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**Datasheet for the decision  
of 10 April 2018**

**Case Number:** T 1029/14 - 3.2.03

**Application Number:** 03758730.0

**Publication Number:** 1616973

**IPC:** C23C2/26, C23C2/06

**Language of the proceedings:** EN

**Title of invention:**

ZINC HOT DIP GALVANIZED STEEL PLATE EXCELLENT IN PRESS  
FORMABILITY AND METHOD FOR PRODUCTION THEREOF

**Patent Proprietor:**

JFE Steel Corporation

**Opponent:**

ArcelorMittal France

**Headword:**

**Relevant legal provisions:**

EPC Art. 54, 100(a), 83  
RPBA Art. 13(3)

**Keyword:**

Novelty - implicit disclosure (no)  
Grounds for opposition - fresh ground for opposition (yes) -  
late-filed ground for opposition - admissibility (no)  
Sufficiency of disclosure - (yes)  
Late-filed argument - adjournment of oral proceedings would  
have been required (yes)

**Decisions cited:**

G 0001/95, G 0009/91, G 0010/91, T 0131/01, T 0597/07,  
T 0448/03, T 0190/99

**Catchword:**



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Case Number: T 1029/14 - 3.2.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.03**  
**of 10 April 2018**

**Appellant:** ArcelorMittal France  
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**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 26 February  
2014 rejecting the opposition filed against  
European patent No. 1616973 pursuant to Article  
101(2) EPC.**

**Composition of the Board:**

**Chairman**            G. Ashley  
**Members:**            B. Miller  
                             E. Kossonakou

## **Summary of Facts and Submissions**

- I. European patent No. 1 616 973 relates to a hot-dip galvanized steel sheet.
- II. An opposition had been filed against the patent, based on the grounds of Article 100(b) and of Article 100(a) EPC together with both Articles 54 and 56 EPC.

The opposition against the patent was rejected by the opposition division which considered the subject-matter of the claims as granted to fulfil the requirements of Article 54 and 83 EPC. The ground of opposition pursuant to Article 100(a) in combination with Article 56 EPC was not considered to be substantiated and was not dealt with in the contested decision.

The appellant (opponent) filed an appeal against this decision.

- III. The appellant requested that the decision under appeal be set aside and the patent be revoked. In the letter setting out the grounds of appeal, the appellant challenged novelty, sufficiency of disclosure and the inventive step of claim 1 as granted.
- IV. The respondent requested that the appeal be dismissed. Alternatively it requested that a patent be maintained on the basis of one of the three auxiliary requests filed with the letter of reply to the appeal.
- V. Claim 1 according to the main request corresponds to claim 1 as granted and reads:

"A hot-dip galvanized steel sheet comprising:  
a plating layer consisting of a  $\eta$  phase; and  
an oxide layer disposed on a surface of the plating  
layer, said oxide layer having an average thickness of  
10 nm or more; and

the oxide layer comprising a Zn-based oxide layer and  
an Al-based oxide layer, the Zn-based oxide layer  
having a Zn/Al atomic concentration ratio of more than  
1 and the Al-based oxide layer having a Zn/Al atomic  
concentration ratio of less than 1,

characterised in that

the Zn-based oxide layer has microirregularities; and  
the microirregularities have a mean spacing (S)  
determined based on a roughness curve of 1,000 nm or  
less and an average roughness (Ra) of 100 nm or less."

Claims 2 to 13 of the main request relate to preferred  
embodiments of the galvanized steel sheet according to  
claim 1.

#### VI. State of the art

The following sets of documents were cited in the  
appeal proceedings.

Document referred to in the contested decision:

D1: JP-A-2000/160358

Documents cited for the first time in the statement setting out the grounds of the appeal:

D2: JP-A-2001/323358  
D3: EP-A-0 778 362  
D4: EP-A-0 866 149  
D5: JP-A-2000/129487  
D6: JP-A-09 17 00 86

Documents submitted by the appellant with its letter dated 5 April 2018:

D7: printout of the website  
<http://digitalmetrology.com/3-steps-understanding-surface-texture>  
D8: JIS B 0601-2001  
D9: T0131/01  
D10: T0597/07

- VII. With the summons to oral proceedings, the Board sent a communication pursuant to Articles 15(1) and 17(2) of the Rules of Procedure of the Boards of Appeal (RPBA) indicating to the parties its preliminary, non-binding opinion of the case.
- VIII. Oral proceedings were held on 10 April 2018. At the end of the oral proceedings the Board pronounced its decision.
- IX. The appellant's arguments can be summarised as follows.

