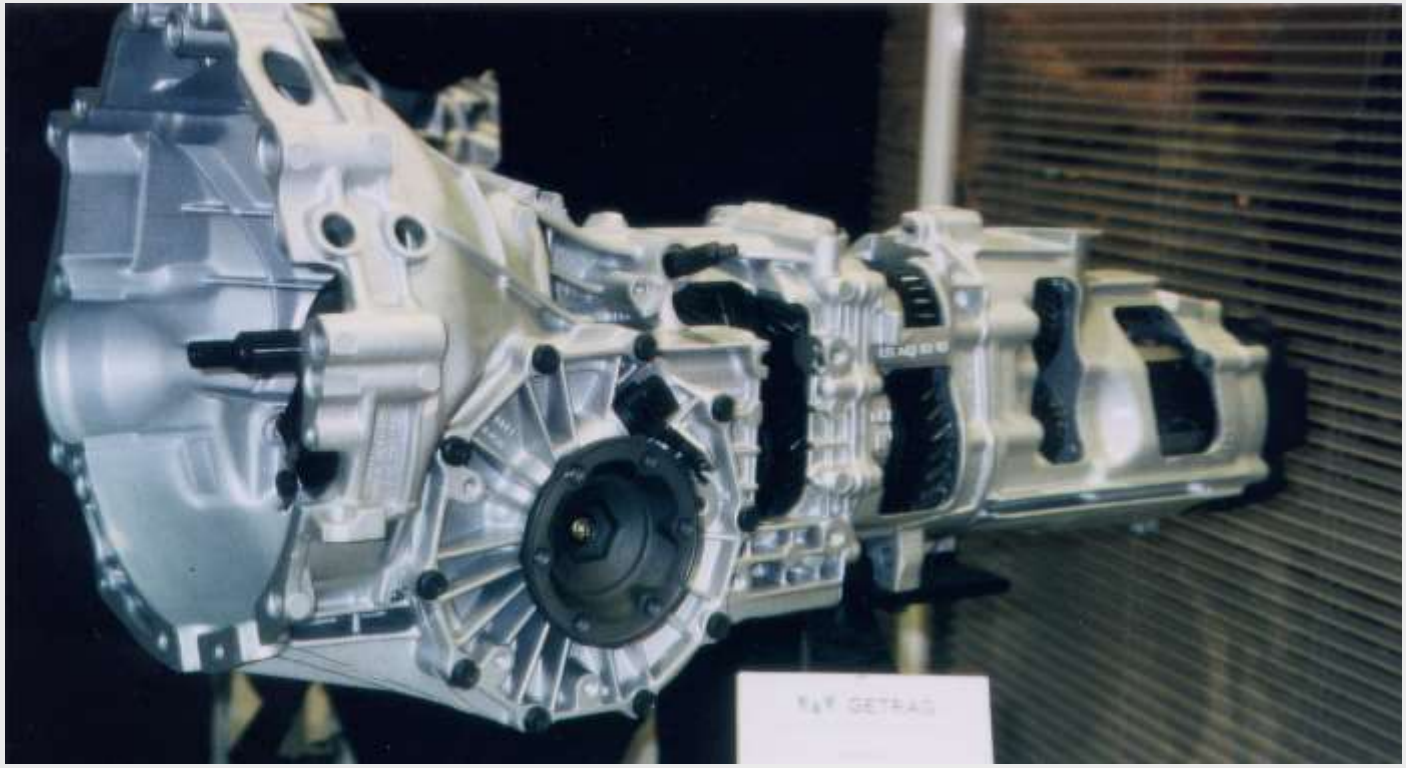
Filter Head

Car Dashboard

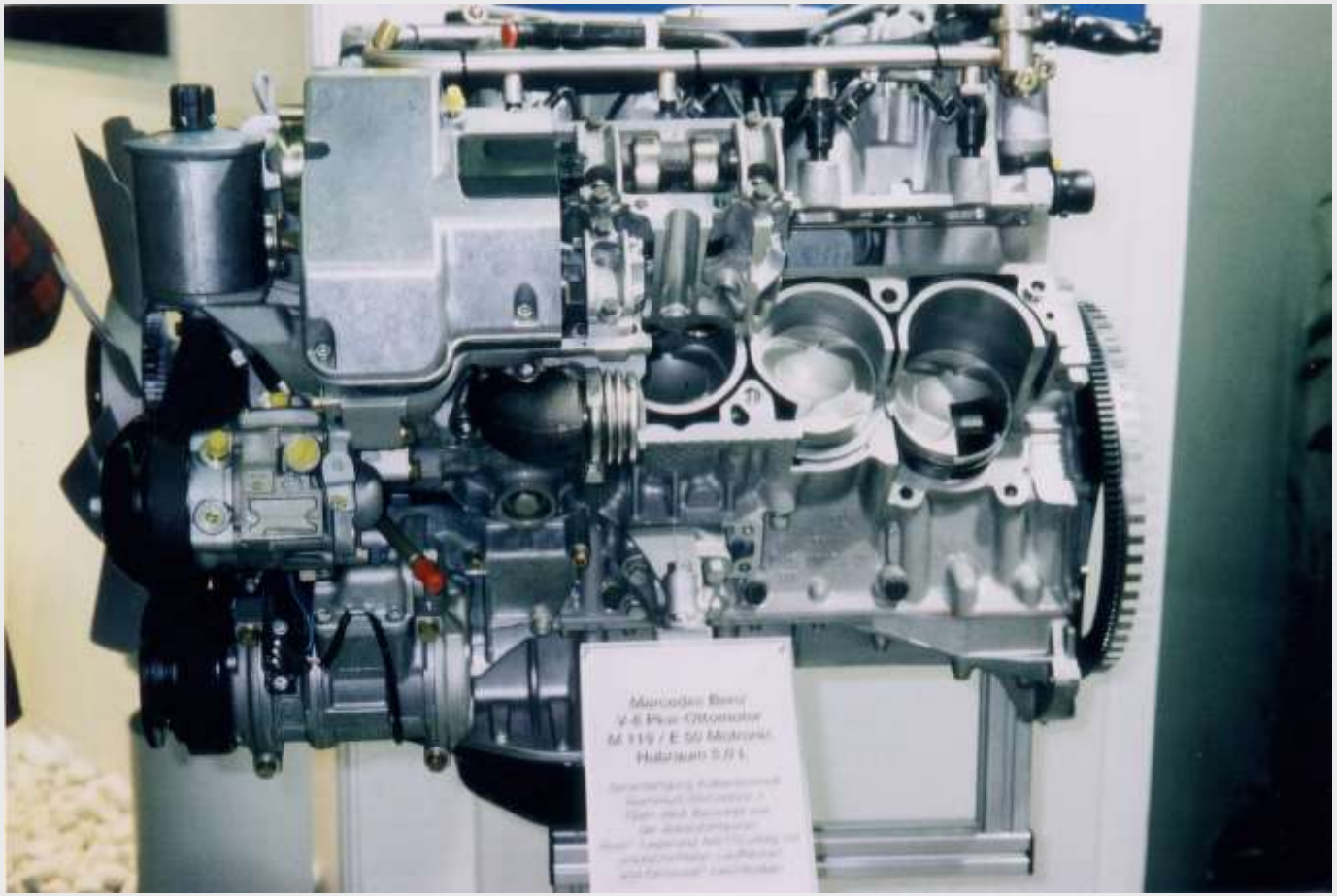


Wheel Suspension

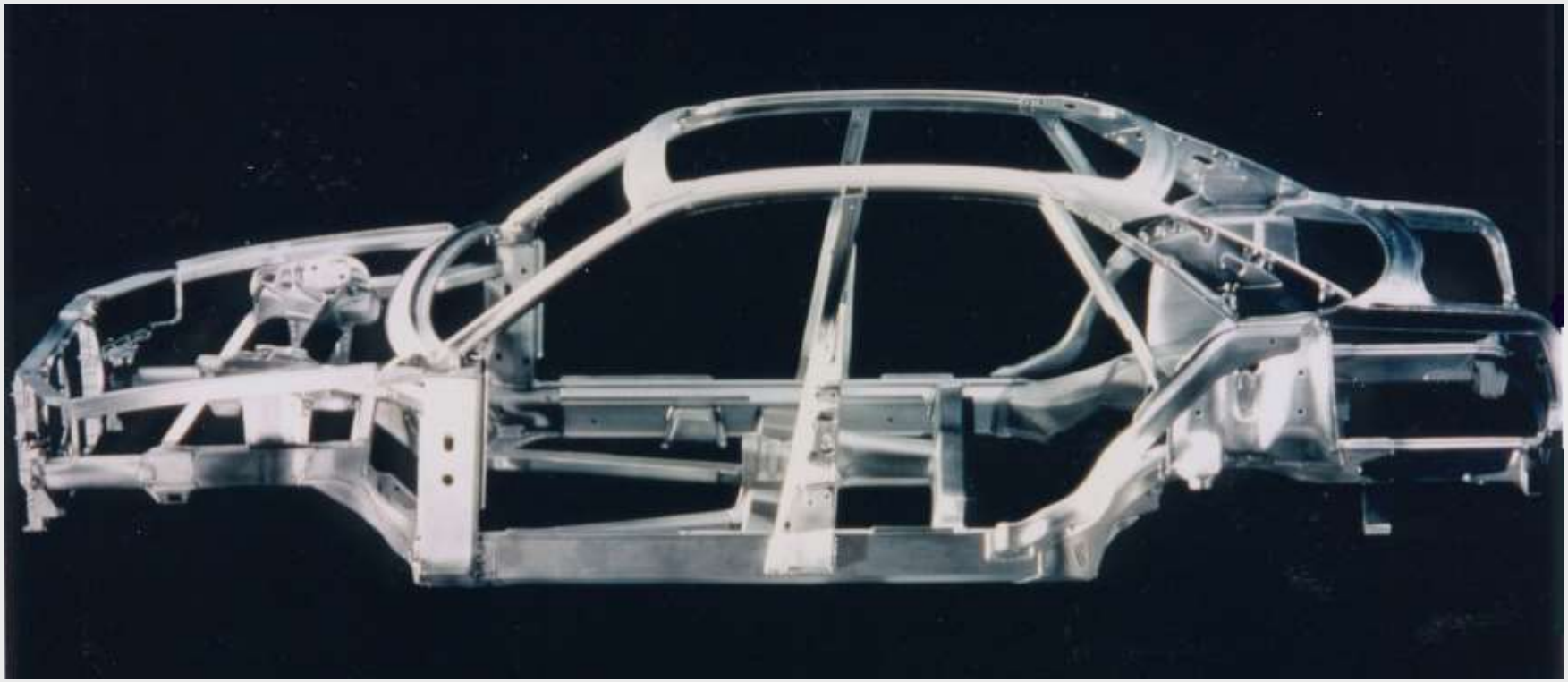
Gearbox



