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**Datasheet for the decision  
of 13 June 2023**

**Case Number:** T 1137/20 - 3.2.03

**Application Number:** 14774993.1

**Publication Number:** 2980260

**IPC:** C23C2/12, C23C2/06, C23C2/02,  
C23C2/26, C22C21/10

**Language of the proceedings:** EN

**Title of invention:**  
Al-Zn-BASED PLATED STEEL SHEET

**Patent Proprietor:**  
JFE Steel Corporation

**Opponent:**  
ArcelorMittal

**Headword:**

**Relevant legal provisions:**  
RPBA 2020 Art. 12(4), 13(2)  
EPC Art. 123(2), 84, 83, 54, 56

**Keyword:**

Amendment to case - requirements of Art. 12(2) RPBA 2020 met  
(yes)

Novelty - (yes)

Amendments - undisclosed disclaimer - allowable (yes)

Claims - clarity (yes)

Sufficiency of disclosure - (yes)

Inventive step - (yes) - ex post facto analysis

Amendment after summons - taken into account (no)

**Decisions cited:**

T 0946/06, G 0001/03, G 0002/03, G 0001/16, T 2130/11,

T 0286/06, T 1914/10, T 0857/11, T 1185/12, T 1385/14,

T 0279/89, T 2759/17

**Catchword:**



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Case Number: T 1137/20 - 3.2.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.03**  
**of 13 June 2023**

**Appellant:** JFE Steel Corporation  
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**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
17 March 2020 concerning maintenance of the  
European Patent No. 2980260 in amended form.**

**Composition of the Board:**

**Chairman** C. Herberhold  
**Members:** B. Miller  
D. Prietzel-Funk

## Summary of Facts and Submissions

- I. European patent EP 2 980 260 B1 ("the patent") relates to an Al-Zn-coated steel sheet that exhibits excellent corrosion resistance after painting.
- II. An opposition against the patent was filed on the grounds of Article 100(b) EPC and Article 100(a) EPC together with Articles 54 and 56 EPC.
- III. The following documents already cited during the opposition proceedings are of particular importance for the present decision:

D1: JP 2001/316791 A  
D1": English translation of document D1  
D3: JP 2004/143506 A  
D3": English translation of document D3  
D4: EP 2 957 648 A1  
D6: JP 2005/272922 A  
D6": English translation of document D6  
D7: US 2003/0003321 A1  
D8: JP 2009/120948 A  
D8": English translations of documents D8  
D12: GalvInfoNote 13 of Sept 03 "The Spangle on Hot-Dip Galvanized Steel Sheet"  
D13: Internet extract from <https://www.emcotest.com/en/the-world-of-hardness-testing/hardness-know-how/theory-of-hardness-testing/vickers-52/how-to-read-and-present-avickers-hardnessvalue-186/>

D4 was published on 23 December 2015, i.e. after the filing date of the patent application (on which the patent is based) of 19 March 2014, and claims the priority date of 31 January 2013, i.e. prior to the

priority date of the patent of 25 March 2013. As the priority of D4 has not been contested, D4 is a prior art document according to Article 54(3) EPC.

In the following, references to the Japanese documents D1, D3, D6 and D8 are made with regard to the corresponding English translations D1", D3", D6" and D8".

- IV. The opposition division admitted the late filed documents D12 and D13 into the proceedings and held *inter alia* that
- the ground for opposition based on Article 100(b) EPC did not prejudice the maintenance of the patent as granted
  - the subject-matter of claim 1 of the patent as granted lacked novelty over D4
  - the patent in amended form met the requirements of the EPC, on the basis of the claims of the auxiliary request 1 filed in electronic form on 20 December 2019.
- V. Since both parties appealed the interlocutory decision, for the sake of simplicity the Board will continue to refer to the parties as the patent proprietor and the opponent.
- VI. The Board sent a communication pursuant to Article 15(1) RPBA 2020 informing the parties of its preliminary opinion on the case that both appeals were likely to be dismissed.
- VII. With a letter dated 17 April 2023 the opponent supplemented its argumentation.

VIII. Oral proceedings were held on 13 June 2023 in the form of a videoconference (Zoom). At the end of the debate the patent proprietor withdrew its appeal.

IX. At the end of the oral proceedings, the following requests were thus maintained by the parties.

The patent proprietor requested that the opponent's appeal be dismissed (and thus that the patent be maintained on the basis of auxiliary request 1 as held allowable by the Opposition Division), alternatively that the patent be maintained in amended form on the basis of one of the sets of claims according to auxiliary requests 1A, 2, 2A, 3, 4, 4A, 5, 5A, 6, 7, 8 or 9 as filed with the statement setting out the grounds of appeal dated 24 July 2020.

The patent proprietor also requested that

- the inventive step attacks starting from D3, D6, D7 and D8 as the closest prior art not be admitted into the appeal proceedings
- the clarity objections against the disclaimer in claim 1 of auxiliary request 1 not be admitted into the appeal proceedings
- the late-filed technical argument concerning the particularities of the measuring method in paragraph [0042] of D6 not be admitted into the appeal proceedings and that
- D12 and D13 be ruled inadmissible in the appeal proceedings.

The opponent requested that the decision under appeal be set aside and the patent be revoked in its entirety. The opponent further requested that auxiliary request 6 not be admitted into the appeal proceedings.

X. Wording of claim 1 of auxiliary request 1 as held allowable by the opposition division:

"An Al-Zn-coated steel sheet comprising:  
an Al-Zn coating layer disposed on a steel sheet surface, the Al-Zn coating layer including two layers which are an interfacial alloy layer present in an interface with a base steel sheet and an upper layer disposed on the interfacial alloy layer,  
wherein the upper layer contains compounds of Si and Ca or Si, Ca, and Al, and Ca/Si mass% ratio in the upper layer is 0.72 to 1.4,  
the interfacial alloy layer contains an Fe-Al compound and/or an Fe-Al-Si compound, and  
in the upper layer, Si content is 0.1 to 2.0 mass% and Ca content is 0.001 to 2.0 mass%,  
with the proviso that the Al-Zn-coated steel sheet is not a hot-dip Al-Zn alloy coated steel sheet according to Table 1 below and having a spangle size and Vickers Hardness as given in Table 1 below;  
the hot-dip Al-Zn alloy coated steel sheet according to Table 1 below having a cold rolled steel sheet as a base steel sheet with a thickness of 0.35 mm produced by a conventional method;  
wherein the hot-dip Al-Zn alloy coated steel sheet according to Table 1 below is produced in a continuous galvanizing line, wherein the composition of the molten bath, and the cooling time of the coated steel sheet, conditions of holding temperature and time of the coated steel sheet after passing through top rolls, and the composition of the upper layer of the hot-dip coating are as given in Table 1 below;  
wherein the production of the hot-dip Al-Zn alloy coated steel sheet according to Table 1 below is performed with a molten bath temperature of 600 °C,

coating weight of 75 g/m<sup>2</sup> per side and 150 g/m<sup>2</sup> for both sides;

