Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 30 June 2025

Case Number: T 0018/24 - 3.3.05

Application Number: 16840352.5

Publication Number: 3341502

IPC: C22C21/06, C22C21/08, C22C21/14, C22C21/16, C22F1/043, C22F1/047, C22F1/05, C22F1/057

Language of the proceedings: EN

Title of invention:

METHOD FOR THE PRODUCTION OF HIGH STRENGTH 6XXX SERIES ALUMINIUM ALLOYS

Patent Proprietor:

Novelis Inc.

Opponents:

C-Tec Constellium Technology Center / Constellium Muscle Shoals LLC / Constellium Bowling Green LLC
Arconic Corporation

Headword:

High Strength 6XXX Aluminum/Novelis

Relevant legal provisions:

EPC Art. 56, 112(1)(a)
RPBA 2020 Art. 13(2)

Keyword:

Referral to the Enlarged Board of Appeal - (no)
Amendment after summons - exceptional circumstances (no)
Inventive step - main request, auxiliary requests I to V (no)
- auxiliary request VI (yes)

Decisions cited:

G 0001/24, T 0197/86, T 0939/92, T 0464/94, T 1989/19

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0

Case Number: T 0018/24 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 30 June 2025

Appellant: (Patent Proprietor)	Novelis Inc. 3560 Lenox Road, Suite 2000 Atlanta, GA 30326 (US)
Representative:	Weickmann & Weickmann PartmbB Postfach 860 820 81635 München (DE)
Appellant: (Opponent 2)	Arconic Corporation 201 Isabella Street Pittsburgh, PA 15212-5858 (US)
Representative:	Lenzing Gerber Stute PartG von Patentanwälten m.b.B. Bahnstraße 9 40212 Düsseldorf (DE)
Respondents: (Opponents 1)	C-Tec Constellium Technology Center / Constellium Muscle Shoals LLC / Constellium Bowling Green LLC Boîte Postale CS10027, Parc Economique Centr'Alp- 725, Rue Aristide Berges / 4805 Second Street 714 Commonwealth Blvd. Muscle Shoals / Bowling Green 38341 Voreppe/ AL 35661 US/ KY 42101 US (FR)
Representative:	Constellium - Propriété Industrielle C-TEC Constellium Technology Center Propriété Industrielle Parc Economique Centr'Alp 725, rue Aristide Bergès CS10027 38341 Voreppe (FR)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on**

25 October 2023 concerning maintenance of the European Patent No. 3341502 in amended form.

Composition of the Board:

Chairman	J. Roider
Members:	G. Glod
	P. Guntz

Summary of Facts and Submissions

I. The patent proprietor's (appellant 1's) and opponent 2's (appellant 2's) appeals concern the opposition division's decision finding that the European patent No. 3 341 502 B1 as amended on the basis of auxiliary request VII met the requirements of the EPC.

II. The following documents cited in the impugned decision are of relevance here:

D2: JP 09031616
D2a: English translation of D2
D7: WO 2016/069695
D12: US 6 423 164 B1
D13: US 4 614 552
D22: Rolling Aluminum: from the Mine through the Mill; The Aluminum Association, 2008, pages 3-8
D24: International alloy designations and chemical compositions for wrought aluminium and wrought aluminium alloys, The Aluminum Association, pages 7 and 10
D26: Ostermann, F., Anwendungstechnologie Aluminium, 1998, pages 155-162 and 168

III. In reply to the communication under Article 15(1) RPBA, appellant 1 submitted the following document:

D29: Mukhopadhyay, P., ISRN Metallurgy, volume 2012, Article ID 165082, pages 1-15, doi 10.5402/2012/165082

IV. Claim 1 of the main request (patent as granted) reads as follows:

"*1. A method of producing an aluminum alloy metal product, the method comprising;*
casting an aluminum alloy to form an ingot, wherein the aluminum alloy comprises 0.5 - 2.0 wt. % Cu, 0.5 - 1.5 wt. % Si, 0.5 - 1.5 wt. % Mg, 0.03 - 0.25 wt. % Cr, 0.005 - 0.4 wt. % Mn, 0.1 - 0.3 wt. % Fe, up to 0.2 wt. % Zr, up to 0.2 wt. % Sc, up to 0.25 wt. % Sn, up to 4.0 wt. % Zn, up to 0.15 wt. % Ti, up to 0.1 wt. % Ni, and up to 0.15 wt. % of impurities, with the remainder as Al;
homogenizing the ingot;
hot rolling the ingot at an entry temperature of 500 °C to 540 °C and an exit temperature of 250 °C to 380 °C and cold rolling the ingot to produce a rolled product; and solutionizing the rolled product, wherein the solutionizing temperature is between 540°C and 590°C."