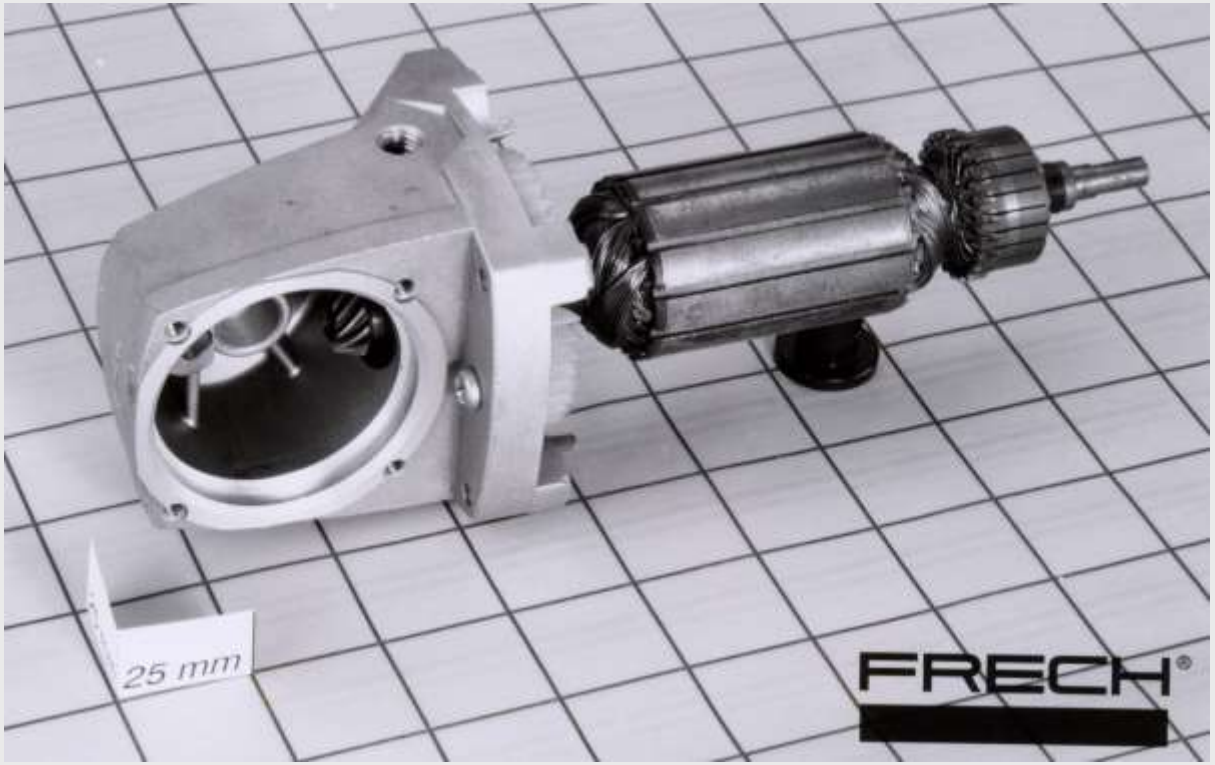
Engine Block made of Aluminium



Space Frame Audi



Angle Drill



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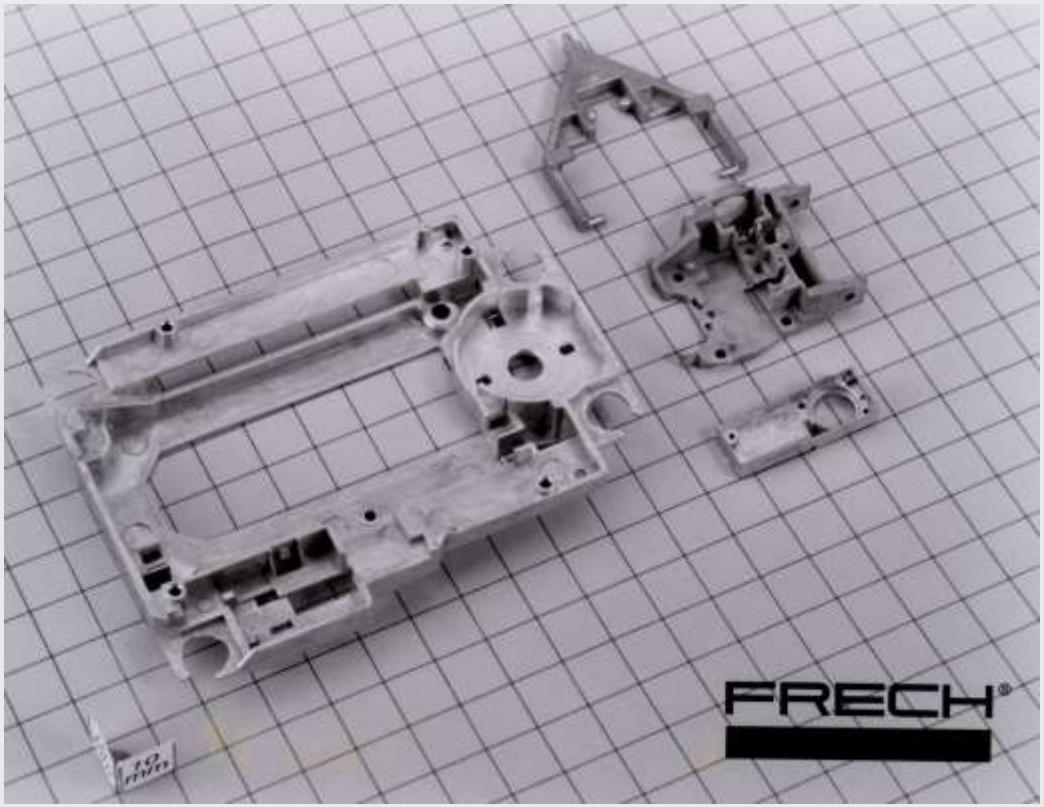
Spray Gun

