Foundry Industry in Germany

Hüttenes Albertus, Status and current Developments

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Dr. Carsten Kuhlrgatz
President (CEO) Hüttenes Albertus-Group
Board Member of German Foundry Association (VDG)
Board Member of Technical Section of German Foundry Association
Hüttenes-Albertus

Position

Status Quo

Development

Current Topics

Supply Chain

Part of Supply Chain

Hüttenes

Albertus

Foundry Chemistry

Raw Materials

Foundry Chemistry

Sand Core by no-bake process

Casted Hub

Rotor Hub

Engine

Casted Engine Block

Shoted Sand Cores

Car

Wind Power Station

„Nothing works without casting“
Global Network

Hüttenes-Albertus
Position
Status Quo
Development
Current Topics

HA Affiliated Companies
HA Partner Companies
HA Sales Representatives
Position of German Foundry Industry

Global Surrounding

German Foundry Industrie: No. 5 worldwide (2012)

<table>
<thead>
<tr>
<th>Country</th>
<th>Mill. t</th>
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<tbody>
<tr>
<td>France</td>
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<tr>
<td>Italy</td>
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<td>USA</td>
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<td>China</td>
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Reference: national associations, Russia = 2011
Foundry Market: Focus Turkey

Europe: Iron and Steal Casting 2012

Reference: CAEF, Poland estimated

Picture: Soschinski (BDG)
Position of German Foundry Industry

Foundry Market: Focus Turkey

Europe: Non-Ferrous Metal 2012

Reference: CAEF, Poland estimated
Picture: Soschinski (BDG)
German foundries are well positioned in the global competition. They are closely linked with a powerful industrial consumer field and with markets with growth potential. \textit{Reference: ifo Institut, Munich: Casting 2020}
Global Surrounding

Customer Structure (t) in % – German Foundry Industry

Non-Ferrous

- 8%
- 7%
- 5%
- 5%
- 2%
- 73%

Ferrous

- 11%
- 5%
- 2%
- 24%
- 2%
- 51%

- Others
- Electrical Engineering
- Steel Industry
- Building Industry
- Engineering
- Rail Car Manufacturing
- Vehicle Construction

Reference: BDG
Position of German Foundry Industry

Global Surrounding

Material (t) in % – German Foundry Industry

Non-Ferrous

- Zinc: 5%
- Copper: 7%
- Magnesium: 2%
- Aluminium: 86%

Ferrous

- Steel Casting: 5%
- Malleable Cast Iron: 1%
- Ductile Cast Iron: 37%
- Grey Cast Iron: 57%

Reference: BDG

Hüttenes-Albertus

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Current Topics
The German Foundry Industry succeeds through:

1. **Performance**
   - Quality
   - Flexibility
   - Innovation
   - Know-how
   - Security of Supply
   - Productivity
   - Extension of Supply Chain

2. **Further Service Features:**
   - Logistical Support
   - Assistance in Simultaneous-Engineering-Projects
   - Product Development
The demand has moved out of the bottom and into a sideways movement.
Improvement of Environmental Conditions

- **Focus:**
  Reduction of Emmissions
  (Car and Industrial Plants)

- **Example: Car**
  - Reduction of weight
  - Reduction of Fuel Consumption
  - Reduction of Emmissions

- **Solution HA:**
  Coldbox-binder for thin-walled cast and for aluminium-gravity die casting
Downsizing to reduce weight

- Smaller Engine with larger performance (use of turbocharger)
- General Framework:
  - Reduction of emissions arising during casting processes
  - Avoiding casting errors resulting of combustion of core binder
  - High strength and good collapsing of core
  - Smaller cross sections of the core and longer cores
  - Different thermal stress in the core package

Developments of Hüttenes-Albertus

Use of core binding material: from hot and warm curing binders (RCS, Hotbox, Warmbox) to gas curing binders (Coldbox) and inorganic (Cordis)
Inorganic Binders

HÜT TENES-ALBERTUS  Product: Cordis

- Cordis Binder: Modified silicate solution
- Mineral
- Anorgit Additive: Synthetic, inorganic auxiliary

- Mixing
- Hot air gassing: 100 - 200 °C
- Heated core box: 130 - 180 °C
- Emission: Steam
Energy

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1. Power plant
- nuclear
- coal
- gas

2. Renewable Energies
- water power
- solar
- wind power
- biogas

Goal: Reduction of Energy Consumption
- Improvement of energy efficiency
- Temperature control of pressure die casting tools
- Reduction of melting amount
  → Feeder system

Rotor hub for wind power systems

→ Furan resins and coatings reduced of sulphur

Feeder (CHEMEX)
Productivity

Hüttenes-Albertus
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Eurokern

Process Automation by Robots
- coatings
- Assembly unit for construction of core packages
- Self calibration coating device

MAGMA
Core shooting simulation
Cooperation between Hüttenes-Albertus and MAGMA

Bild 6: Fehlerstelle beim Aushärtten eines Wassermantelkerns (a) und in der Simulation identifizierte Bereiche (b), die nicht aushärten.
Hüttenes-Albertus

Rapid Prototyping

- **Resin Coated Sands**
  - Layer by layer application of the resin coated sand to a carrier plate
  - Outlining by laser beam
  - Putting the core into the die or the sand form
  - Result: Prototype casting

- **No-Bake**
  - A large form or a core is produced by milling of a sand casting produced by resin
  - Assembling of milled parts

Hüttenes-Albertus developed an inorganic binder consisting of 2-components, that is used in the core printing process of Voxeljet-Printers = Cordis, RCS, Furan and Nobake

Milling of a core

- Deposition of powder (1)
- Binder (2)
- Lowering (3)
- Steps (1) to (3) are repeated
- Curing (4)
- Finish (5)
- Aftertreatment / Infiltration
Salt Cores

Salt Cores Used in Die Casting

No Use of salt cores

Production of salt cores with very thin cross cuttings and high resistance

Disadvantage: bad decay

Current topic: Flushing of core with water

Aluminium casting with salt core, which can be rinsed with water under high pressure

Salt core produced on die casting machine Ecoline 53

Bilder: Bühler AG, Uzwil Schweiz
Image and Recruitment Campaigns

Hüttenes-Albertus Position Status Quo Development Current Topics

Efficiency of German Foundry Industry

- well trained staff
- innovative staff

IMAGE CAMPAIGNES
GIFA + NEWCAST 2015

International trade fair for foundries, foundry auxiliaries and technology

June 2015
Düsseldorf, Germany

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Thank you very much for your attention