\*1 "sum" stands for the total of Ca, Mg, Mn, V, Cr, Mo, Ti and Sr

Table 1:

Hot-Dip Coating Production Conditions											Hot-Dip Coating															
Composition of Molten Bath (mass%)										Cooling time from Bath Temp - 20 °C 580 °C To Bath Temp - 80 °C 520 °C (Sec)	Holding Temp of Steel Sheet after Passing Top Roll		Composition of Upper Layer of Coating (mass%)								Sample Size (mm)	Vickers Hardness (HV)				
Al	Si	Ca	Mg	Mn	V	Cr	Mo	Ti	Sr		sum #1	Holding Temp of Steel Sheet (°C)	Time (Sec)	Al	Si	Ca	Mg	Mn	V	Cr			Mo	Ti	Sr	sum #1
55	1.6	1.5	-	-	-	-	-	-	-	1.5	0.8	360	10	55	1.6	1.5	-	-	-	-	-	-	-	1.5	0.22	82

The wording of claim 1 of the further auxiliary requests is irrelevant for this decision.

XI. The opponent's arguments, as far as they are relevant for this decision, can be summarised as follows.

(a) Admittance of D12 and D13

The Opposition Division admitted D12 and D13 into the proceedings making correct use of its discretion.

(b) Auxiliary request 1 - Article 123(2) EPC

The undisclosed disclaimer in claim 1 of auxiliary request 1, removed more than necessary to restore novelty regarding D4. In particular, the disclaimer removed a coated steel sheet with:

- any amount of Zn for the upper layer
- any amount of elements other than Al, Si, Ca, Mg,



Mn, V, Cr, Mo, Ti and Sr for the upper layer.

Furthermore, the disclaimer removed a coated steel sheet having any corrosion resistance, contrary to Example 15 of D4 showing a specific corrosion resistance due to the composition of the base steel sheet which is missing from the disclaimer.

(c) Auxiliary request 1 - Article 84 EPC

The clarity of the disclaimer in claim 1 had to be evaluated while considering what the skilled person would have understood in reading the claim only, taking into consideration common general knowledge. The disclosure of D4 had to be disregarded when interpreting the disclaimer in claim 1.

The wording of the disclaimer was unclear because the expressions "produced by a conventional method" and "top roll" were unclear and undefined. It was further confirmed by case law that the term "conventional" was unclear. There was no information on what a "conventional method" implied on the corresponding base steel sheet and how such a base steel sheet differed from a base steel sheet obtained by a "non-conventional method".

The wording of the disclaimer was further unclear since neither claim 1 nor the corresponding description specified the methods to measure the spangle size value and the Vickers hardness value. The values for these parameters were meaningless in the absence of a specification of the measuring conditions, see D12 and D13.

(d) Auxiliary request 1 - Article 83 EPC

The skilled person was unable to carry out the invention in view of the spangle size value and the Vickers hardness value specified in the disclaimer, for which no measurement methods were specified in the patent.

(e) Auxiliary request 1 - Article 54 EPC

- D1

The subject-matter of claim 1 represented a simple selection from the disclosure of D1 regarding the Ca and Si contents of the upper layer. The claimed ranges were not based on a purposive selection.

Since Example 15 of D1 was very close to the claimed range, novelty should not be acknowledged.

Furthermore, the skilled person would seriously contemplate working within the disclosure that overlapped with the subject-matter as defined in claim 1 due to the excellent corrosion resistance after coating achieved for the examples of D1.

- D6

Table 6 of D6 summarised the composition of the plated layers obtained by the examples of D6. Table 6 did not disclose the iron content. Hence, the plated layer referred to by D6 did not encompass the interfacial layer - which inevitably comprised iron - and corresponded to the upper layer as defined in claim 1. Example 22 of D6 disclosed an average composition over

the whole thickness of the plated layer that fell within the claimed composition.

Further evidence could be found in paragraph [0042] of D6 for the conclusion that the plated layer referred to by D6 did not encompass the interfacial layer. D6 described that for analysing the composition of the plating layer the plated steel was de-coated with an ISO dissolving liquid. Due to the presence of hexamethylenetetramine in the ISO dissolving liquid the interfacial layer was not dissolved in the de-coating step and hence the results of the subsequent analysis of the composition did not encompass the interfacial layer.

(f) Auxiliary request 1 - Article 56 EPC

- starting from D1

The examples of D1 exhibited excellent corrosion resistance after coating, like in the contested patent. The disclosure of D1 was closer to the claimed subject-matter than the comparative examples of the patent. The contested patent did not show any technical effect of 7% difference on the Ca/Si ratio between Example 15 of D1 and the claimed range. Hence, Example 15 would cast doubt on the alleged effect so that the burden of proof of an improved corrosion resistance after painting compared with the disclosure of D1 would be shifted to the patent proprietor.

D1 disclosed already that an excellent corrosion resistance after coating could be obtained with the plating composition of D1. Hence D1 solved the same problem as the contested patent. Starting from Example 15 of D1, the objective technical problem could

be seen as the provision of an alternative Al-Zn coated steel sheet. It fell within routine experimentation of the skilled person to adjust the ratio of Ca and Si in the composition of the upper layer of the plating of D1 by varying the Ca content within the range disclosed in D1. Therefore, the claimed steel sheet was an obvious alternative obtained by routine experimentation by varying the Ca content of examples 2, 3, 7 and 11 to 15 of the 11 examples of D1 which exhibit very excellent corrosion resistance after coating, in particular since D1 provided a motivation to vary the Ca content in order to provide a balance between workability and suppression of wrinkle formation.