The arguments and documents submitted with the letter dated 5 April 2018 were filed late, since the representative took over the case only in March 2018 and therefore could not have filed them any earlier.

The information provided in the contested patent was not sufficient for the skilled person to rework the invention without undue burden. In particular the skilled person did not get enough information how to obtain a zinc based oxide layer having micro-irregularities and how to obtain a steel sheet comprising a zinc-based oxide layer and an aluminium-based oxide layer in any structure possible according to claim 1. Furthermore the contested patent did not disclose the cut-off length and therefore the skilled person could not determine the surface roughness.

The subject-matter of claim 1 lacked novelty with respect to D1, since D1 disclosed a manufacturing process for a galvanized steel sheet which was similar to a process described in the contested patent and which therefore inevitably obtained a sheet having the same properties as defined by claim 1.

The subject-matter of claim 1 was obvious when starting from D1 or D2 as the closest prior art, in particular when further taking into account the teaching of documents D3 to D6.

- X. The respective arguments of the respondent can be summarised as follows.

Documents D7 to D8 and the objections with respect to insufficiency and inventive step based on D1 raised in the letter dated 5 April 2018 were filed at a very late stage of the proceedings, i.e. two working days before the oral proceedings took place. The respondent did not have sufficient time to prepare an appropriate defence against these new objections. Therefore documents D7 to D8 and the new objections should not be admitted into the proceedings.



The contested patent disclosed 28 examples describing in detail how the claimed galvanized steel sheet could be obtained. Further detailed information was presented in the general description. Therefore the skilled person could manufacture a galvanized steel sheet as defined by claim 1 without undue burden.

D1 did not disclose a galvanized steel sheet as defined by claim 1. The argumentation of the appellant was based on a speculative interpretation of the disclosure of D1.

The ground of opposition pursuant to Article 100(a) in combination with Article 56 EPC was not substantiated in the opposition proceedings. The objections based on D1 and D2 as the closest prior art constituted a fresh ground of opposition which was not to be discussed in the appeal proceedings.

## **Reasons for the Decision**

### **1. Admissibility of documents D7 and D8 and the arguments based thereon**

1.1 In the statement setting out the grounds of appeal, the appellant argues that the contested patent does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, since

i) the position of the zinc (Zn) oxide based layer relative to the aluminium (Al) oxide based layer is not specified and

ii) the skilled person is not enabled to manufacture a zinc oxide layer comprising micro-irregularities.

- 1.2 With the letter dated 5 April 2018, i.e. two working days before the oral proceedings took place and therefore at a very late stage of the appeal proceedings, the appellant submitted the new line of attack that the skilled person was not able to determine the surface roughness defined in claim 1 of the contested patent in the absence of a defined cut-off length, which was required for applying the Japan Industrial Standard (JIS) B-0660-1998 cited in paragraph [0055] of the contested patent. In support of that argument it filed documents D7 and D8.

The question whether or not the skilled person is able to rework the Japan Industrial Standard (JIS) B-0660-1998 without an indication of a cut-off length is not causally linked to the objections raised in the statement setting out the grounds of appeal. Thus, the arguments based on D7 and D8 represent a completely new line of attack and therefore an amendment to the appellant's case.

- 1.3 The respondent confirmed during the oral proceedings that it was not in a position to deal with the extremely late filed new attack without an adjournment of the oral proceedings (Article 13(3) RPBA).
- 1.4 The fact that the appellant's representative took over the case only one month before the oral proceedings is of no relevance in this context (see cases cited in Case Law of the Boards of Appeal, 8th edition, 2016, Chapter IV.C.1.3.18).

1.5 Therefore the Board does not admit documents D7 and D8 and the corresponding new line of attack based thereon into the proceedings pursuant to Article 13(3) RPBA.

2. Sufficiency of disclosure (Article 83 EPC)

2.1 As indicated above, the appellant argues that the contested patent does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art, since

i) the position of the Zn-oxide based layer relative to the Al-oxide based layer is not specified and

ii) the skilled person is not enabled to manufacture a Zn-oxide layer comprising micro-irregularities.

