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**Datasheet for the decision
of 10 April 2024**

Case Number: T 2218/21 - 3.3.05

Application Number: 13782264.9

Publication Number: 2841611

IPC: C22C21/08, C22F1/05

Language of the proceedings: EN

Title of invention:

Extruded profile of Al-Mg-Si aluminium alloy with improved properties

Patent Proprietor:

Norsk Hydro ASA

Opponents:

TRIMET Aluminium SE
F.W. Brökelmann Aluminiumwerk GmbH & Co. KG
C-TEC Constellium Technology Center /
Constellium Singen GmbH
Hammerer Aluminium Industries Holding GmbH

Headword:

Al-Mg-Si aluminium alloy/Norsk Hydro

Relevant legal provisions:

EPC Art. 56

Keyword:

Inventive step - (no)

Decisions cited:

Catchword:



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Case Number: T 2218/21 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 10 April 2024

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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
11 November 2021 concerning maintenance of the
European Patent No. 2841611 in amended form.**

Composition of the Board:

Chairman E. Bendl
Members: G. Glod
S. Fernández de Córdoba

Summary of Facts and Submissions

I. The appeals of the patent proprietor and opponents 1, 3 and 4 lie from the opposition division's decision which found that European patent No. 2 841 611 in amended form based on auxiliary request 1 met the requirements of the EPC. The opposition division held that the main request did not meet the requirements of Article 123(2) EPC and that there was no need to debate auxiliary requests 2 to 4.

II. The following documents are relevant to the present decision:

D42: JP H086161

D42b: English translation of D42

D53: S.A. Court, et al., "Improved performance in Al-Mg-Si (6XXX) extruded, structural alloys through microstructural control", 4th International Conference on Aluminum Alloys, 1994

III. With their reply to the appeals of opponents 1, 3 and 4, the patent proprietor submitted a further auxiliary request, i.e. auxiliary request 5.

IV. Claim 1 of the main request reads as follows:

*"1. Extruded profile comprising an extrudable Al-Mg-Si aluminium alloy with improved strength, corrosion resistance, crush properties and temperature stability, in particular useful in the front structure of vehicles, wherein the composition of the alloy is defined within the following coordinate points of an Mg-Si diagram:
a1 - a2 - a3 - a4,*

wherein in wt% $a_1=0.60\text{Mg}$, 0.65Si , $a_2=0.90\text{Mg}$, 1.0Si , $a_3=1.05\text{Mg}$, 0.75Si and $a_4=0.70\text{Mg}$, 0.50Si , wherein the alloy has a non-recrystallised grain structure in the extruded profile, the alloy containing in addition the following alloy components in wt%:

Fe up to 0.30

Cu 0.12 - 0.32

Mn 0.4 - 1.0

Cr 0.10 - 0.20

Zr up to 0.25 and

Ti 0.005 - 0.15,

incidental impurities up to 0.1 each and including Zn up to 0.5, with balance Al, and wherein Mn and Cr are both present in the alloy together, wherein the extruded profile is overaged."

In claim 1 of the first auxiliary request, the Cu content has been limited to 0.15 - 0.30 wt%.

In claim 1 of the second auxiliary request, the following amendment (underlined and struck through) compared to claim 1 of the main request has been made:

"1. Extruded profile ~~comprising of~~ an extrudable Al-Mg-Si aluminium alloy [...]"

In claim 1 of the third auxiliary request, the following amendment (underlined) compared to claim 1 of the main request has been made:

"1. Extruded profile [...], wherein the extruded profile is in overaged T7 condition."

Claim 1 of the fourth auxiliary request combines the amendments of the second and third auxiliary requests.

Claim 1 of the fifth auxiliary request combines the amendments of the first, second and third auxiliary requests.

- V. The patent proprietor's arguments, where relevant to the present decision, can be summarised as follows:

The requirements of Article 56 EPC were met. D42 was the closest prior art but it did not disclose overageing; in fact, it taught away from it. The problem to be solved was to improve crush properties. The skilled person consulting D53 would change the composition of the alloy, but would not modify the temper.

The opponents' arguments are reflected in the reasoning below.

- VI. In the communication pursuant to Article 15(1) RPBA of 14 December 2023, the board was of the preliminary opinion that the patent was likely to be revoked.
- VII. By letter of 9 February 2024, the patent proprietor withdrew their request for oral proceedings. Consequently, the scheduled oral proceedings were cancelled and the decision can be handed down in writing in accordance with Article 12(8) RPBA 2020.
- VIII. The patent proprietor requests that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of the main request, or, alternatively, on the basis of one of auxiliary requests 1 to 5; the main request and auxiliary requests 1 to 4 having been submitted on 27 May 2021 before the opposition division and auxiliary request 5 having been submitted on 25 July 2022.