Connector Box

Die Castings for CD-Player

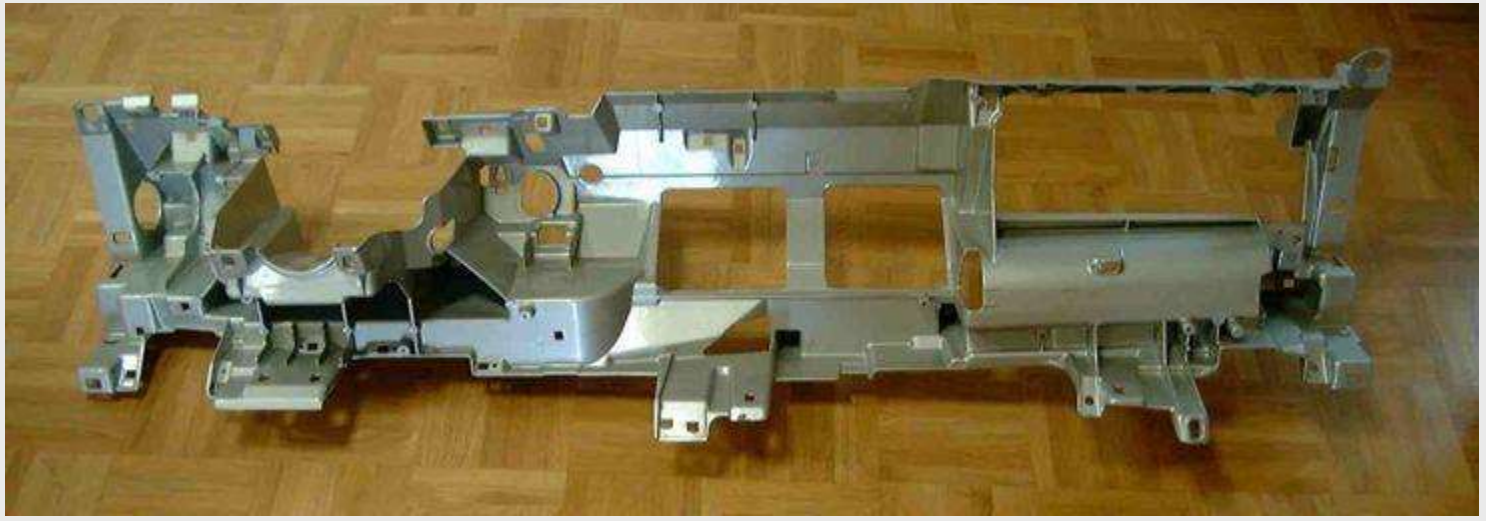


Trunk Lid VW Lupo

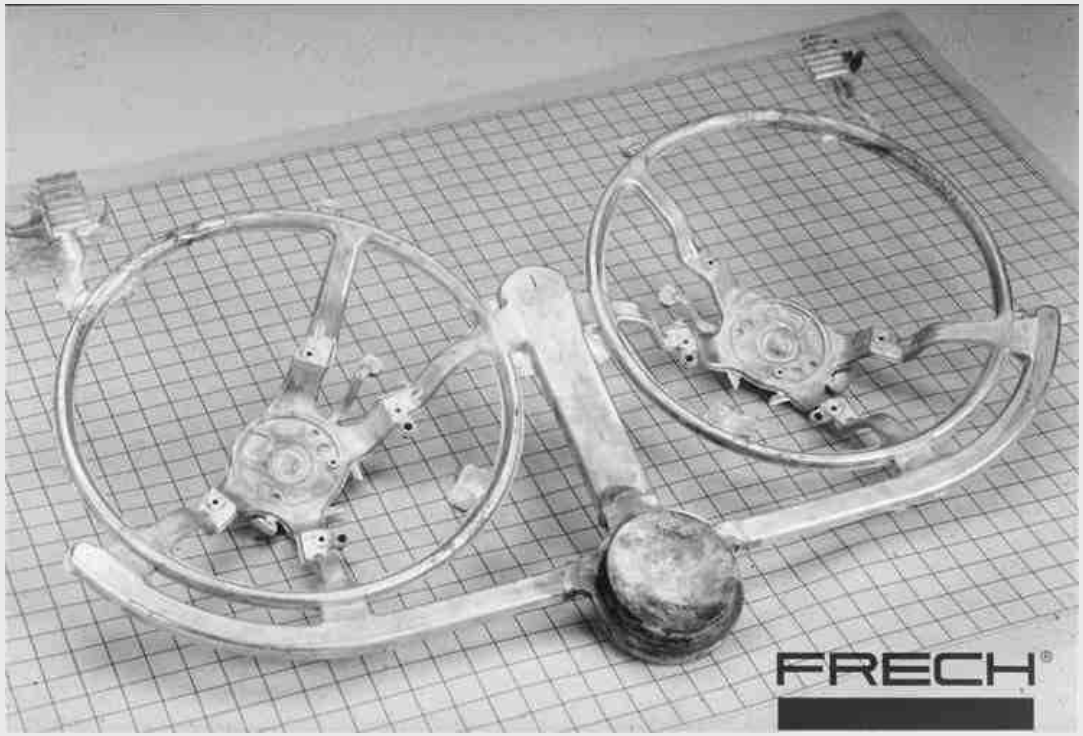
Car Door

Roof Frame

Dashboard

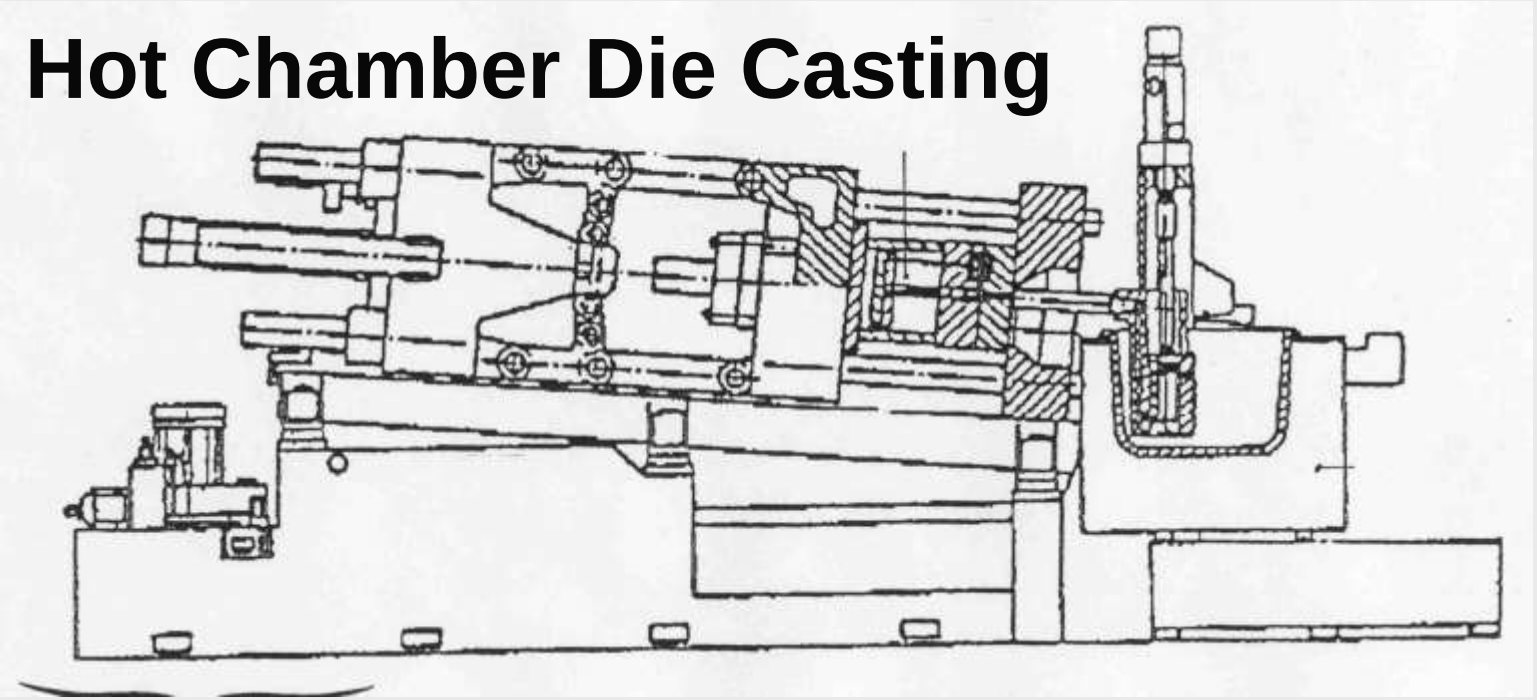


Steering Wheel



Steering Wheel

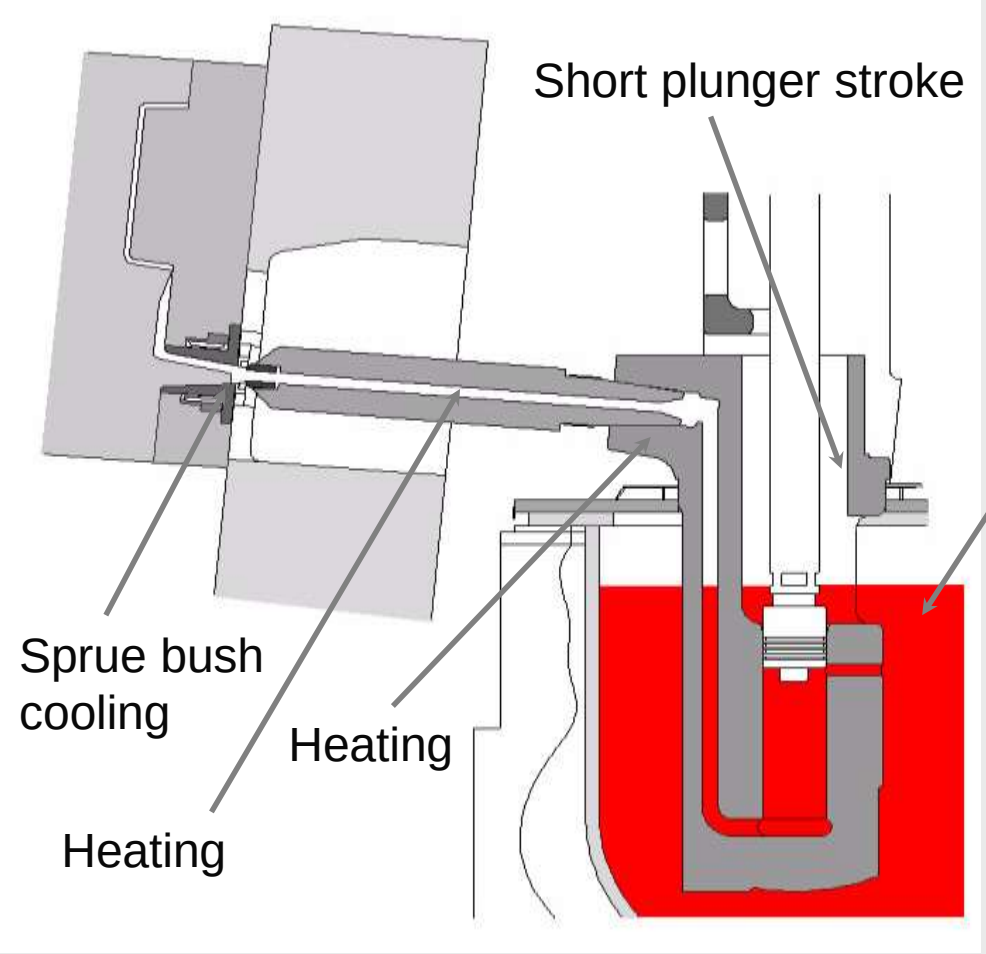
Hot Chamber Die Casting



The machine basically consists of:

- locking unit with toggle lever interlock and ejector unit
- vertical 2-phase injection unit
- integrated furnace
- control unit

Hot Chamber Die Casting



Zinc- and magnesium-alloys can be melted in a steel crucible without any problems. This crucible is integrated in the machine.

Temperature of metal approx. 640 °C

The melt flows through the gooseneck and the nozzle into the die.

2 phases are necessary for filling the die casting die.