Claim 1 of auxiliary request I is identical to claim 1 of the main request.

In claim 2 of auxiliary request II the alloy composition has been limited as follows:

"*1. [...] wherein the aluminum alloy comprises 0.6 – 2.0 wt. % Cu, 0.55 – 1.35 wt. % Si, 0.6 – 1.35 wt. % Mg, 0.03 – 0.18 wt. % Cr, 0.005 – 0.4 wt. % Mn, 0.1 – 0.3 wt. % Fe, up to 4.0 wt. % Zn, up to 0.05 wt. % Sc, up to 0.05 wt. % Sn, up to 0.05 wt. % Zr, 0.005 – 0.25 wt. % Ti, up to 0.07 wt. % Ni, and up to 0.15 wt. % of impurities, with the remainder as Al [...].*"

In claim 1 of auxiliary request III the alloy composition has been limited as follows:

"*1. [...] wherein the aluminum alloy comprises 0.6– 1.0 wt. % Cu, 0.6 – 1.35 wt. % Si, 0.9 – 1.3 wt. % Mg, 0.03*

– 0.15 wt. % Cr, 0.05 – 0.4 wt. % Mn, 0.1 – 0.3 wt. % Fe, up to 3.5 wt. % Zn, up to 0.2 wt. % Sc, up to 0.25 wt. % Sn, up to 0.2 wt. % Zr, up to 0.15 wt. % Ti, up to 0.05 wt. % Ni, and up to 0.15 wt. % of impurities, with the remainder as Al [...]."

Claim 1 of each of auxiliary requests IV and V is identical to claim 1 of auxiliary request III.

In claim 1 of auxiliary request VI the alloy composition has been limited as follows:

"*1. [...] wherein the aluminum alloy comprises 0.8 – 1.95 wt. % Cu, 0.6 – 0.9 wt. % Si, 0.8 – 1.2 wt. % Mg, 0.06 – 0.18 wt. % Cr, 0.005 – 0.35 wt. % Mn, 0.13 – 0.25 wt. % Fe, 0.05 – 3.1 wt. % Zn, up to 0.05 wt. % Sc, up to 0.05 wt. % Sn, up to 0.05 wt. % Zr, 0.01 – 0.14 wt. % Ti, up to 0.05 wt. % Ni, and up to 0.15 wt. % of impurities, with the remainder as Al [...].*"

Dependent claims 2 to 6 concern particular embodiments of claim 1 of auxiliary request VI.

V. Appellant 2 and the respondents (opponents 1) considered that the main request and auxiliary requests I to VI lacked an inventive step when starting from D2/D2a as the closest prior art.

Appellant 1 argued that the requirements of Article 56 EPC were fulfilled. The problem to be solved was to provide a method for producing an aluminium alloy metal product having high strength and at the same time good crash test behaviour. None of the documents taught that the combination of alloy composition and process features provided such benefits.

VI. Appellant 1 requested that the decision under appeal be set aside and that the opposition be rejected (patent be maintained as granted) or, alternatively, that the patent be maintained as amended on the basis of one of auxiliary requests I to IX, with auxiliary request VII implying the dismissal of appellant 2's appeal. All the auxiliary requests were submitted before the opposition division.

Appellant 2 requested that the decision under appeal be set aside and that the patent be revoked.

The respondents (opponents 1) requested that appellant 1's appeal be dismissed. In addition, a referral under Article 112(1)(a) EPC was requested in the event that the board followed T 1989/19.

Reasons for the Decision

Main request

1. Article 13(2) RPBA 2020

On 18 April 2025, the patent proprietor submitted a new document, D29, in reply to the communication under Article 15(1) RPBA of 5 February 2025. It argued that D29 was proof of common general knowledge and merely confirmed the disclosure of D22.

Under Article 13(2) RPBA 2020 any amendment to a party's appeal case made after notification of a communication under Article 15(1) is, in principle, not to be taken into account unless there are exceptional circumstances, which have been justified with cogent reasons by the party concerned.

In the case in hand there are no exceptional circumstances, for the following reasons.

The topic of the entry temperature and the exit temperature of the hot rolling was already part of the opposition proceedings and is referred to in the impugned decision, including the reference to D26 (see points 7.1.2, 7.2.6, 7.2.7 and 9.1.4). With its appeal, appellant I did not file D29 or argue that D26 was unsuitable for 6XXX series aluminium alloys. However, pursuant to Article 12(3) RPBA 2020, the statement of grounds of appeal has to contain a party's complete appeal case.