Opponents 1, 3 and 4 request that the decision under appeal be set aside and that the patent be revoked.

Opponent 2 did not make any comments as to the substance of the case.

Reasons for the Decision

Main request

1. Article 56 EPC
 - 1.1 The invention relates to an extruded profile comprising an extrudable Al-Mg-Si aluminium alloy with improved strength, corrosion resistance, crush properties and temperature stability.
 - 1.2 In agreement with the impugned decision, D42/D42b is a promising starting point for the evaluation of inventive step. D42b discloses an alloy 3 falling within the scope of the alloy composition of claim 1 of the main request. The fact that boron is present at 0.02 wt% does not alter this conclusion since impurities of up to 0.1 wt% in each case are allowed. It makes no difference whether the component was intentionally added or is present as an impurity, since claim 1 is not a process claim but a product claim. In the product it cannot be distinguished whether boron was added intentionally or whether it originated as an impurity from the other metals added.

It is accepted that "overaged" is understood as ageing beyond the point of maximum strength, but it is also evident that claim 1 does not contain any indication as

to the point at which or conditions under which the overageing should be performed. The conditions in claim 14 must consequently be chosen such that ageing beyond the point of maximum strength is achieved.

Such overageing is not disclosed in D42b, since the extruded material was subjected to artificial ageing with the goal of obtaining high strength (see D42b: page 9, lines 7 to 9, and page 7, lines 14 to 20).

- 1.3 According to the patent proprietor, the problem to be solved by the present invention is to improve crush properties without compromising the strength (see the patent proprietor's reply to the appeal of 25 July 2022: page 15, sixth paragraph).
- 1.4 The patent proprietor proposed solving this problem by way of an extruded profile according to claim 1, characterised in that the extruded profile is overaged.
- 1.5 It cannot be accepted that the problem posed by the proprietor is solved over the whole range claimed since claim 1 does not contain any limitations with respect to the overageing. The expression "improved strength" in claim 1 does not have any specific meaning in that respect since "improved" is not related to any reference. Claim 1 does not specify that the overageing should be such that a certain requirement such as C28 or C24 (see the patent in suit: paragraph [0004]) is maintained. It is not credible that all types of overageing will inevitably be such that the strength is maintained at a certain level. Figures 21 to 24 clearly show that overageing impacts the strength such that it decreases. Therefore, the problem to be solved can be redefined as simply to improve crush properties.

1.6 The proposed solution is obvious for the following reasons:

D53 teaches that extrusions in overaged tempers possess a good combination of adequate strength and formability, high levels of toughness, good thermal stability and a high resistance to "splitting" during crush deformation (see D53: abstract). This also applies to the alloy AA6082, which has a Mg and Si content in accordance with alloy 3 of D42/D42b. Although it is indicated in D53 that the AA6082 alloy had catastrophic failure in the T6 temper (page 399, last paragraph), it is evident from Figure 6 (page 400) that overageing has a considerable effect on the crush properties of such an alloy (comparison of (b) and (c)). Therefore, D53 clearly teaches the benefits of overageing with respect to crush properties. The board cannot see why a skilled person trying to solve the posed problem would not apply the teaching of D53 to D42/D42b.

The opposition division's position that D42b would teach away from overageing in view of the impact on strength (D42b, page 7, lines 18 to 20) cannot be accepted since claim 1 does not require a certain strength after overageing. Furthermore, the conclusions with respect to crush properties are not limited to a certain alloy in D53, but generally apply to 6XXX alloy extrusions (see the last two paragraphs (2. and 3.) on page 402).

1.7 Consequently, the subject-matter of claim 1 of the main request lacks an inventive step in view of D42/D42b in combination with D53, and the main request must fail.

Auxiliary request 1 (found allowable by the opposition division)

2. Article 56 EPC

The only difference between claim 1 of auxiliary request 1 and claim 1 of the main request is the Cu content. Alloy 3 of D42/D42b still falls within the range claimed, and therefore the reasoning set out above with respect to the main request also applies here.

Consequently, the subject-matter of claim 1 lacks an inventive step and auxiliary request 1 is not allowable either.

Auxiliary requests 2 to 5

3. Article 56 EPC

The patent proprietor argued that claim 1 of auxiliary requests 2 to 5 was inventive over the prior art for at least the same reasons as those specified with respect to claim 1 of auxiliary request 1 (see the reply to the opponents' appeals: point 7.4 on page 19).

Consequently, the patent proprietor did not provide any reasons as to why these requests should be allowable when the first auxiliary request was not.

Notwithstanding the question of substantiation under Article 12(3) RPBA 2020, the board cannot identify anything that would justify the presence of an inventive step. Therefore, auxiliary requests 2 to 5 are not allowable either.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



C. Vodz

E. Bendl

Decision electronically authenticated