- Slow pre-filling-phase, to bring the melt to the gate
- Fast filling-phase for the die cavity

Hot Chamber Die Casting Machine

from DAW 20 F up to DAW 500 F

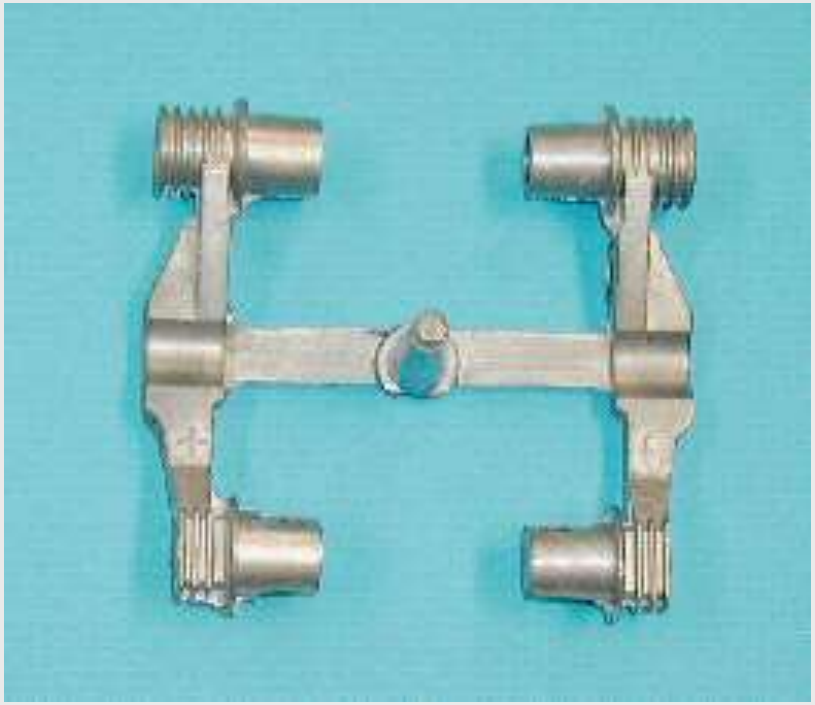
DAW 20 F

Zinc Die Casting

Handle

Lead Die Casting

Pole Bush



Housing of Model Railway Locomotive

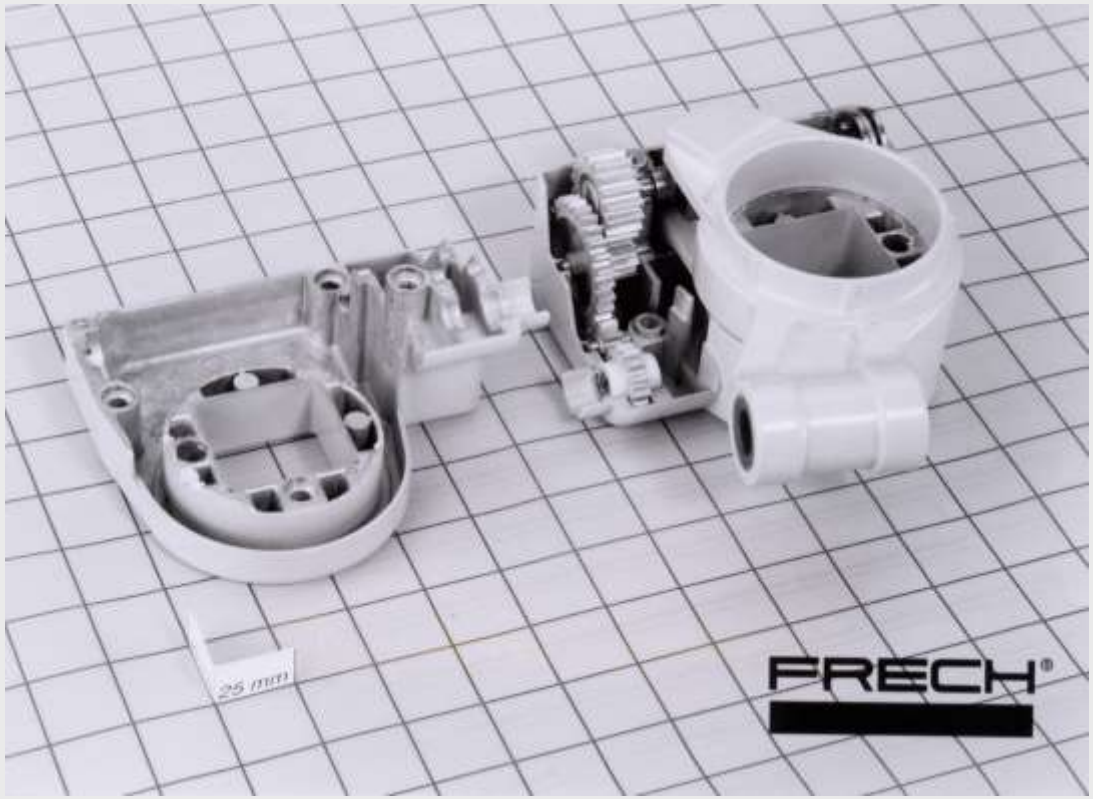
Door Handle

Sanitary Handle

Handle for Furniture

Gas Regulator

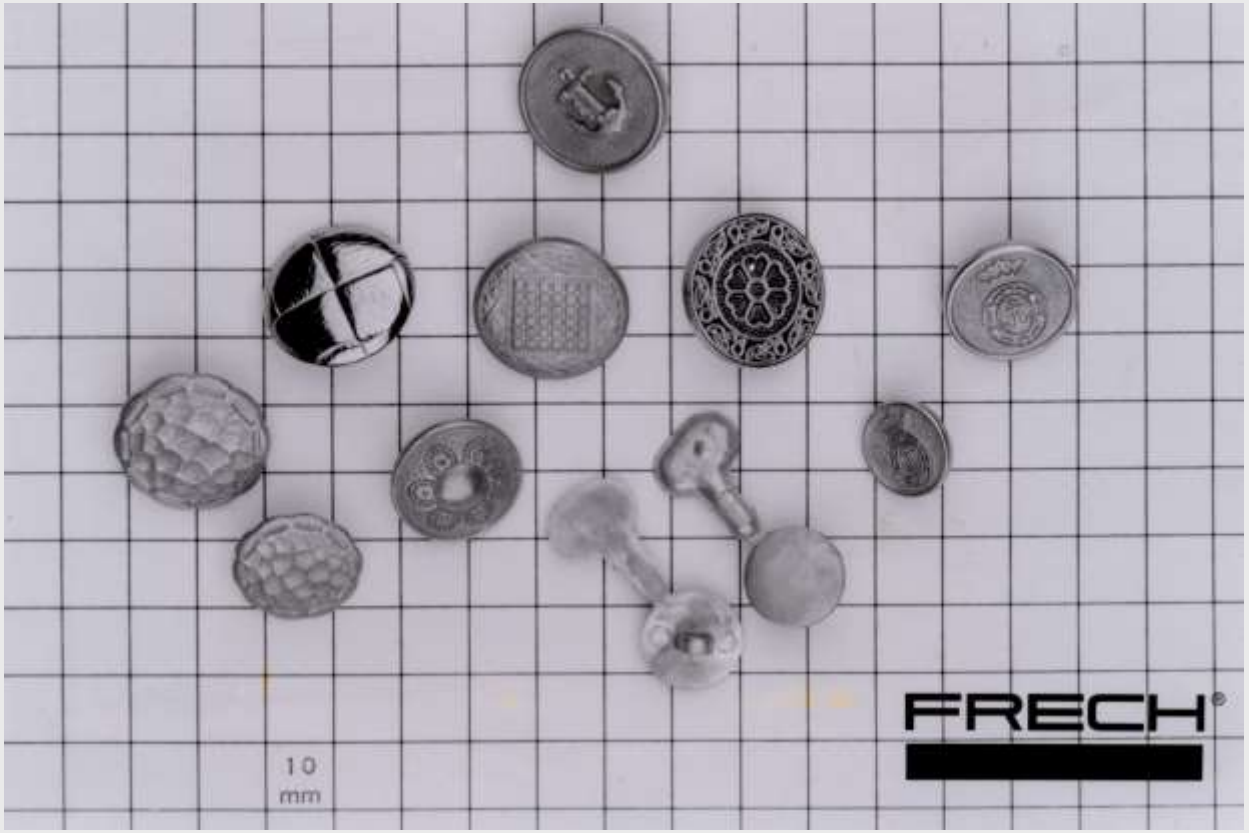
Gear Housing for Awning



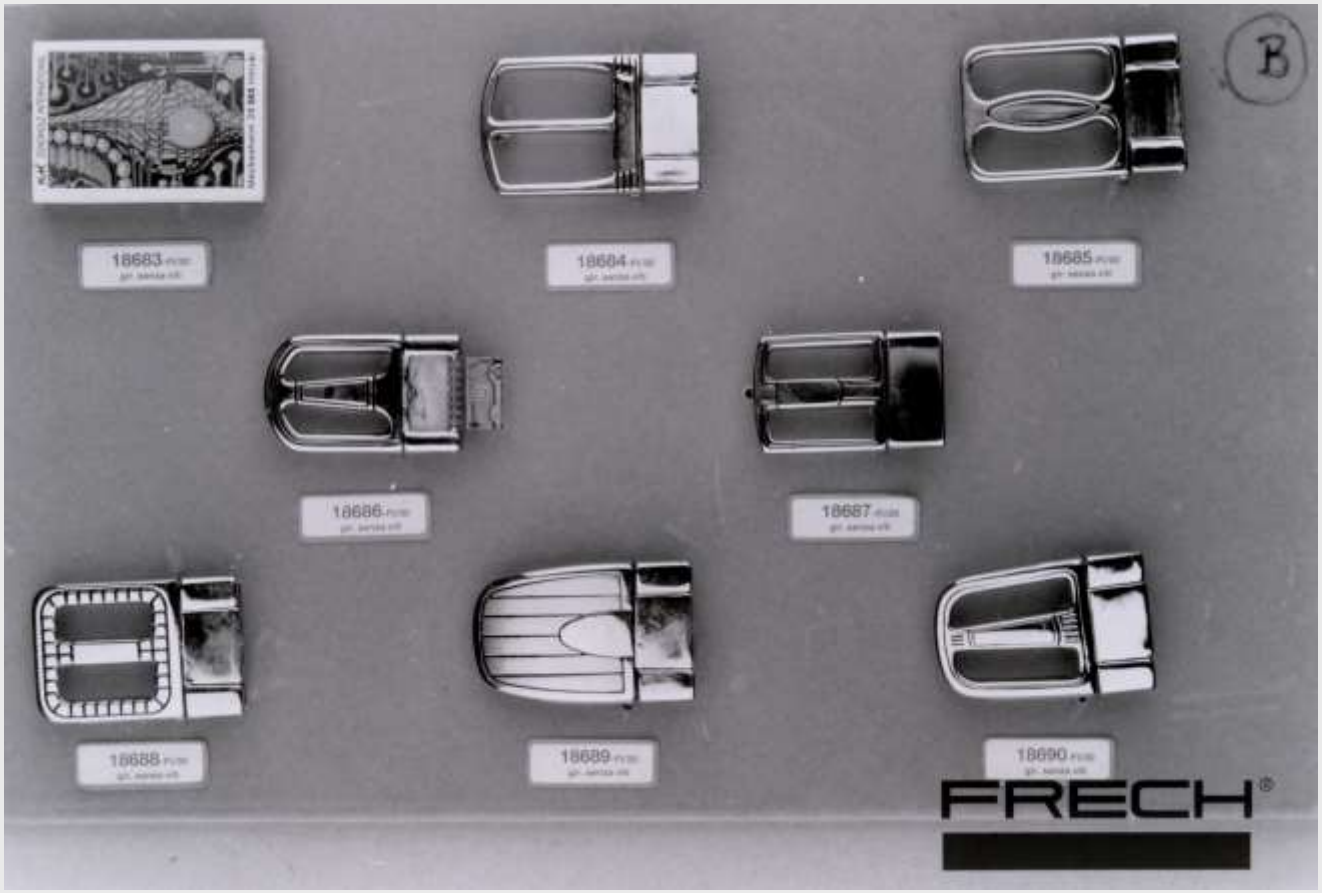
Model Car

Model Car

Buttons