In the communication pursuant to Article 15(1) RPBA the board argued why it regarded the objection under Article 56 EPC as persuasive for the main request and auxiliary requests I to V. This was based solely on arguments which had already been part of the opposition proceedings and then reiterated in appellant 2's and the respondents' submissions on appeal. There were no new facts which would have triggered the filing of a new document at such a late stage of the proceedings. The communication cannot *per se* be regarded as creating exceptional circumstances if it is based exclusively on earlier submissions (Case Law of the Boards of Appeal of the EPO, 10th edition, 2022, V.A.4.5.8(b)).

In addition the board cannot see any cogent reasons that would justify why D29 was only submitted so late in the proceedings. The case has not changed during the appeal, and D22 was already part of the opposition proceedings (Case Law of the Boards of Appeal of the EPO, 10th edition, 2022, V.A.4.5.8(c)).

Consequently D29 is not taken into account and its content is not part of the appeal proceedings.

2. Articles 100(a) and 56 EPC

Claim 1

2.1 The invention relates to 6XXX aluminium alloys.

2.2 It is undisputed that D2/D2a is an appropriate starting point for the discussion of inventive step. D2 relates to Al-Mg-Si series alloy sheets having good formability and mechanical strength (D2: paragraphs [0001] and [0002]). D2 discloses, for example, alloy A3 (Table 1, page 5) comprising 0.75 wt.% Cu, 0.61 wt.% Si, 0.76 wt.% Mg, 0.03 wt.% Cr, 0.13 wt.% Mn, 0.15 wt.% Fe, 0.01 wt.% Ti and 0.03 wt.% V in addition to Al.

This alloy was cast, homogenised at 530°C and hot rolled to form a hot-rolled sheet having a thickness of 5 mm. After performing intermediate annealing at 520°C for 1 minute, a cold-rolled plate having a thickness of 1 mm was produced and solution heat-treated at 540°C (D2a: page 3, paragraph [0016]).

D2 is silent about the hot-rolling conditions.

2.3 The goal (overall problem to be solved) of the patent is to provide a process for forming 6XXX aluminium alloys exhibiting improved mechanical strength, formability, corrosion resistance and anodised qualities (patent in suit, paragraph [0001]). According to appellant 1, high formability and high strength result in good crash test behaviour (grounds of appeal, page 6, second paragraph).

2.4 It is proposed to solve said problem by a process according to claim 1, characterised in that the ingot is hot rolled at an entry temperature of 500°C to 540°C and an exit temperature of 250°C to 380°C.

2.5 It needs to be evaluated whether this problem is successfully solved across the scope of the claim. There is no evidence available that the entry temperature and exit temperature as present in claim 1 lead to a specific advantage as compared with D2/D2a. Nor is it credible that specifying the entry temperature of 500°C to 540°C and the exit temperature of 250°C to 380°C provides any benefit compared with other standard hot-rolling conditions. Appellant 1's arguments in that respect are not convincing since the results shown in the patent are not representative of the broad wording of claim 1. The only alloy sample tested in a crash test is alloy SL3 in a T6 temper condition having high ultimate tensile strength (UTS) due to the Cu level of 1.7 wt.% (paragraphs [0142] and [0143]). The results are illustrated in Figure 18. The samples tested were 2 mm thick and prepared according to the procedure of example 1 (paragraph [0140] and paragraph [0126]). Claim 1 is not limited to any specific gauge or ageing conditions. D2/D2a also teaches high formability and high strength (paragraphs [0002] and [0019]). It is established case law that where comparative tests are chosen to demonstrate an inventive step with an improved effect over a claimed area, the nature of the comparison with the closest state of the art must be such that the effect is convincingly shown to have its origin in the distinguishing feature of the invention (T 197/86, Reasons 6.1.3). However, the patent does not contain any such comparison or, importantly, any example which would make it possible to derive an effect from the

change in the hot-rolling entry temperature and/or exit temperature. Therefore the board concurs with the opposition division (Reasons 7.2.6, page 29) that the problem to be solved is only to provide an alternative process.

2.6 The solution to this not very ambitious problem is obvious. D26 generally relates to aluminium and is evidence of the skilled person's general knowledge. It discloses in Figure 7.1.2 (page 156) an entry temperature range (500°C to 600°C) and an exit temperature range (250°C to 350°C) for a hot-rolling process leading to a sheet of 2.3 to 5 mm thickness. If the skilled person trying to solve the stated problem has not yet worked in the claimed temperature ranges, then they will surely consider the temperature ranges indicated in D26 and arrive at the claimed subject-matter. It is accepted that D26 indicates that the hot-rolling temperature and process conditions depend on the details of the rolling mills. It is also true that D22 discloses *one* case where the ingot temperature may be raised directly to a rolling temperature of *perhaps* 455°C. But it is evident that this temperature is not present as the only one suitable for treating aluminium alloys. Therefore numerous rolling conditions are ultimately disclosed in the prior art. However, it should be noted that making a mere arbitrary choice from possible solutions does not require a pointer and cannot be regarded as involving an inventive step (T 939/92, Reasons 2.5.3).