D6, D7 or D8 disclosed coated steel sheets wherein the plating comprised Ca in amounts which would result in a Ca/Si ratio according to claim 1, when used accordingly in Example 15 of D1. The skilled person would be motivated to do this, since documents D6, D7 or D8 disclosed plated steel sheets having a good corrosion resistance.

- further attacks

The subject-matter of claim 1 of auxiliary request 1 lacked an inventive step in view of:

- D3 taken as the closest prior art  
in combination with either with D6, D7 or D8
- D6 alone
- D7 alone

These attacks had been raised in and maintained throughout the opposition proceedings.

XII. The patent proprietor's arguments, as far as they are relevant for this decision, can be summarised as follows.

(a) Admittance of D12 and D13

The Opposition Division should not have admitted the late filed documents D12 and D13 into the proceedings, since they were not relevant.

(b) Auxiliary request 1 - Article 123(2) EPC

The undisclosed disclaimer was based on Example 15 of D4 and did not remove more than necessary to restore novelty. The wording of the disclaimer reflected precisely the level of generality as Example 15 of D4.

(c) Auxiliary request 1 - Article 84 EPC

The clarity of the wording of the disclaimer in claim 1 had to be assessed with a mind willing to understand, not a mind desirous of misunderstanding. The meaning of technical terms and parameters had to be considered in their technical context. A skilled person did not determine the extent of a disclaimer in isolation, but rather, in a pragmatic and realistic manner by taking into account the prior art document upon which the disclaimer was based.

The case law cited by the opponent considered the term "conventional" in completely different context. The cited decisions were irrelevant for the present case as they had nothing to do with producing a base steel sheet for coating with an Al-Zn coating layer. Defining the Vicker's hardness and spangle size in line with the disclaimer based on D4 did not render claim 1

unclear. Amended paragraph [0010] of the patent stated that "Example 15 of PTL 7 is disclaimed". The conditions for measuring the Vicker's hardness and spangle size defined in the disclaimer of claim 1 were clear for the skilled person, since the skilled person knew from paragraphs [0061] and [0062] of D4, to which amended paragraph [0010] of the patent refers, which measurements methods should be used.

Top rolls were a commonly used part of a continuous galvanizing line. They were positioned such that the steel sheet following coating passed through the top rolls before being held at the holding temperature. This was clear to a person skilled in the art.

Various clarity objections raised in the statement of grounds of appeal had not been raised before by the opponent, contrary to Article 12(2) RPBA 2020.

(d) Auxiliary request 1 - Article 83 EPC

There was no dispute in the appeal procedure that the invention according to claim 1 as granted was sufficiently disclosed by the patent. Claim 1 of auxiliary request 1 merely gave up a small amount of the original monopoly, i.e., the hot-dip Al-Zn alloy coated steel sheet according to Example 15 of D4. The introduction of a disclaimer however did not render the description of the patent insufficient. The opponent had not presented verifiable facts that could generate doubts concerning the sufficiency of disclosure.

(e) Auxiliary request 1 - Article 54 EPC

- D1

D1 did not disclose an Al-Zn coated steel sheet according to claim 1 comprising an Al-Zn coating layer in which an upper layer thereof contained compounds of Si and Ca or Si, Ca, and Al wherein the Ca/Si mass% ratio was within the range of 0.72 to 1.4.

D1 did not even disclose a range for the Ca/Si ratio. Thus, considerations of selection or overlapping ranges from D1 simply did not arise.

- D6

D6 did not directly and unambiguously disclose an Al-Zn-coated steel sheet wherein the composition of the upper layer of the Al-Zn coating layer met the requirements of granted claim 1. Entry No. 22 in Table 6 of D6 indicated a Ca-content of 0.542 mass% Ca, and a Si-content of 0.40 mass% Si. However, these values referred to average contents of Ca and Si in the whole coating of the steel sheets but did not refer to the composition of the upper layer.

The content values for the elements present in each coating in Table 6 did not sum up to 100%. Therefore, the lack of a specification of the iron content in Table 6 did not provide a direct and unambiguous disclosure, that the "average composition in whole thickness of plated layer" did not encompass the interfacial layer.

This disclosure could also not be derived unambiguously from the particularities of the measuring method disclosed in paragraph [0042] of D6. Moreover, the

argument based on the particularities of the measuring method disclosed in paragraph [0042] of D6 had been raised for the first time during the oral proceedings before the Board. The late-filed new technical argument should not be admitted into the proceedings.

(f) Auxiliary request 1 - Article 56 EPC

- starting from D1

The invention according to claim 1 was concerned with the problem of suppressing blistering after painting and improving post-paint corrosion resistance, see paragraphs [0002], [0003], [0006], [0018], [0019] and [0020] of the patent. Blistering was a unique phenomenon and an indicator of poor post-paint corrosion resistance. A test for assessing blistering after painting was described at paragraph [0046] of the patent. The invention enabled blistering after painting to be suppressed, with a concomitant improvement in post-paint corrosion resistance.

The experimental data in the patent, as summarised in Table 1, demonstrated that blistering after painting could be suppressed by carefully controlling the Ca/Si mass% ratio in the upper layer of the Al-Zn-coating layer.

None of D1, D3, D6, D7 or D8 was concerned with the specific technical problem of suppressing blistering after painting and improving post-paint corrosion resistance. Hence, the solution to this problem as defined in claim 1 of auxiliary request 1 was not rendered obvious when considering D1 alone or, alternatively when considering D1 while further taking



into account the disclosure in any of D3, D6, D7 and D8.

- further attacks

It was contrary to the requirements of Article 12(2) and Article 12(6) RPBA 2020 to resuscitate inventive step attacks based on D3, D6, D7 and D8 as closest prior art.

The inventive step attacks starting from D3, D6, D7 and D8 as closest prior art should be disregarded in the appeal proceedings.

## **Reasons for the Decision**

### 1. Admittance of D12 and D13

D12 and D13 were filed after expiry of the period for filing the opposition with the submissions dated 17 January 2020.

Exercising its discretion, the Opposition Division admitted documents D12 and D13 (see point II. B 1.1 and 1.2 of the reasons of the decision). The division justified the admission of D12 and D13 by stating that they reflect general knowledge and that they were submitted in response to the auxiliary requests filed by the patent proprietor on 20 December 2019.

