Presentation
Division Metallurgy
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1919</td>
<td>Founded under the name Jihočeská zbrojovka</td>
</tr>
<tr>
<td>1923</td>
<td>Original production – small arms</td>
</tr>
<tr>
<td>1930</td>
<td>Production of bicycles</td>
</tr>
<tr>
<td>1931</td>
<td>Production of chains</td>
</tr>
<tr>
<td>1934</td>
<td>Production of tools</td>
</tr>
<tr>
<td>1935</td>
<td>Production of motorcycles</td>
</tr>
<tr>
<td>1954</td>
<td>Production of castings</td>
</tr>
<tr>
<td>1981</td>
<td>Production of turbochargers</td>
</tr>
<tr>
<td>1988</td>
<td>Production of gearboxes for Škoda-VW passenger cars</td>
</tr>
<tr>
<td>1993</td>
<td>Privatisation of the company – ČZ Strakonice, a.s.</td>
</tr>
<tr>
<td>1995</td>
<td>Joint Venture ČZ-TURBO-GAZ, Inc. in Russia</td>
</tr>
<tr>
<td>1999</td>
<td>Production of forklift trucks DESTA</td>
</tr>
<tr>
<td>2004</td>
<td>Takeover by principal shareholder ČZ a.s.</td>
</tr>
</tbody>
</table>
Organisation Chart of ČZ a.s.
History of Division Al - Foundry

- The history of casting production in ČZ a.s. is stretched up to the foundation of the company in 1919. The individual Al - Foundry was founded in the year 1954.
- Due to the long-term tradition, the foundry production was subsequently serving different sectors of the automotive industry, as an example the production of castings for engine parts or its components.
  - Currently, Division Al Foundry has 160 highly qualified employees with a long-term work experience
  - Modern machinery equipment - among others - a highly productive, fully automatic casting workplace CLD 1600 t
  - New technology – low pressure die-casting – machine BPS 650 SX – producer LPM Italy
History of Division Tool Shop

- Thanks to long term tradition the tool production was gradually used for production of weapons, bicycles, motorcycles, chains and various automotive industry branches like for example production of moulds for gearbox castings and turbochargers. The Tool shop division employs at the present 250 highly qualified employees with a long time professional experience.
  - 8000 m² of production area
  - Modern PC equipment and machinery – apart of that a hardening line
- 2013 – The Division Metallurgy was established by merging two divisions - Divisions Al – Foundry and Division Tool Shop
ČZ a.s., Division Metallurgy is certified according to:

- ISO/TS 16949:2009
- ISO 9001:2008
- ISO 14001:2004
- Safe Enterprise

In case of the customers interest CZ a.s. Tool Shop arranges the tools service during the complete lifetime.

The major target of ČZ a.s. Division Metallurgy is the satisfied the customer, the permanent modernization and improvement of the production technologies
Production of Parts in ČZ a.s.

- Proposals of design solution of parts regarding manufacturability
- Development, construction and trials of molds
- Casting of parts
- Finishing and machining of parts
- Packing
- Transport

Example of machining in ČZ a.s.

Example of a mould produced in ČZ a.s.
Production program - tools

- Injection moulds for plastics, zinc, aluminium, SMC, rubber
- Maximal size 25 tons
- Maximal dimensions 1600 x 1600
- Pattern equipment and cores for production from grey and ductile cast iron
- Fixtures for drilling and clamping, gauges
- Fixtures for drilling and clamping, gauges
- Trimming and pressing tools, cutting tools

ČZ a.s. Division Metallurgy also offers the production of the exact parts, and serial production of groups and subgroups according to customer’s drawings or samples.
## Production program - tools

The main representatives of our machines:

- EDM machine
- Bridge type drilling machine
- Coordinate drilling machine
- Wire cut machine
- CNC machining centre
- Gun drilling machine
- CNC lathe
- Column type milling machine
- Radial drilling machine
- 3D measuring machine
- Centre grinder
- Spotting press

### Technical possibilities

<table>
<thead>
<tr>
<th>Operation</th>
<th>Maximal dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lathe</td>
<td>360 x 1 500 mm</td>
</tr>
<tr>
<td>Peripheral grinding</td>
<td>300 x 1 000 mm</td>
</tr>
<tr>
<td>Flat grinding</td>
<td>700 x 2 000 mm</td>
</tr>
<tr>
<td>Milling 3D</td>
<td>1 600 x 1 600 mm</td>
</tr>
<tr>
<td>Milling 5D</td>
<td>730 x 560 x 560 mm</td>
</tr>
<tr>
<td>Wire cut machining</td>
<td>350 x 250 mm</td>
</tr>
<tr>
<td>EDM</td>
<td>880 x 1 400 mm</td>
</tr>
<tr>
<td>Gun drilling</td>
<td>1 200 mm</td>
</tr>
<tr>
<td>3D measuring</td>
<td>1500 x 800 x 700 mm</td>
</tr>
</tbody>
</table>
Production program - tools

CUSTOM HARDENING SHOP

- Hardening
- Annealing
- Cementing
- Nitriding
- Nitrocementing
- Improving

INJECTION OF PLASTICS

- Mould proposals and design
- Mould sampling
- Piece production, including the drying of granulate
- Assembly and subassembly of parts
- Labeling of parts