2.7 Consequently the subject-matter of claim 1 lacks an inventive step in view of D2 in combination with D26.

The main request (patent as granted) is not allowable.

Auxiliary request I

3. Article 56 EPC

Claim 1 is identical to claim 1 of the main request. The same objection applies.

Auxiliary request I is not allowable either.

Auxiliary request II

Claim 2

4. Article 56 EPC

The objection under Article 56 EPC raised against claim 1 of the main request also applies to claim 2 of auxiliary request II. Alloy A3 of D2/D2a satisfies the compositional requirements of claim 2 of this request. Therefore claim 1 of the main request and claim 2 of auxiliary request II differ from D2/D2a on account of the same features.

Auxiliary request II is not allowable either.

Auxiliary request III

5. Article 56 EPC

Claim 1 further differs from the alloy A3 of D2/D2a on account of the amount of Mg (0.76 wt.% in alloy A3 vs a lower limit of 0.9 wt.% in claim 1). It is true that claim 2 only requires the presence of 0.8 wt.% Mg, which is also present in alloy 7 of D2/D2a, but alloy 7 only has 0.63 wt.% Cu, which is lower than the amount required by claim 2 (0.8 wt.%).

No synergy can be discerned between the two distinguishing features (entry temperature of 500°C to 540°C with the exit temperature of 250°C to 380°C and the amount of Mg). Even if it were accepted that the higher amount of Mg led to improved strength – for which evidence appears to be lacking – the increase in Mg is still obvious in view of the teaching of D2/D2a. In particular, paragraph [0006] of D2a teaches that Mg contributes to strength improvement and its content should preferably be in the range of 0.6 to 1.3 wt.%. Therefore, the skilled person trying to increase the strength of the alloy A3 would surely also work in the middle of this preferred range for Mg ((0.6 + 1.3)/2 = 0.95) and arrive at a value within the range claimed.

A clear relationship between the amount of Mg and Cu is not taught in D2/D2a (see also paragraph [0008]). There is no disclosure that an increase in Mg should be followed by a decrease in Cu since no relationship between the two elements is part of the teaching of D2/D2a.

Consequently there is no reason to deviate from the opposition division's conclusion.

Auxiliary request III is not allowable either.

Auxiliary requests IV and V

6. Article 56 EPC

As indicated in the impugned decision (point 8.1), the subject-matter of claim 1 of auxiliary requests IV and V is the same as the subject-matter of claim 1 of auxiliary request III. Consequently the same conclusion

applies, and auxiliary requests IV and V are not allowable either.

Auxiliary request VI

7. Admission

Appellant 2 seems to be contesting the admission of this request (see reply to the appeal, point 48). However, this request was part of the decision and is consequently also part of the appeal proceedings (Article 12(1) and (2) RPBA). The boards do not have the power to disregard on appeal submissions admitted by the opposition division in the exercise (and within the limits) of its discretion (Case Law of the Boards of Appeal of the EPO, 10th edition, 2022, V.A.3.4.4).

8. Article 123(2) EPC

Claim 1 is based on claims 19, 22, 25 and 26 of the application as originally filed, claim 2 is based on claims 23 and 24, claim 3 is based on claims 27 and 28, and claims 4 to 6 correspond to claims 29 to 31 of the application as originally filed. The requirements of Article 123(2) EPC are fulfilled.

9. Article 83 EPC

There was no objection under Article 83 EPC regarding this request. The board cannot see any either, since the individual process steps are known by the skilled person and can be executed in combination.

The requirements of Article 83 EPC are met.

10. Article 54 EPC

Neither the respondents (opponents 1) nor appellant 2 (opponent 2) raised a substantiated novelty objection against this request (see respondents' reply to the appeal, points 9.1 and 5.3, and appellant 2's reply to the appeal, points 48 and 33).

10.1 In any case, D7 does not disclose an individualised combination of the nominal values of at least 0.8 wt.% Cu and at least 0.8 wt.% Mg. D7 does not disclose the entry temperature of 500°C to 540°C and an exit temperature of 250°C to 380°C for hot rolling either. As indicated by appellant 2, it may be obvious that the entry temperatures of the two examples are 520°C and 500°C and their exit temperatures are 300°C and 325°C, respectively (reply to the appeal, page 9, first paragraph, penultimate sentence), but obviousness is a criterion to be used for inventive step, not novelty.