2.2 Concerning i)

Claim 1 does not clearly define the position of the oxide layers relative to each other. Confronted with the vagueness in claim 1 concerning the structural relationship between the oxide layers the skilled person would consult the description to interpret the claim.

Thereby he should take into account the whole disclosure of the patent (see cases cited in Case Law of the Boards of Appeal, 8th edition, 2016, Chapter II.A.6.1, such as T190/99 cited by the respondent).

Throughout the description of the contested patent (see paragraphs [0023] to [0025], [0030], [0031], [0046] to [0049]) it is taught to break down the aluminium oxide layer and to form zinc oxide at the freshly exposed zinc surface.

Therefore the description of the contested patent leaves no doubt as to what is intended by the wording of claim 1 and the arrangement of the Zn-oxide based layer and the Al-oxide based layer that solves the problem underlying the contested patent.

Moreover, various methods for breaking down the Al-oxide based layer and for subsequently oxidising the freshly exposed zinc surface are presented in the contested patent, such as in paragraphs [0024] to [0025] and the various examples.

The skilled person wishing to produce a steel sheet therefore gets sufficient information in order to obtain the two oxide layers as defined in claim 1 on a galvanized steel sheet.

### 2.3 Concerning ii)

The contested patent teaches three ways of producing micro-irregularities:

Method (a): mechanically breaking down the Al-oxide layer and contacting the sheet with an acidic iron (Fe) containing solution having a pH-buffering effect (see e.g. paragraphs [0040] and [0057] and examples summarised in tables 3, 6, 7);

Method (b): mechanically breaking down the Al-oxide layer and distributing material directly on the plating surface (see e.g. paragraph [0053]); and

Method (c): mechanically breaking down the Al-oxide layer and contacting the sheet with an acidic solution

having a pH-buffering effect for 1 to 30 seconds before washing (see e.g. paragraph [0083]).

- 2.4 The appellant argues that none of these methods is sufficiently disclosed to allow the skilled person to produce a steel sheet without undue burden wherein the zinc-based oxide layer comprises micro-irregularities.

The Board observes that claim 1 is directed to a product and not a method of manufacturing. Therefore the question to be answered is whether or not the contested patent discloses at least one way to produce a steel sheet as defined by claim 1 within normal experimental effort.

- 2.5 Concerning method a)

The appellant argues that

- it is unclear whether the Fe-content mentioned in paragraph [0054] refers to the Fe-content in the dipping composition or in the obtained galvanized steel sheet,
- the time for oxidation is not indicated
- the steel sheet obtained by example 7 in table 2 of the contested patent does not comprise micro-irregularities.

Paragraph [0057] explicitly teaches that suitable levels of Fe-inclusion can be obtained by contacting the steel sheet with an acidic solution containing ferrous sulfate heptahydrate in the range of from 5 to 400 g/l. Therefore this paragraph makes it clear to the skilled person that the Fe-content mentioned in paragraph [0054] refers to the Fe-content in the dipping composition.

Furthermore paragraphs [0109] and [0152] teach the retention time of the steel sheet in the acidic solution.

Hence the contested patent teaches the skilled person which treatment solution to use and how long to keep the steel sheet therein for forming a zinc oxide layer having micro-irregularities as defined in claim 1.

With respect to example 7, the contested patent teaches that slight protrusions are produced having a S value of 100 nm and a Ra value of 3.1 nm. Both values fall within the ranges defined in claim 1. Therefore the slight protrusions obtained by example 7 are small micro-irregularities as defined in claim 1. Paragraph [0078] further confirms that the surface obtained by example 7 is smoother than the surface obtained by examples 1 to 6.

Example 7 is therefore consistent with the further teaching of the contested patent and does not provide any obstacle for the skilled person to rework the invention.

Consequently the skilled person is able to rework the invention as required by Article 83 EPC.

2.6 For the sake of completeness the following is further observed with respect to methods b) and c).

2.6.1 The appellant argues that the skilled person is unable to reproduce method b) because the patent does not provide sufficient information concerning the nature of the oxide, the shape of the grains, their size distribution, coating weight or application method.

However, it has not been demonstrated that these variables are crucial for obtaining a steel sheet as defined in claim 1 and cannot be determined within routine experimentation. On the face of it, method b) would appear to result in a steel sheet as claimed.

- 2.6.2 In order to show that method c) is insufficiently disclosed, the appellant discusses the examples of the contested patent.