The Board sees no reason to overturn the discretionary decision of the Opposition Division to admit the documents. The criteria mentioned by the division (that

the documents reflect general knowledge and that they were filed in response to the filing of auxiliary requests) are relevant criteria in the case at hand. In addition, the fact that these documents ultimately turned out not to be relevant to the decision (the patent proprietor refers in this respect to the division's reasoning in relation to Article 83 EPC) cannot cast doubt on the division's exercise of discretion when admitting these documents.

2. Auxiliary request 1 - Article 123(2) EPC

2.1 Claim 1 of auxiliary request 1 comprises an undisclosed disclaimer which is based upon Example 15 of D4.

According to G 1/03 and G 2/03 (EPO OJ 2004, 413 and 448; see also G 1/16, EPO OJ 2018, 70) an amendment in the form of a disclaimer may be allowable in order to restore novelty by delimiting a claim against state of the art under Article 54(3) EPC such as D4.

2.2 The opponent considers that the undisclosed disclaimer introduced in claim 1 removes more than necessary to restore novelty, contrary to the conditions for drafting a disclaimer developed in point 3 of the reasons of G1/03 (see also headnote 2.2):

"The necessity for a disclaimer is not an opportunity for the applicant to reshape his claims arbitrarily. Therefore, the disclaimer should not remove more than is necessary to restore novelty or to disclaim subject-matter excluded from patentability for non-technical reasons."

According to the opponent, the disclaimer removes in addition a coated steel sheet with:

- any amount of Zn for the upper layer
- any amount of elements other than Al, Si, Ca, Mg, Mn, V, Cr, Mo, Ti and Sr for the upper layer.

This argument is not convincing.

2.3 Example 15 of D4 describes a specific composition for the coating, see Table 1.1. Although Example 15 describes a Al-Zn plated steel sheet, it does not specify the content of Zn in the plating. Hence, the specific information presented for Example 15 has to be read by the skilled person in the appropriate technical context as set up by D4. D4 does not specify in claim 1 or in the examples that the balance is composed of Zn. Instead, the term "including" in the expressions used in claim 1 and the paragraphs [0019] and [0043] of D4 ("the balance including Zn and incidental impurities") does not exclude the presence of other elements such as Ni and does not provide a minimum value for the amount of Zn.

Contrary to the argument of the opponent, neither the disclosure regarding Example 15 of D4 nor the corresponding disclaimer thus exclude the possibility that the upper layer of the coating comprises a relatively high content of e.g. Ni and/or a relatively low amount of Zn.

Although D4 defines in preferred embodiments according to claims 3 and 8 that certain elements can be present in a total amount of up to 10 wt.-%, this limitation is neither defined in claim 1 nor disclosed in Example 15 of D4.

Since the balance of the Zn-Al coating is neither defined in Example 15 of D4 nor in the disclaimer of

claim 1, the disclaimer provides the same level of generality as Example 15 of D4 regarding the composition of the balance.

Hence, the disclaimer according to claim 1 does not remove more than is required by the disclosure of D4 regarding the composition of the upper layer.

- 2.4 The opponent argues, that the skilled person would understand that for the upper layer of the Al-Zn coating of Example 15 of D4 the balance is Zn and unavoidable impurities.

If the skilled person interprets Example 15 of D4 in the context of Al-Zn plated steel sheets to have a balance which is Zn and unavoidable impurities, the same interpretation is adopted by the skilled person for the identical wording of the disclaimer in the context of claim 1 of auxiliary request 1, since claim 1 like D4 refers to a hot-dip Al-Zn alloy coated steel sheet.

Hence, the disclaimer according to claim 1 does not remove more than is required when interpreting the disclosure of D4 regarding the composition of the upper layer as proposed by the opponent.

- 2.5 The same applies with regard to the corrosion resistance, which depends on the coated steel sheet composition, production process and properties, which are indicated in Table 1 of D4 and which are encompassed by the disclaimer. Moreover, D4 does not provide any teaching that the composition of the base steel sheet has an influence on the corrosion resistance, contrary to the opponent's allegation.

Thus, the disclaimed coated steel sheet has inevitably also the corrosion resistance properties as the coated steel sheet according to Example 15 of D4.

2.6 In view of the above, the Board concludes that claim 1 of auxiliary request 1 fulfils the requirements of Article 123(2) EPC, since the amendment in form of an undisclosed disclaimer fulfils the conditions set out in the headnote 2.1 and 2.2 of G1/03.

3. Auxiliary request 1 - Article 84 EPC

3.1 The clarity of the disclaimer has been discussed during the oral proceedings before the opposition division, see point 6 of minutes, and is discussed in the appealed decision, see points II.B.2.2 iii) and II.2.3 iii) of the reasons.

Hence, the clarity objections of the opponent raised in the statement setting out the grounds of appeal address an issue discussed in the appealed decision and therefore comply with the requirements of Article 12(2) RPBA 2020.

3.2 A claim containing a disclaimer must - like any other claim - meet the requirements of clarity and conciseness pursuant to Article 84 EPC (G 1/03, Headnote 2.4; G 1/16, Reasons 48; see Case Law of the Boards of Appeal, 10th Edition, 2022, Chapter II.E. 1.7.2 or T 2130/11 and T 286/06 cited by the opponent).

3.3 The opponent argues that the wording of the disclaimer is unclear, since

- the expression "produced by a conventional method" is unclear due to the use of the term "conventional"

- the expression "top rolls" is undefined
- the production steps are not defined and the order of the features is confusing
- the methods for measuring the spangle size values and Vickers hardness values are not specified

3.4 The Board does not share the opponent's view.

3.4.1 The disclaimer based on Example 15 of D4 had been introduced, since during the assessment of novelty of claim 1 as granted it was concluded that Example 15 of D4 described sufficiently and clearly all features defined in claim 1 of the patent.

The skilled person consistently interprets the same wording in the same technical context, i.e. Al-Zn plated steel sheets. Hence if the skilled person is able to determine directly and unambiguously what was disclosed in Example 15 of D4 for the assessment of novelty, the skilled person is also capable to determine what is defined by the wording of the corresponding disclaimer in claim 1 of auxiliary request 1 (which precisely reflects the wording of Example 15 of D4 and which thus does not reshape the claims arbitrarily in the sense of G1/03, reasons 3).