- Hardening line SOLO – Solotherm 203 60/110
- Storey annealing furnace up to 700° C
- Leveling and send blasting

Press Demag Plastik Group
Ergotech Extra 200 - 600
Production program: casting

- **Die-castings made of Al alloys**
- Weight of castings 0,1 - 8 kg
- Applied alloys:
  - EN AC 46 000 - DIN 226
  - EN AC 47 100 - DIN 231
Production program - casting

- Aluminium castings - low pressure casting
- Including heat treatment T4 and T6 in a continuous hardening unit
- Sand cores are produced within ČZ a.s. Croning method or ensuring external production method ColdBox
- Ensured alloys:
  - AlSi5Cu3
  - AlSi12(b)
  - Other alloys according to the demand of customer
Production – Machinery Representatives

- **Die – casting machines**
  - 3 x CLH 400 t
  - 1 x DAK 500 S FRECH
  - 7 x CLH 630 t – 1x fully automatic incl. trimming
    - 1x half-automatic (spray robot)
  - 1 x DAK 880 FRECH – fully automatic including trimming
  - 1 x CLD 1600 t – fully automatic including trimming
  - Die-casting machines are made by: Frech, Hydac, DEL, Snina

- **Low pressure casting machine:**
  - 3 x BPS 650 SX – producer LPM Italy

- **Trimming presses:**
  - SOL 10
  - SOL 26
  - CNOS 16
  - LHS 15B
  - Range 10t – 30 t
### Capacities

- **CLD 1600**: 533 t/yr
- **DAK 880 Frech**: 260 t/yr
- **CLH 630**: 1482 t/yr
- **CLH 400**: 947 t/yr
- **BPS 650 SX**: 430 t/yr
- **DAK 550S Frech**: 178 t/yr
Melting – House Equipment

- **Gas-melting furnace STRIKO**
  - two – chamber
  - output 1.000 kg/hr
  - volume 2.000 kg
  - for alloy EN AC 46000

- **Gas-melting furnace STRIKO**
  - two – chamber
  - output 750 kg/hr
  - volume 1.500 kg
  - for alloy EN AC 47100

- **Electric resistance furnace ELSKLO**
  - output 180 kg/hr + 290 kg/hr
  - volume 600 kg/hr + 1000 kg/hr
  - for low pressure casting alloys

- **Degassing equipment nitrogen-based**
Finishing Technology

- Basic machining:
  - 2 x screw-cutting
  - 2 x drill presses

- Finishing
  - drum washer
  - tumbling
    - tumbling equipment
      - Rössler
  - blasting
    - suspension blast machine SPH Disa
    - drum blast machine PTB Disa
Production Quality Support

- Chemical structure control – Spectrolab
- DICH Index control (melt gassiness)
- RTG x-ray television network Rich.Seifert 160 kV 4 mA
- 3D measuring Zeiss Contura G2
  - Carl Zeiss-software Calypso and Holos
  - possibility of a 3D model measurement
- Quality system support CAQ
- Palstat – software
- Applied standards of the automotive industry APQP, PPAP, VDA 2, G8D, FMEA, SPC
Customer Service

- Division Metallurgy is supported within ČZ a.s. with mould production and consequent machining of castings (Division Auto).
- Just send us a drawing or a 3D model of the casting in the following data format and everything else will be arranged by us!

<table>
<thead>
<tr>
<th>CAD</th>
<th>VERSION</th>
<th>INTERFACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>✅ CATIA V5</td>
<td>20</td>
<td>Catpart, model, igs</td>
</tr>
<tr>
<td>✅ Creo</td>
<td>2.0</td>
<td>prt, stp, igs</td>
</tr>
<tr>
<td>✅ VariCAD</td>
<td></td>
<td>dxf, igs, dwb</td>
</tr>
</tbody>
</table>
● Based on a long-term experience, modern production and measuring technology, and last but not least the possibility of tool production for castings and its consequent machining on one site, we offer a high quality in short terms and at acceptable prices. This is proved a wide range of domestic and also foreign customers.

● Among them are for example:

✓ Škoda Auto ✓ Spindelfabrik Süssen
✓ Aisin Písek ✓ Rieter GER, CZE
✓ Mubea Žebrák ✓ Isolit – Bravo
✓ CCN France ✓ Dura Automotive
✓ John Deere ✓ Benteler
### Address

- **Company head office:**
  ČZ a.s.
  Praha 5, Sluneční náměstí č. p. 2540/5
  PSČ: 158 00
  IČO: 25181432
  Company is registered in the Commercial register at Prague's city court

- **Production Plant:**
  ČZ a.s.
  Division Metallurgy
  Tovární 202
  CZ-386 15 Strakonice
Contact

- **Leader of Commercial Department**
  Ing. Přemysl Papež
  Tel.: +420 383 342 327
  Fax: +420 383 343 026
  E-mail: premysl.papez@czas.cz

- **Al Foundry – Sales Department**
  Pavel Švihovec
  Tel.: +420 383 342 321
  E-mail: prodej.al@czas.cz

- **Tool Shop – Sales Department**
  Lukáš Fuščič
  Tel.: +420 383 342 154
  E-mail: nastrojarna@czas.cz