Belt Buckles



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All Electric Hot Chamber Die Casting Machine

from DAW 20 E
up to DAW 125 E

DAW 125 E

All Electric Hot Chamber Die Casting Machine

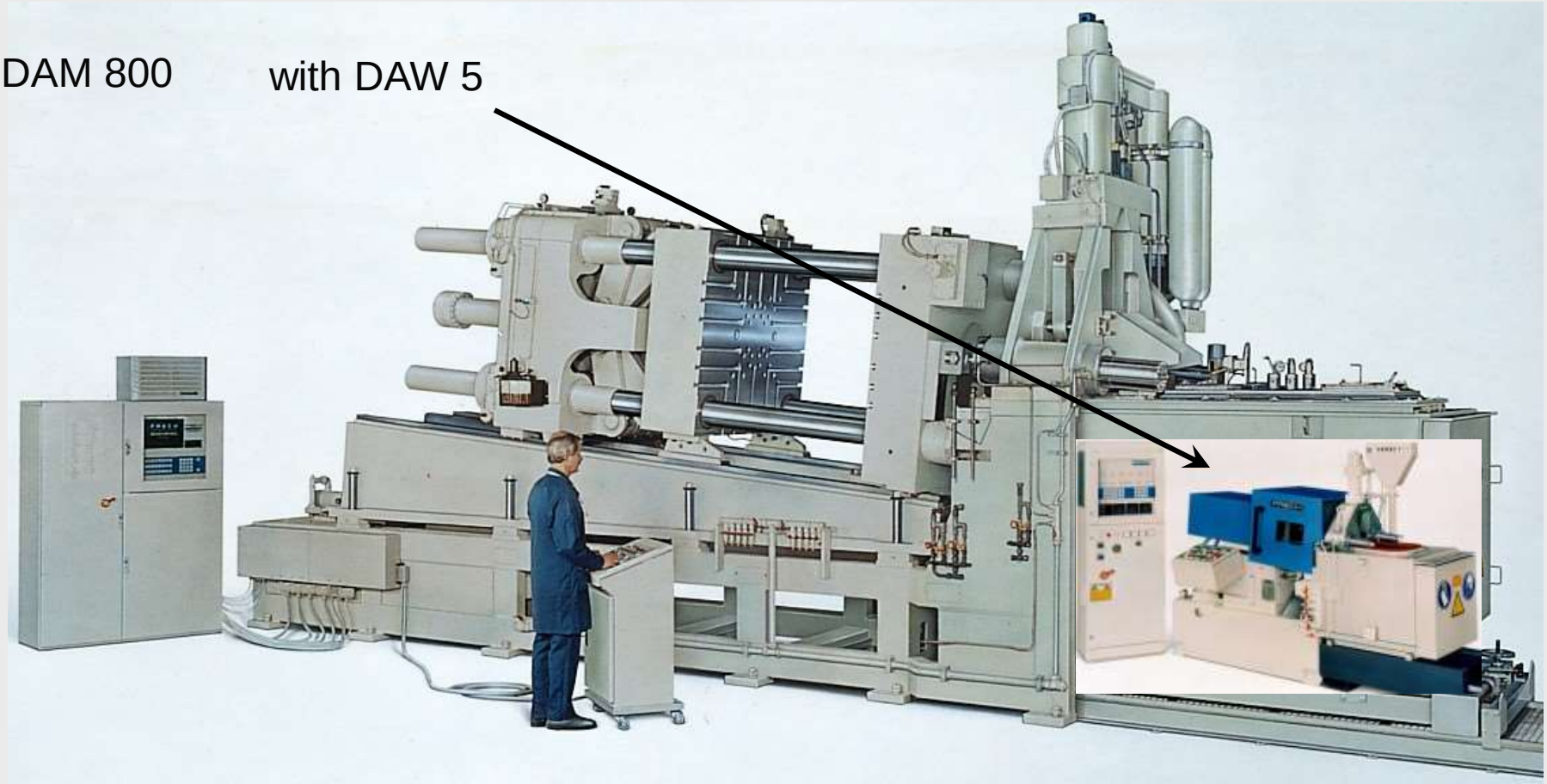
- Environmental-friendly: no hydraulic fluid, silent, tidy
- Powerful: 10-25 % shorter cycle time
- Energy saving: less need of electricity and water
- Real-time controlled: Easy adjustment and high repeatability of parameters
- Precise control of all movements
- DataDialog-Control-Unit
- High operational availability