3.4.2 In line with point 3 of the reasons of G1/03 the Board is of the opinion that "as in respect of other problems of clarity, a balance has to be struck between the interest of the applicant in obtaining adequate protection and the interest of the public in determining the scope of protection with reasonable effort."

It follows that a claim comprising a disclaimer must be construed as any other claim by a mind willing to

understand, not a mind desirous of misunderstanding (Case Law of the Boards of Appeal, 10th Edition, 2022, II.A.6.1).

- 3.4.3 Although claim 1 does not define what should be considered a conventional method, the skilled person would interpret the term "conventional" in the context of claim 1. A skilled person dealing with the galvanisation of steel sheets has no difficulty in determining what is meant by "a cold rolled steel sheet [...] produced by a conventional method", since cold rolled steel sheets have been manufactured for decades and the method of manufacturing has no relevance for such conventionally manufactured steel sheets, in particular in the context of hot-dip coating thereof.

Hence, the Board is of the opinion that in the context of claim 1, the term "conventional" may well be broad but it is not unclear.

This opinion of the Board is not affected by the case law cited by the opponent in this regard.

In T 1914/10, T 857/11, T 1185/12, T 1385/14 the term "conventional" in its particular technical context has been found to be unclear. However, the assessment of a term in its technical context has to take place on a case-by-case basis and by considering the special circumstances of the case. Hence, no general principle can be derived from the cited case law that the term "conventional" is per se unclear, irrespective of the claimed subject-matter and the technical context thereof. The opponent further referred to T 2130/11. This decision does not provide further insights in this regard but confirms the established case law that the

wording of a disclaimer needs to be clear, see point 3.2 above.

3.4.4 The feature "conditions of holding temperature and time of the coated steel sheet after passing through top rolls" implies that the coating has been performed, i.e. that the top rolls are located after hot-dip coating. An interpretation of the feature in view of the description of the contested patent is not necessary. Top rolls are commonly used in hot-dip galvanisation. The expression "top rolls" therefore does not render the wording of the disclaimer unclear.

3.4.5 The disclaimer in claim 1 refers to a hot-dip Al-Zn alloy coated steel sheet and a molten bath: This implies for the skilled person that a hot-dipping step is unambiguously to be performed in the continuous galvanizing line.

Similarly, the cooling time, the holding temperature and the holding time refer to parameters of the continuous galvanizing line. For each step it is clear whether it concerns the base steel sheet (i.e. before coating), the coating process (i.e. during coating), the hot-dip coated steel sheet (i.e. after coating) or the coating itself. In this respect a clear link between the features of the disclaimer and those of the rest of claim 1 is provided.

As far as the feature concerning the coating weight is concerned, the skilled person would understand without ambiguity that it concerns the hot-dip Al-Zn alloy coated steel sheet. Therefore, also this feature does not provide any confusion for the skilled person.



3.4.6 There is no general rule that in order to meet the requirements of Article 84 EPC a claim itself needs to define the measurement methods. They can alternatively be specified in the description. This is per se not contested by the appellant who argues, however, that the measurement method needs to be specified in the description of the patent itself. A reference to a further document in the description, in particular to the one on which the disclaimer is based, is not enough.

However, in the present case, amended paragraph [0010] of the description explicitly mentions that Example 15 of D4 ("Patent Literature" PTL 7) is disclaimed. This statement in paragraph [0010] on the one hand provides transparency with regard to the basis for the amendment to the patent as granted, i.e. the introduction of an undisclosed disclaimer, in line with the requirements for formulating a disclaimer as set out in the last paragraph of point 3 of the reasons of G1/03. At the same time, the statement provides transparency concerning the parameters referred to in the disclaimer of claim 1. Hence, it is clear for the skilled person that the parameters referred to in the disclaimer are measured by the methods indicated in D4, paragraphs [0061] and [0062]. In this context, the Board does not follow the appellant's opinion, that the disclosure of D4 (although specifically referred to in the patent as basis for the disclaimer) would be ignored by the skilled person.

Thus, although different methods for measuring the spangle size and the Vickers hardness may exist as taught by D12 and D13, the skilled person nevertheless is not left in doubt by the patent which measurement methods should be used.

3.5 In view of the above, the Board concludes that claim 1 of auxiliary request 1 fulfils the requirements of Article 84 EPC.

4. Auxiliary request 1 - Article 83 EPC

The opponent argues that the skilled person would not be able to carry out the invention in view of the spangle size value and the Vickers hardness value specified in the disclaimer, for which no measurement methods would be specified in the contested patent.

As discussed in point 3.4.6 above, the Board takes the view that the conditions for performing Example 15 of D4 have been introduced in the contested patent, see amended paragraph [0010] ("Example 15 of PTL 7 is disclaimed"), the same way as the disclaimer in claim 1. As a consequence, the fact that different measurements methods could be available elsewhere (e.g. D12 or D13) is not decisive. The skilled person would immediately and directly refer to the methods which are disclosed in D4, paragraphs [0061] and [0062] due to the reference in paragraph [0010] of the patent.

In view of the above, the Board concludes that claim 1 of auxiliary request 1 fulfils the requirements of Article 83 EPC.

5. Auxiliary request 1 - Article 54 EPC in view of D1

5.1 D1 discloses in claims 1 and 2 a coated steel sheet, wherein the upper layer of the Zn-Al plating comprises 0.3 to 10 % Si and 0.005 to 5 % Ca.

In preferred embodiments according to paragraphs [0010] and [0011] of D1, the upper layer of the Zn-Al plating comprises 0.5 to 5 % Si and 0.05 to 0.5 % Ca.

The end points of the Ca and Si ranges disclosed in D1 lead to a Ca/Si ratio from 0.0005 to 16.7, preferably from 0.001 to 10.

- 5.2 The opponent argues in a first line of argument that claim 1 lacks novelty over D1, since Example 15 of D1 discloses a coated steel sheet that comes very close to the subject-matter of claim 1 and achieves the same effects as a steel sheet according to claim 1.

This argument by the opponent is not convincing.