Even if the claimed temperature ranges appear highly likely in opponent 2's view, it should be noted that whether a document is prejudicial to novelty cannot be decided on the basis of probability (see T 464/94, Reasons 16).

10.2 D12 at least does not disclose the claimed Fe and Cr content of the alloys in examples 1 and 2. D12 cannot be combined with D13 for the question of novelty since D12 does not contain any indication that the concentration range of D12 should be understood as shown in the table of column 4 of D13. Even if appellant 2's argument were to be accepted, it would still be unclear why it should only be applied to Fe and not to Cu and Mg, for example.

10.3 The requirements of Article 54 EPC are met.

11. Article 56 EPC

11.1 Both appellant 2 and the respondents raised an objection based on D2/D2a, alloy A3 in Table 1, as the closest prior art (see appellant 2's reply to the appeal, points 33 and 48, and the respondents' reply to the appeal, points 9.1 and 5.3). Appellant 1 argued that there was no teaching to adjust both Cu and Cr. The Cu content in D2/D2a was below the limits required according to claim 1 of this request (grounds of appeal, page 23, third paragraph).

11.2 The board does not agree with the opposition division that alloy A3 of D2/D2a differs from the subject-matter of claim 1 only on account of the amount of Cr plus the entry and the exit temperatures of the hot rolling. Alloy A3 only contains 0.75 wt.% Cu, which is below the lower endpoint (0.8 wt.%) of the range claimed. 0.75 wt.% cannot be construed as 0.8 wt.% in the case in hand. According to established case law, it is a prerequisite for the acceptance of lack of novelty that the claimed subject-matter is directly and unambiguously derivable from the prior art (Case Law of the Boards of Appeal of the EPO, 10th edition, 2022, I.C.4.1). It is evident to the skilled person that 0.75 wt.% is a measured value from a specific alloy and that D2/D2a explicitly indicates that the added content of Cu is less than 0.8 wt.% (paragraph [0008]). Therefore, in the case in hand, it cannot be concluded that it is unambiguous that 0.75 wt.% has to be construed as anticipating 0.8 wt.%.

The patent indicates in paragraph [0018] that the description makes reference to alloys identified by aluminium industry designations, such as "series" or "6XXX". The meaning of these is explained in D24. However, claim 1 refers not to an industry designation but to specific ranges of metals, the final composition of which may come under such an industry designation. The skilled person consulting the description to interpret the claims when assessing inventive step, as set out in G 1/24, would not turn to paragraph [0018] and D24 to redefine the end values since the claim does not relate to an industry designation.

It is true that D2a (paragraph [0008]) discloses that corrosion resistance decreases if the Cu content *exceeds* 0.8 wt.%, as pointed to by the respondents. However, it is equally true that the teaching in said paragraph is clearly to add less than 0.8 wt.%. Therefore, in the case in hand, the 0.75 wt.% indicated for alloy A3 is construed as less than 0.8 wt.% and is not considered to anticipate the lower endpoint of the Cu range given in claim 1.

Consequently, the amount of Cu is accepted as a further difference compared with D2/D2a.

11.3 Even if it were accepted that there is no evidence showing that this difference led to a technical effect, the solution to the problem of providing an alternative would still not be considered obvious.

11.4 As already indicated, D2/D2a (paragraph [0008]) explicitly teaches that the content of Cu should be less than 0.8 wt.%. There is no reason why the skilled person trying to find a suitable alternative would not follow this teaching. The skilled person would rather

stay within the teaching of D2/D2a when trying to find alternative alloys.

11.5 Consequently the subject-matter of claim 1 and of claims 2 to 6, which are dependent on claim 1, involves an inventive step. The requirements of Article 56 EPC are met.

12. Article 112(1)(a) EPC

The respondents requested that questions be referred to the Enlarged Board of Appeal if the board followed T 1989/19 or diverged from the generally accepted rounding conventions. This request is a conditional request. This board reached its conclusion in the current case on the basis of the generally accepted principle of direct and unambiguous disclosure (Case Law of the Boards of Appeal of the EPO, 10th edition, 2022, I.C.4.1). Therefore none of the conditions underpinning the respondents' request is fulfilled. Consequently there is no reason to refer questions, whatever they might be, to the Enlarged Board of Appeal under Article 112(1)(a) EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the opposition division with the order to maintain the patent as amended on the basis of the claims of auxiliary request VI filed on 20 April 2023 and a description to be adapted.

The Registrar: The Chairman:

C. Vodz J. Roider

Decision electronically authenticated