Magnesium Hot Chamber Die Casting

from DAM 80 F
up to DAM 800 F

DAM 315 F

Size Comparison



Magnesium Hot Chamber Parts

Cylinder
Head Cover

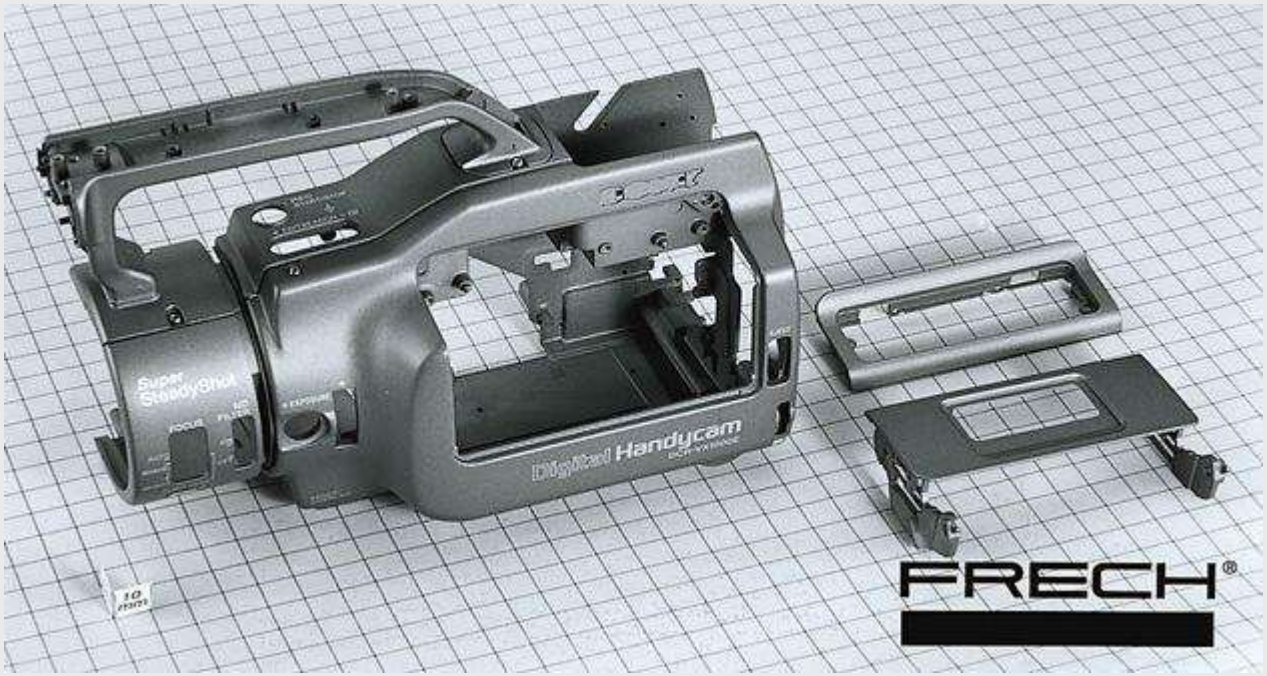
Housing of
steering column
lock

Radio Frame

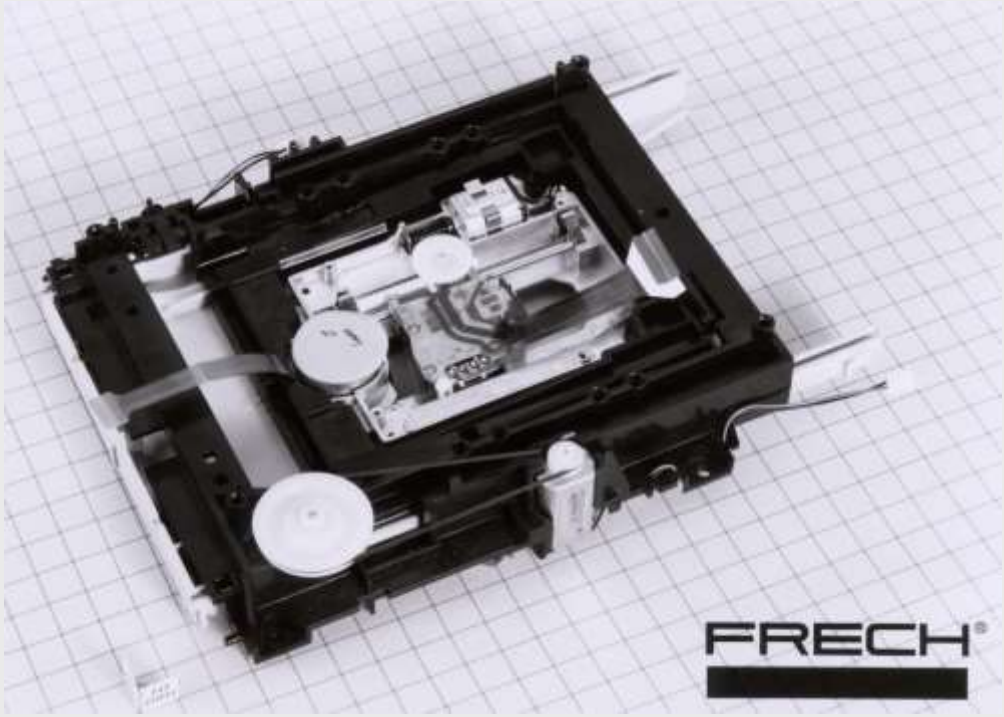
Power Saw

Laptop

Camcorder



CD-Player



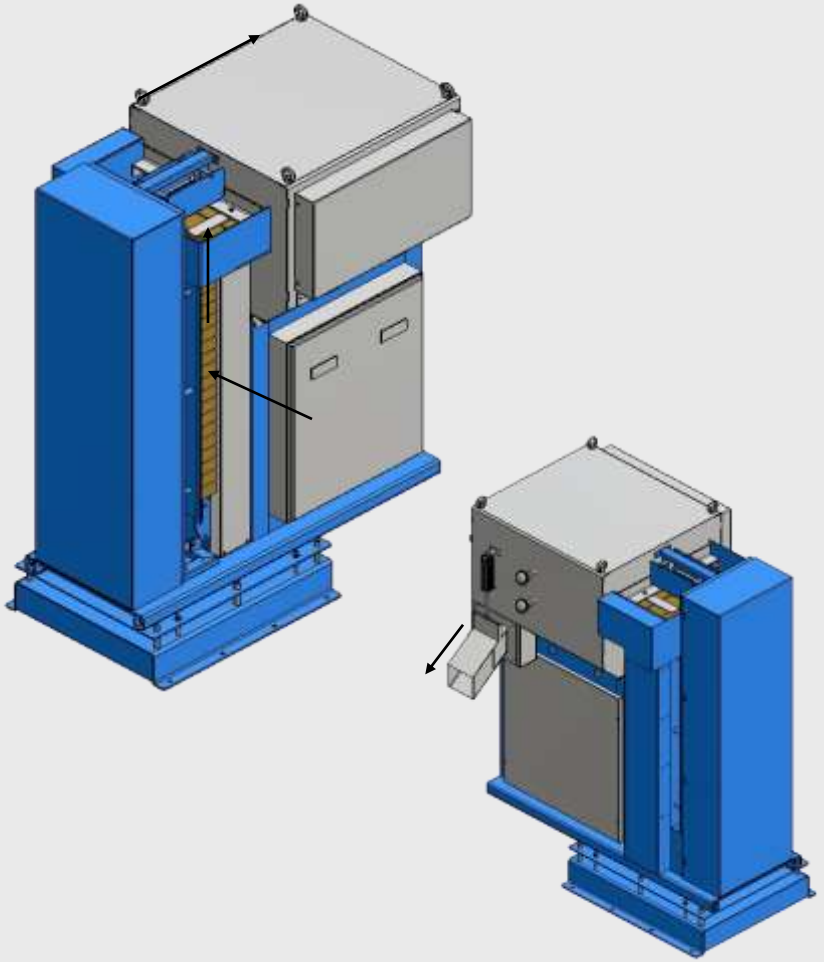
Automation Units

Dosing Unit MDF

Magnesium dosing unit for cold chamber die casting machines

Ingot Preheating and Charging System (IPC)

Hot and Cold Chamber Die Casting Machines



Heating and Cooling Units

Why Temperature Control?

- Increased life cycle of die casting die