- 5.2.1 Example 15 of D1 (see table 2) discloses a coated steel sheet wherein the upper layer of the coating comprises 1% of Ca and 1.5% of Si. The Ca/Si mass% ratio can be calculated to be 0.67. Hence, the Ca/Si mass% ratio disclosed in this example is below the lower limit of 0.72 as defined in claim 1.

The case law of the boards of appeal is based on a narrow concept of novelty. Equivalents, or in the words of the opponent products which come "very close" and which allegedly provide the same benefits as the claimed products, are not considered for novelty, see Case Law of the Boards of Appeal, 10th Edition, 2022, Chapter I.C.4.5.

- 5.2.2 The difference in the Ca/Si mass% ratio is also not negligible.

The Ca/Si mass% ratio disclosed in Example 15 of D1 is 7% away from the lower limit of range as defined in claim 1.

With the Si content of Example 15 of D1 (1.5%), the Ca content would have to be 1.08% (instead of 1%) to result in a Ca/Si mass% ratio to fall within the range according to claim 1. The gap of 0.08% of Ca content cannot be regarded as being negligible in view of the different embodiments of D1 and the disclosed range with a lower limit of e.g. 0.01%, i.e. with a definition of at least two digits after the decimal point (see the definition of the Ca range in claim 3 of D1).

The same applies when considering the Ca content of example 15 of D1 (1%), the Si content would have to be 1.39% instead of 1.5% to result in Ca/Si mass% ratio according to claim 1.

- 5.3 The opponent further argues in a second line of argument that the amounts for Ca and Si and their ratio as defined in claim 1 are arbitrary selections from the disclosure in D1 and the skilled person would seriously contemplate working in the overlap between the selected ranges and the ranges as defined in claim 1.

Also this argument is not convincing.

- 5.3.1 According to established case law, the selection within a parametric range is considered novel under certain conditions.

In T 279/89 three criteria were developed which have to be fulfilled by a sub-range to be considered novel:

- (a) the selected sub-range should be narrow;
- (b) the selected sub-range should be sufficiently far removed from the known range illustrated by means of examples;
- (c) the selected area should not provide an arbitrary specimen from the prior art, i.e. not a mere embodiment of the prior description, but another invention (purposive selection).

5.3.2 The first two criteria are met by the Ca/Si mass% ratio of 0.72-1.4 as defined in claim 1 when compared to the Ca/Si mass% ratio as calculated from the Si and Ca content as disclosed in D1 (from 0.0005 to 16.7, preferably from 0.001 to 10), see point 5.2 above for criterion b).

There is also no disclosure in D1 which guides the skilled person to select specific sub-ranges for the amounts of Si and Ca in order to provide a Ca/Si mass% ratio as defined in claim 1.

5.3.3 Concerning the last criterion "(c)", the case law has further developed and the Board agrees with the conclusion arrived at that whether or not a purposive selection was made is relevant rather for assessing inventive step than for novelty, see Case Law of the Boards of Appeal, 10th Edition, 2022, Chapter I.C. 6.3.1.

However, even if the criterion "(c)" were considered, this criterion would also seem to be fulfilled in the present case, since the experimental results reported in Table 1 of the patent demonstrate that the Ca/Si mass% ratio has an effect on the post-paint corrosion resistance for the claimed composition (embodiments 1, 2, 4, 5, 8 to 11, 13, 15 and 16) in comparison with

examples having a composition falling outside that can be considered as a representative of D1, at least in terms of the Ca and Si contents (see comparative examples 6, 7, 14 and 17).

- 5.4 The opponent further refers to case law dealing with overlapping ranges and implicit disclosure.

None of the arguments in relation to this case law is convincing.

- 5.4.1 According to the Examples 1-3, 7, 11-15, 17 and 18 of D1 the upper layer comprises Ca in an amount of 0.02, 0.05, 0.08, 0.15, 0.5 or 1% in combination with either 0.5, 1 or 1.5% of Si. However, the Ca/Si mass% ratio obtained by the examples of D1 falls clearly outside the ratio as required by claim 1.

Contrary to the opponent's view, Examples 2 to 18 of D1 (see Table 2) do not form a range for the Ca/Si mass% ratio, but only a group of individual point-like implicit disclosures, since the Ca/Si mass% ratio is not addressed by D1.

- 5.4.2 Even if the embodiments of D1 would be interpreted as defining ranges (0.3 to 3% Ca and 0.5 to 8% Si according to the opponent), these ranges would be the result of multiple selections within the teaching of D1. According to established case law, subject-matter derivable by multiple selections is usually considered novel unless there is a pointer towards the combination, see Case Law of the Boards of Appeal, 10th edition, 2022, Chapter I.C.6.3.3.

Moreover, even if the Ca and Si ranges (0.3 to 3% Ca and 0.5 to 8% Si) generated from the individual amounts

disclosed for certain examples of D1 ("the generated ranges") are taken into account for calculating the Ca/Si mass% ratio, no partial overlap with the claimed range is generated. Both, the upper and the lower limit of the Ca/Si mass% ratio as defined in claim 1 of auxiliary request 1 (0.72-1.4), fall within the range for the possible Ca/Si mass% ratio (0.01-2), which can be calculated from the upper and lower limits of the generated ranges for the Si and Ca contents.

It follows that a further selection of appropriate amounts for Ca and Si would be needed to obtain a composition which eventually fulfils the Ca/Si mass% ratio as defined in claim 1. Hence, even if using the generated ranges, the criteria for a selection invention apply and not considerations whether or not the skilled person would seriously contemplate working in an area of overlap as discussed in the Case Law of the Boards of Appeal, 10th Edition, 2022, Chapter I.C. 6.3.2.

- 5.5 In view of the above, the Board concludes that the subject matter of claim 1 of auxiliary request 1 is novel over D1.
- 6. Auxiliary request 1 - Article 54 EPC in view of D6
  - 6.1 D6 discloses in Table 6, paragraph [0053], "the average composition in whole thickness of plated layer" of various Zn-Al plated steel sheets according to comparative and inventive examples of D6. For the plated steel sheets according to Example 22 of Table 6 the average composition of the plated layer comprises 0.542 mass% Ca and 0.40 mass% Si which results in a Ca/Si mass% ratio of 1.355.