However, all objections of the appellant relate to the question how the results demonstrated in the examples can be interpreted and do not demonstrate that the skilled person is unable to rework method c) and thereby to achieve a galvanized steel sheet as defined in claim 1.

- 2.7 Concerning claim 13 the appellant argues that the contested patent does not provide sufficient information how to obtain a galvanized sheet wherein the micro-irregularities have a mean spacing (S) determined on the basis of a roughness curve of 10 to 500 nm and an average roughness (Ra) of 4 to 100 nm.

The galvanized sheet according to claim 13 is a preferred embodiment of the sheet defined in claim 1. In the absence of any evidence that the skilled person is unable to obtain the specific combination of preferred options by the manufacturing methods defined in the contested patent, the same arguments as for claim 1 have to apply.

Moreover, the examples presented in table 7 of the contested patent demonstrate that the preferred embodiment defined in claim 13 can be obtained by reworking the examples listed therein.

2.8 Therefore none of the arguments presented by the appellant demonstrates that the reasoning in point 2.2 c) of the impugned decision is deficient.

3. Article 54 EPC

3.1 Both parties agree that D1 discloses examples of galvanized steel sheets whereby the Ra value of the oxidised film should be 1200 nm or less and can be as low as 600 nm (paragraph [0027] and table 2).

It is further undisputed that D1 does not disclose that the Zn-based oxide layer has micro-irregularities which have a mean spacing (S) determined on the basis of a roughness curve of 1,000 nm or less and an average roughness (Ra) of 100 nm or less.

3.2 According to the appellant these features are inherently disclosed by D1, since the galvanized steel sheet described in D1 is produced by one of the manufacturing methods described in the contested patent.

3.3 D1 discloses that the steel sheets of the examples are manufactured by dipping a steel sheet in a galvanizing bath containing aluminium (paragraph [0041]), subjecting the sheets to skinpass rolling (paragraph [0042]) and dipping them into an aqueous solution containing iron ions having a pH of 2 (paragraph [0043]).

The method described in D1 is therefore similar to method a) described in the contested patent (see point 2.5 above).



3.4 However, two differences can be identified between the method described in D1 and that of the contested patent, both of which have an effect on oxide formation and therefore on the surface properties of the zinc oxide based layer.

3.4.1 Paragraph [0044] of the contested patent teaches that the Fe-containing solution has to be sufficiently buffered in order to form the desired oxide layer. This statement is confirmed in the examples of the contested patent (see tables 3 to 5), where it is demonstrated that unbuffered treatment solutions (samples 8 and 9), which reflect the teaching of D1 on this aspect, do not lead to the formation of the same amount of oxide as buffered treatment solutions (samples 1 to 7).

However, the acidic solution according to D1 (paragraph [0043]) does not contain any buffer. The pH is adjusted simply by addition of sulphuric acid, which is a strong acid and which does not form a buffer.

3.4.2 Paragraph [0043] of D1 discloses that after depositing the iron, the steel sheet is heated to promote the oxidation of Fe and Zn.

Following the method described in paragraph [0040] of the contested patent the steel sheet is simply washed and dried after the contact with the buffered acidic solution. A further oxidation step at elevated temperature as required by D1 is not performed according to the manufacturing methods proposed in the contested patent.

3.5 Since the manufacturing method described in D1 is not the same as one of the manufacturing methods proposed

in the contested patent, it cannot be concluded that the products thereby obtained are inevitably identical.

Therefore it cannot be concluded that the galvanized sheet obtained by the method of D1 inevitably comprises a Zn-based oxide layer having micro-irregularities whereby the micro-irregularities have a mean spacing (S) determined on the basis of a roughness curve of 1,000 nm or less and an average roughness (Ra) of 100 nm or less as required by claim 1 of the contested patent.

3.6 Claim 1 of the contested patent therefore fulfils the requirements of Article 54 EPC.

4. Admissibility of the new ground of opposition

4.1 During opposition proceedings the appellant, then opponent, crossed on Form 2300 the box for the ground of opposition pursuant to Article 100(a) in combination with Article 56 EPC. However, lack of inventive step was neither substantiated in the notice of opposition nor later discussed during the opposition proceedings (see impugned decision, point 3.4 of the reasons).

4.2 The first time that the appellant argued that the subject-matter of claim 1 lacks an inventive step was during appeal proceedings.

