

Title (en)

THICK AL - CU - LI - ALLOY SHEETS HAVING IMPROVED FATIGUE PROPERTIES

Title (de)

DICKE BLECHE AUS AL- CU - LI LEGIERUNG MIT VERBESSERTEN ERMÜDUNGSEIGENSCHAFTEN

Title (fr)

TÔLES ÉPAISSES EN ALLIAGE AL CU LI À PROPRIÉTÉS EN FATIGUE AMÉLIORÉES

Publication

EP 3411508 B1 20200408 (FR)

Application

EP 17707940 A 20170203

Priority

- FR 1650850 A 20160203
- FR 2017050255 W 20170203

Abstract (en)

[origin: CA3012956A1] The invention relates to a rolled product having a thickness of at least 50 mm made of aluminium alloy comprising, in % by weight, 2.2% to 3.9% of Cu, 0.7% to 1.8% of Li, 0.1% to 0.8% of Mg, 0.1% to 0.6% of Mn; 0.01% to 0.15% of Ti, at least one element chosen from Zn and Ag, the amount of said element, if it is chosen, being 0.2% to 0.8% for Zn and 0.1% to 0.5% for Ag, optionally at least one element chosen from Zr, Cr, Sc, Hf, and V, the amount of said element, if it is chosen, being 0.04% to 0.18% for Zr, 0.05% to 0.3% for Cr and for Sc, 0.05% to 0.5% for Hf and for V, less than 0.1% of Fe, less than 0.1% of Si, the remainder being aluminium and inevitable impurities, having a content of less than 0.05% each and 0.15% in total; characterized in that its granular structure is predominantly recrystallised between 1/4 and 1/2 thickness. The invention also relates to the process for manufacturing such a product. The products according to the invention are advantageously used in aircraft construction, in particular for the production of an aircraft wing spar or rib.

IPC 8 full level

C22C 21/12 (2006.01)

CPC (source: EP US)

C22C 21/12 (2013.01 - EP US); **C22C 21/14** (2013.01 - EP US); **C22C 21/16** (2013.01 - EP US); **C22C 21/18** (2013.01 - EP US);
C22F 1/057 (2013.01 - EP US)

Citation (opposition)

Opponent : Arconic Corp

- CN 102021457 A 20110420 - AVIC BEIJING INST OF AERONAUTICAL MATERIALS
- US 2011278397 A1 20111117 - BES BERNARD [FR], et al
- WO 2015082779 A2 20150611 - CONSTELLIUM FRANCE [FR]
- US 2007181229 A1 20070809 - BES BERNARD [FR], et al
- CN 101967589 A 20110209 - BEIJING INST AERONAUTICAL MATERIALS AVIAT INDUSTRY CORP CHINA
- US 7229509 B2 20070612 - CHO ALEX [US]
- WO 2009036953 A1 20090326 - ALERIS ALUMINUM KOBLENZ GMBH [DE], et al
- US 4894096 A 19900116 - MEYER PHILIPPE [FR]
- US 5455003 A 19951003 - PICKENS JOSEPH R [US], et al
- US 5066342 A 19911119 - RIOJA ROBERTO J [US], et al
- DAVIS J R, ET AL: "Introduction to Aluminum and Aluminum Alloys", ASM SPECIALTY HANDBOOK, 1 January 1993 (1993-01-01), pages 46,121 - 125, XP055964649
- JAIN V.K, JATA K.V, RIOJA R.J, MORGAN J.T, HOPKINS A.K: "Processing of an experimental aluminum-lithium alloy for controlled microstructure", JOURNAL OF MATERIALS PROCESSING TECHNOLOGY, ELSEVIER, NL, vol. 73, no. 1-3, 1 January 1998 (1998-01-01), NL , pages 108 - 118, XP055964651, ISSN: 0924-0136, DOI: 10.1016/S0924-0136(97)00219-7
- RIOJA, R.J.: "Fabrication methods to manufacture isotropic Al-Li alloys and products for space and aerospace applications", MATERIALS SCIENCE, ELSEVIER, AMSTERDAM, NL, vol. 257, no. 1, 30 November 1998 (1998-11-30), AMSTERDAM, NL, pages 100 - 107, XP005495447, ISSN: 0921-5093, DOI: 10.1016/S0921-5093(98)00827-2
- BALMUTH, E. S.; CHO, A.: "FRACTURE AND FATIGUE CRACK GROWTH RESISTANCE OF RECRYSTALLIZED AL-LI ALLOYS", ECO-MATERIALS PROCESSING AND DESIGN VIII : ISEPD-8, PROCEEDINGS OF THE 8TH INTERNATIONAL SYMPOSIUM ON ECO-MATERIALS PROCESSING AND DESIGN, JANUARY 11 - 13, 2007, KITAKYUSHU, JAPAN, TRANS TECH PUBLICATIONS LTD, CH, vol. 217-222, no. 3, 1 January 1996 (1996-01-01), CH , pages 1365 - 1370, XP009085471, ISBN: 978-0-87849-431-6
- DOMACK M S, ET AL: "Effect of thermal exposure on the strength-toughness behavior of elevated temperature service aluminum alloys", ALUMINUM ALLOYS, 1 January 1998 (1998-01-01), pages 1081 - 1086, XP055964654, Retrieved from the Internet <URL:http://www.icaa-conference.net/ICAA6/Aluminium%20Alloys%20Volume%202/1081-1086.pdf> [retrieved on 20220926]

Designated contracting state (EPC)

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

DOCDB simple family (publication)

FR 3047253 A1 20170804; FR 3047253 B1 20180112; BR 112018014770 A2 20181218; BR 112018014770 B1 20221116;
 CA 3012956 A1 20170810; CA 3012956 C 20231003; CN 108603253 A 20180928; CN 108603253 B 20210319; EP 3411508 A1 20181212;
 EP 3411508 B1 20200408; US 2019040508 A1 20190207; US 2024035138 A1 20240201; WO 2017134405 A1 20170810

DOCDB simple family (application)

FR 1650850 A 20160203; BR 112018014770 A 20170203; CA 3012956 A 20170203; CN 201780009624 A 20170203; EP 17707940 A 20170203;
 FR 2017050255 W 20170203; US 201716074661 A 20170203; US 202318448998 A 20230814