6.2 The opponent argues that the plated layer of D6 does not encompass the interfacial layer. In their view, the plated layer in D6 corresponds to the upper layer specified in claim 1 of auxiliary request 1. Since Examples 17 and 22 of D6 discloses an "average composition in whole thickness of plated layer" falling within the claimed composition, the subject-matter of claim 1 of auxiliary request 1 lacks novelty over D6.

The Board does not share the opponent's view.

6.2.1 D6 confirms that the average composition of the plated layer is not the same as the composition of the superficial upper layer, see paragraph [0014]: "the total concentration of Mg and Ca in the superficial portion of the plated layer is higher than the average total concentration of Mg and Ca in the plated layer" (emphasis added).

In agreement with the argument of the opponent, the superficial portion of the plated layer of Example 22 of D6 does not correspond to that of the upper layer of the plating layer that is defined in claim 1 of auxiliary request 1.

6.2.2 It is undisputed that an interfacial alloy layer containing an Fe-Al compound and/or an Fe-Al-Si compound is formed inherently when forming a plated steel sheet according to Example 22 of D6.

D6 refers in Table 6 to the "whole thickness of plated layer". Since the interfacial alloy layer is formed during the plating process, it is not unambiguously derivable from D6 that the "whole thickness of plated layer" referred to in Table 6 of D6 does not include the interfacial alloy layer.



- 6.2.3 The opponent argues in this regard that it is implicitly derivable from Table 6 of D6, that the analysed plated layer does not encompass the interfacial alloy layer, since Table 6 does not disclose the content of iron in the plated layer.

This argument is not convincing.

The content of the various elements presented in Table 6 of D6 does not sum up to 100%. Table 6 therefore does not provide a direct and unambiguous disclosure that the plated layer does not comprise iron and therefore does not encompass the interfacial alloy layer containing an Fe-Al compound and/or an Fe-Al-Si compound.

- 6.3 During the oral proceedings, the opponent further argued for the first time in appeal proceedings that based on the conditions of the measuring method for analysing the composition of the plated layer disclosed in paragraph [0042] of D6, it followed inevitably that the plated layer of D6 did not encompass the interfacial alloy layer.

Also this argument is not convincing.

- 6.3.1 According to paragraph [0042] of D6 a ISO dissolving liquid (50 mass% HCl aqueous solution + 0.35 mass% hexamethylenetetramine) is used to dissolve the plated layers of the samples.

Paragraph [0042] does not describe that the interfacial alloy layer remains intact during the treatment with the ISO dissolving liquid, but rather states in general terms that the plated layers are dissolved. Hence the

explicit teaching of D6 does not support the argument of the opponent.

Even if it is accepted for the sake of argument that it is known in the art that hexamethylenetetramine can act as an inhibitor for steel sheets, D6 does not provide a direct and unambiguous disclosure that the interfacial alloy layer formed during the plating process remains fully intact under the highly acidic conditions (50 mass% HCl) during the de-coating step.

- 6.3.2 The opponent argued that this was nevertheless inevitably the case due to the presence of hexamethylenetetramine in the dissolving liquid. Since this new technical argument was presented for the first time during the oral proceedings before the Board and was not supported by experimental or documentary evidence already presented in the proceedings, the argument is an amendment to the case of the opponent to which the patent proprietor could not be expected to be in the position to react during the oral proceedings before the Board.

The Board therefore did not admit this late filed new technical argument into the proceedings pursuant to Article 13(2) RPBA 2020.

- 6.4 In view of the above, the Board concludes that the subject matter of claim 1 of auxiliary request 1 is novel over D6.

7. Auxiliary request 1 - Article 56 EPC starting from D1

- 7.1 As discussed above with regard to novelty, the subject-matter of claim 1 differs from the disclosure of D1 in

that the Ca/Si mass% ratio of the coating's upper layer is between 0.72 to 1.4.

- 7.2 According to paragraph [0020] of the patent, the Ca/Si mass% ratio controls the balance between the formation and dissolution of compounds of Si and/or Ca and Si. As a result thereof, the corrosion resistance of the painting is improved, when the Ca/Si mass% ratio is adjusted to fall within the range defined in claim 1.

This effect is confirmed by the examples of the patent. Sample Nos. 1, 2, 4, 5, 8, 9, 10, 11, 13, 15 and 16 of Table 1 of the patent, all of which have a Ca/Si mass% ratio falling within the relatively narrow range of 0.72 to 1.4, exhibit a maximum blistering width of less than 1.0 mm, indicative of the highest 'A' rating, and improved post-paint corrosion resistance.

In contrast, Sample Nos. 3, 6, 12 and 17, all of which have a Ca/Si mass% ratio below 0.72, and Sample Nos. 7 and 14, all of which have a Ca/Si mass% ratio above 1.4, exhibit a maximum blistering width which is greater than 1.0 mm, with a ratings of 'B', 'C' and 'D', and poorer post-paint corrosion resistance.

The experimental data as summarised in Table 1 of the patent therefore credibly demonstrate that blistering after painting can be suppressed by adjusting the Ca/Si mass% ratio in the upper layer of the Al-Zn-coating in a narrow range of from 0.72 to 1.4.

- 7.3 The opponent argues that the comparative examples disclosed in Table 1 of the patent differ from the corresponding inventive examples not only by the Ca/Si mass% ratio alone but also by the individual amounts for Si and Ca and the coating weight. Hence the

experimental evidence of the patent did not allow to conclude that the Ca/Si mass% ratio alone was responsible for obtaining the corrosion properties reported in Table 1 of the patent.

This argument is not convincing.

As stated above the examples summarised in Table 1 of the patent demonstrate that the desired suppression of blistering and reduction of post-paint corrosion is obtained by a plating comprising an upper layer having a Ca/Si mass% ratio according to the range defined in claim 1 (samples 1, 2, 4, 5, 8, 9, 10, 11, 13, 15 and 16). This effect is demonstrated for samples with various coating weights and for different individual contents of Ca and Si in line with the scope of claim 1. Similarly, the six comparative samples 3, 6, 7, 12, 14 and 17 demonstrate for various coating weights and individual amounts for Ca and Si that the desired effect is not obtainable, if the Ca/Si mass% ratio is outside the claimed range.

The coating weight applied on the samples according to the invention and the coating weight applied on the comparative samples disclosed in Table 1 of the patent are similar and hence allow a comparison of the results.

