**Amoree /K-Project**

Aluminium and magnesium processing optimisation with special respect to resource and energy efficiency

Programme: COMET – Competence Centers for Excellent Technologies

Programme line: K-Projects

COMET subproject, duration and type of project:
Amoree, 07/2014 – 06/2018, single-firm

**W-tempering and hot stamping of Al-7xxx alloys**

For the production of components made of high strength aluminum alloys of the 7xxx group process routes are needed that supports the performance potential of these alloys. By the examining and the investigation of the whole process chain to produce car body components, single process steps can be used to realize desired material property's, they are important for subsequent steps. This gives the objective of energy efficient process management with a maximum of component performance.

Efficient view of the process chain for the forming of AW-7xx alloys

Within the Amoree project, investigations on heat treatments of AW-7075-T6 and AW-7021-T4 based on the forming process of W-temper and hot stamping has been carried out. The Solution heat treatment was first investigated due to its relevance to the above mentioned forming processes. Solution heat treatments of 480°C/15 min for AW-7075 and 515°C/5 min for AW-7021 are needed to achieve full saturated solid solution in the sheet materials.

The cooling rate during heat treatment has an influence on the material properties of both alloys. It was found that hardness increases with increasing cooling rate. AW-7075 alloy shows a higher cooling rate sensitivity with a critical cooling rate of more than 300 K/s compared to AW-7021 with a critical cooling rate around 10 K/s.

![Efficient view of the process chain for the forming of AW-7xx alloys](image-url)
The Cooling rate during hot stamping is depending on the heat transfer between sheet and tool. An average cooling rate of 50K/s was realized using the tool at LKR to form test parts which affect all further process steps.

**Stabilization of AW- 7xx alloys**

The investigation on the stabilization heat treatment highlights out that depending on temperature and holding time, specific material properties can be adjusted. These specific material properties are important for the following process step of mechanical joining.

**Impact and effects**

Considering the whole process chain the heat treatment of paint baking is the last step which affects the end characteristic of the whole part. This is used to increase the yield strength of AW-7075 near to T6 and AW-7021 near to T4 conditions.

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**Contact and information**

**K-Projekt Amoree**

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**Project partners**

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<td>AMAG Austria Metall AG</td>
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<td>HAI Hammerer Aluminium Industries GmbH</td>
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<td>Magna Steyr Fahrzeugtechnik AG &amp; Co.KG</td>
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