The appellant submits two lines of objection:

a) In the statement setting out the grounds of appeal it is argued that the subject-matter of claim 1 is obvious when starting from document D2 as the closest prior art.

b) In the letter dated 5 April 2018 it is argued that the subject-matter of claim 1 is obvious when starting from document D1 as the closest prior art.

4.3 Concerning a)

4.3.1 Any specific ground of opposition raised but not substantiated in the opposition period is a new ground of opposition in appeal proceedings, which cannot be admitted into the appeal proceedings unless the proprietor agrees (G9/91, point 18 of the reasons; G10/91 headnotes; G1/95 (point 7.1)).

4.3.2 The arguments presented in the statement setting out the grounds of appeal are based on D2 as the closest prior art and are completely independent from the argument pursued during opposition proceedings that the claimed subject-matter lacks novelty over D1.

This new objection therefore constitutes a fresh ground of opposition which is moreover based on documents which had not even been submitted in opposition proceedings.

Furthermore, the respondent (proprietor) does not consent to the introduction of a new ground of opposition into the proceedings (see statement in the letter of reply to appeal, point IV, page 4, confirmed during the oral proceedings before the Board).

Consequently, in line with the ruling in G9/91 and G10/91 the Board does not admit the line of objection starting from D2 into the appeal proceedings.

4.4 Concerning b)

- 4.4.1 In the statement setting out the grounds of appeal D1 is not mentioned at all in the context of inventive step.

The objection concerning inventive step based on D1 was presented for the first time in the letter submitted on 5 April 2018, i.e. two working days before the oral proceedings before the board of appeal took place. Therefore the objection has been raised only at an extremely late stage of the proceedings and represents a complete change of the appellant's case for which not even the provisional opinion expressed in the annex to the summons does not provide any justification.

The respondent confirmed during oral proceedings that it was not in a position to deal with the new attack without an adjournment of the oral proceedings.

Therefore this line of objection is not admitted into the proceedings pursuant to Article 13(3) RPBA.

- 4.4.2 Notwithstanding the above conclusion it is further questionable, whether the line of attack starting from D1 as the closest prior art can be discussed at all in the appeal proceedings without the agreement of the patent proprietor.

The appellant argues that the objection concerning inventive step starting from D1 does not constitute a fresh ground of opposition and can be examined in appeal proceedings without the agreement of the patentee, since D1 has been used to attack novelty. To support this argument it refers to T 131/01 (D9) and T 597/07 (D10).

In decision T 131/01 the Board held that in a case where the ground of lack of novelty has been substantiated, a specific substantiation of the ground of lack of inventive step is neither necessary - given that novelty is a prerequisite for determining whether an invention involves an inventive step and such prerequisite is allegedly not satisfied - nor generally possible without contradicting the reasoning presented in support of lack of novelty. Therefore it held that the objection of lack of inventive step is not a fresh ground for opposition (headnote).

However, in T 131/01 the opponent had already indicated in the notice of opposition that the claimed subject-matter lacks an inventive step in the event that it is found to be novel (see point 3.2. of the reasons). Therefore T 131/01 differs from the present case, where the appellant had made no suggestion in opposition proceedings that the claimed subject-matter would be obvious when starting from D1, should it be found to be novel.

The situation underlying T 597/07 is similar to case T 131/01 where inventive step had also been discussed during opposition proceedings (point 2.6 of the Reasons).

The Board therefore concludes that the present case is to be distinguished from those underlying T 131/01 and T 597/07.

Case T 448/03 is similar to the present one in that inventive step was not discussed at all in opposition proceedings (see point 5.2 of the Reasons), but for the first time only in the appeal proceedings (point 5.3 of

the reasons). In T 448/03 it is concluded, in line with the principles set out in decision T 131/01, that an objection concerning inventive step is to be considered a fresh ground, if it is raised for the very first time in the appeal proceedings (point 5.4 of the Reasons), irrespective of the fact that the document used as the starting point for the inventive step objection was the same document as used before to attack novelty.

The Board concludes that in the present case, the objection concerning inventive step starting from D1 has to be considered to constitute a fresh ground of opposition in line with the finding in T 448/03 which cannot be discussed without the consent of the proprietor, which was not given in the present case.

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:



C. Spira

G. Ashley

Decision electronically authenticated