



DRAHTZUG STEIN

combicore

**Filled robust aluminium tubes
for all casting processes,
especially magnesium casting**



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1. Target: 3D-channels in cast parts



VW Käfer: Mg-Parts (ca. 20 kg),
e.g. gear housings

http://de.wikipedia.org/wiki/Metallurgie#Aluminium.2C_Magnesium



Lupo 3L TDI (Type 6E) / „3 liter car“:
Usage of lightweight materials
Magnesium and Aluminium

http://de.wikipedia.org/wiki/VW_Lupo



2. Conventional Methods

- Axial movable feeders (mould cores)
- Drilling (blades may cause flammability)
- Thick, empty and heavy steel tubes

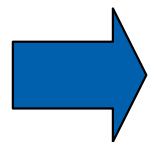


Combicore solution:
Aluminium tubes with
little wall thickness



3. Description of the cores

- Filled, stable tubes for foundries produced in a well known process developed from Mr. Rudolf Stein for cored welding consumable wires
- Bent in the required geometry
- Insert in mould
- Tube remains in the cast part
- Clean out the filling after casting



**Realize 3D-channels for oil,
water and other fluids**



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4. Production & Process



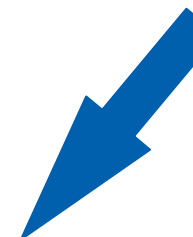
Filling



Shaping



Surface



Mould removing
& Cleaning



Casting



Joining



5. Advantages of combicore tubes

5.1 Construction & Design

5.2 Casting properties

5.3 Machining & Usage





5.1 Construction & Design

- Casting a near net shape with the reduction of weight and material
- Great design opportunities
- Integration of lines inside the part (Safety)





5.2 Casting properties

- Resist casting pressure > 1.000 bar
- Adaptation to cast alloy (Coefficient of thermal expansion, low risk of corrosion)
- Dedicated for all casting processes, especially high pressure aluminium and magnesium casting





5.3 Machining & Usage

- Ecological mould removing with water
- Improved tool wear
- Good machining
- Avoiding swarf and dust
→ Reduced risk of flammability
- Easy Recycling

- Realize cast parts with high absorptivity
(less vibration and less noise emission)
- Less consumption in later operations



Combicore cores are made for ecological, economic and innovative applications.



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6. Awards 2010



**Innovation-Champion
TOP 30**

**NoAE Innovation
Competition 2010**

German Award from
the Ministry of Economy
for the tubes' Material Efficiency



7. Aluminium Alloys

- AlMn1 (EN-AW 3103)
- Al99,5 (EN-AW 1050)
- AlSiMg0,5 (EN-AW 6060)





8. Tube Dimensions

■ Tubes' wall thickness:
0,5 to 2,0 mm
(other dimensions on request)

■ Outer-Ø: 5,0 to 18,0 mm
(other dimensions on request)

■ Bending radii & straight lengths:
min. 1,5 x Outer-Ø





9. Moulding Materials for stability

- Sodium chloride (NaCl)
- Potassium chloride (KCl)
- Calcium chloride (CaCl_2)
- Potassium carbonate /
potash (K_2CO_3)

Other mineral sands and mixtures on request





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Thank you!

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