

PART I. CASTING

AA4032 ALLOY'S HEAT TREATMENT AND ITS INFLUENCE INTO SUBSTRUCTURE

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Aim of this work was to do divers heat treatment for AlSi12CuMgNi alloy as a temper hardening (artificial ageing) with different temperatures of purpose to acquire the best mechanical properties (breaking limit and creep limit in comparison with required dilatibility min. 7 – 8 %). Further aims were to search exchanges in material substructure for several heat conditions, to compare this with reached mechanical values and with influence into form and character of receiving chip on the machining under the same conditions. From heat treatment view and strength properties influence for this Al₂Cu₃Ni alloy is some important intermetallic compound phase marked as the T phase, what makes precipitates stable in higher temperatures to the 300°C, too. Cu and Mg presence also makes intermetallic compound CuMgAl₂, what participates on the strength properties increase after heat treatment.

Key words: aluminum alloys, mechanical properties, treatment

References

- [1] Bajcura M., Michna Š., Lukáč I.: Nové poznatky o struktuře tvářené slitiny AlSi12CuMgNi (AA 4032), Archiwum odlewnictwa, Katowice 2006, Poland ISBN 83-922029-8-8
- [2] Bolibruchová, D., Tillová, E.: Zlievarenské zliatiny Al-Si, ŽU v Žiline, 2005
- [3] Lukáč I., Michna Š.: Colour Contrast, Struktura and Defects in Aluminium and Aluminium Alloys. Cambridge international science publishing, september 2001
- [4] Mečiarová, J., Dado, M.: Computer application for decision-making support in manufacturing technology. In: Annals of DAAAM for 2008 & proceedings of the 19th international DAAAM symposium "Intelligent manufacturing & automation : focus on next generation of intelligent systems and solutions" : 22-25th October 2008, Trnava, Slovakia Vol. 19, no. 1, p. 839-840. Vienna : DAAAM International Vienna, 2008. ISBN 978-3-901509-68-1. ISSN 1726-9679
- [5] Michna Š., Lukáč I., Bajcura M.: Struktura slitiny EN AW 4032 a její vliv na výsledné vlastnosti materiálu, (Transactions of the Univerzities of Košice, 5. mezinárodní konference Aluminium 2007, Staré Splavy, ISSN 1335-2334)
- [6] Michna Š., Lukáč I., Očenášek V., Kořený R., Drápala J., Schneider H., Miškuřová A. a kol.: Encyklopedie hliníku (vydal Adin s.r.o. Prešov 2005 ISBN 80-89041-88-4
- [7] Michna Š., Majrich P.: Nové poznatky o struktuře slitiny AlSi12CuMgNi. Transactions of the VŠB – Technical Univezity of Ostrava, Metallurgical series 1/2007, ISBN 978-80- 248-1748-0, ISSN 1210-0471
- [8] Mondolfo L.F.: Aluminium Alloys, Structure and Properties, Butterworths, London 1979