- Reduction of selective overheating in the die, therefore reduction of stress cracks
- Shorter heating-up times
- Better quality of the parts
  - precise dimensions
  - continuous repeatable quality
  - clean surface
- Die casting of thin-walled parts

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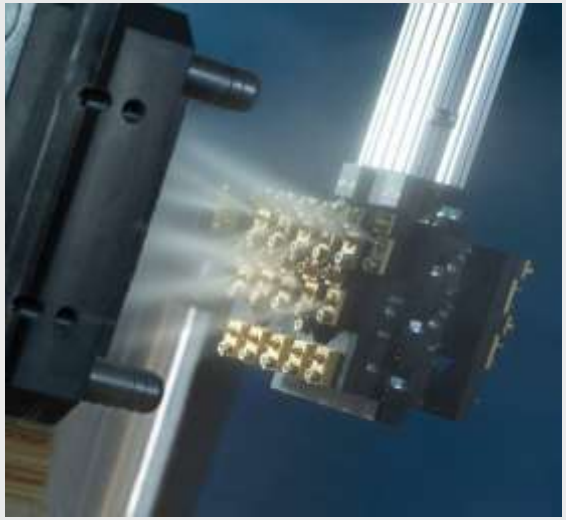
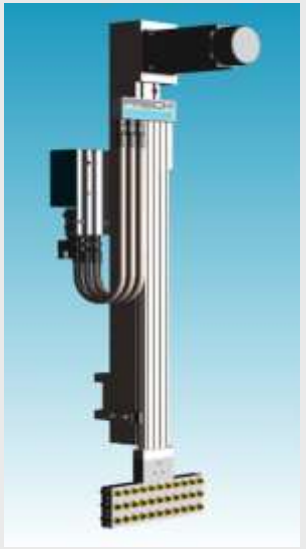
Spraying devices

For cleaning of die surface and for the spraying of die lube

Sprayhead „Contour“



Spraymotion 2



Extractor Device

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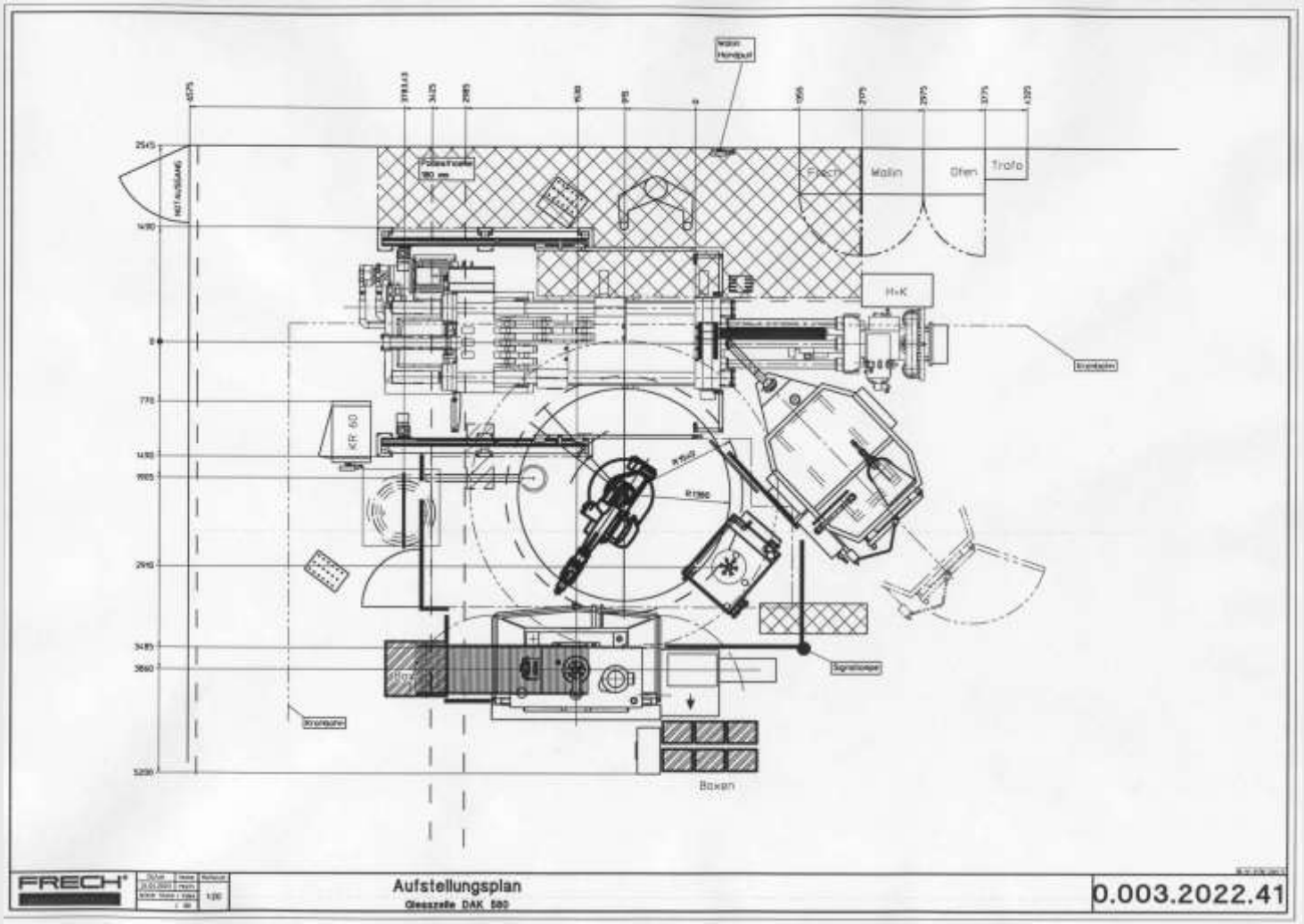
Weight Scales



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