The simple fact that the individual amounts of Ca and Si of the comparative samples also fall outside the ranges defined in claim 1 does not create any doubt, that the effects achieved by the various examples are comparable. In fact the individual amounts of Ca and Si are linked to the Ca/Si mass% ratio, since in order to adjust this ratio, the individual amounts of Si and Ca have to be adjusted.

7.4 In line with the statement in paragraph [0006] of the patent, the objective technical problem can therefore be formulated as to provide an Al-Zn coated steel sheet having good corrosion resistance after painting and being capable of suppressing occurrence of blistering.

7.5 The opponent disputes that the patent solves this problem in view of the closest prior art D1, since the comparative examples of the patent did not reflect the teaching of D1.

This argument is not convincing.

Considering D1 as whole as the starting point as argued by the opponent in a first approach, it can be observed that the examples according to the invention of D1 show a similar excellent or very excellent corrosion resistance.

They have a Ca/Si mass% ratio (Ca/Si mass% ratio of examples of in D1 example 1: 0.1, example 2: 0.05, example 3: 0.033, example 4: 0.02, example 5: 0.01, ..., example 16: 2) that is removed from the range as defined in claim 1 of auxiliary request 1 at least as far the comparative examples of the patent (Ca/Si mass % ratio of comparative examples 3, 6, 7, 12, 14 and 17 of the patent: 0.00, 0.05, 3.07, 1.56 and 0.23).

Hence the comparative examples of the patent reflect the disclosure of the totality of the examples of D1.

7.6 According to a second line of argument of the opponent Example 15 of D1 has to be considered to solve the problem addressed in the contested patent because it

discloses a coated steel sheet wherein the Ca/Si mass% ratio in the upper layer is 0.67 and thus closer to the examples of the invention than the six comparative examples listed in Table 1 of the patent. In their view, the technical problem was to be reformulated as the provision of alternative steel sheets compared to D1.

This argument is not convincing.

- 7.6.1 Following a first line in the case law (see T 2759/17, points 5.3.2 and 5.5 of the reasons) a disclosure within a prior-art document can only be considered to represent a suitable starting point for assessing inventive step if the skilled person would have realistically started from it. The skilled person normally does not arbitrarily pick any existing disclosure in a prior art document and only then starts to think what effect it could possibly achieve. This approach would be unrealistic and artificial. Instead a skilled person selects a disclosure within the prior art with the underlying purpose in mind, i.e. in the present case the purpose to suppress blistering and to avoid post-paint corrosion.

While the same or similar purpose or effect is not necessarily the only consideration the skilled person would make, other considerations, such as the greatest possible structural similarity between the composition described within the closest prior art and that defined in the relevant claim, are of less importance (Case Law of the Boards of Appeal, 10th Edition, 2022, Chapter I.D.3.3).

Starting from Example 15, as the opponent does because of its compositional closeness to the claimed subject-

matter, presupposes knowledge of the present invention, i.e. of the importance of the Ca/Si mass% ratio according to claim 1. However, D1 does not provide a hint that the Ca/Si mass% ratio is of any relevance for suppressing blistering and for avoiding post-paint corrosion.

The line of reasoning starting from Example 15 therefore amounts to an ex-post-facto approach and is based on hindsight.

- 7.6.2 Even if the skilled person were to start from Example 15 of D1 according to a second line in the case law (see T2759/17, point 5.3.1 of the reasons), the objective technical problem would still correspond to the problem as formulated in paragraph [0006] of the patent in line with the reasoning in the contested decision, see point II. B 5.4.2 of the reasons.

The argument of the opponent that the problem stated in paragraph [0006] of the patent is already solved by Example 15 of D1 is based on a mere allegation. D1 does not disclose that Example 15 shows a post-paint corrosion resistance and suppression of blistering after painting as reported in the contested patent. Instead, D1 focuses on the occurrence of red rust on a steel sheet that has been coated with a black melamine system, see paragraph [0024] of D1. Neither the observed effect nor the test conditions are therefore the same in D1 and the patent. The opponent has also not provided any experimental evidence of its own to support its allegation.

The technical teaching with regard to Example 15 in D1 therefore does not put into question the technical effect demonstrated in the experimental section of the

patent. In particular, no reason exists for shifting the burden proof to the patent proprietor to demonstrate that the effect is also obtained compared to Example 15 of D1, which is outside the claimed Ca/Si mass% ratio range.

It follows that it is not justified to reformulate the objective technical problem in rather general terms as suggested by the opponent, namely the provision of an alternative steel sheet.

Even if the mere allegation of the appellant was accepted for the sake of argument and in the absence of any experimental proof that Example 15 of D1 can be expected to have better post-paint corrosion properties than the comparative examples of the patent, the objective technical problem would nevertheless have to be formulated as the provision of a steel sheet that has at least the same post-paint corrosion resistance and blister suppression as the coated steel sheet of Example 15 of D1.

7.7 As stated above, D1 neither addresses the underlying technical problem of suppressing blistering and post-paint corrosion resistance nor discloses that the Ca/Si mass% ratio is of any relevance to address this problem.

Starting from Example 15 of D1 the skilled person has therefore no motivation to modify the composition of the upper layer of the Zn-Al plating by adjusting the Ca and Si contents so that the Ca/Si mass% ratio falls within the range as defined in claim 1 in order to solve the underlying problem.



7.8 Contrary to the argument of the opponent, the skilled person has also no motivation to adjust the Ca/Si mass% ratio in order to improve other properties such as the workability. In Examples 1 to 16 of D1 the Ca/Si mass% ratio varies to a great extent (0.01 (Example 5) to 2 (Example 16)) and does not seem to be of any relevance for the overall rating or for specific individual ratings as summarised in Table 2 of D1.

Example 16 has the highest Ca/Si mass% ratio of the examples of D1 and shows slightly worse results in workability than Example 15. However, Example 7 has the same "slightly poor but usable" workability than Example 16 while having a very low Ca/Si mass % ratio of 0.01. Moreover, the inventive examples of D1 also differ in thickness of the plating, etc. which could also be responsible for the observed differences in the properties achieved by the examples of D1.

The same applies with regard to the wrinkle suppression as addressed by D1 in Table 2 under the heading "appearance". D1 teaches that Ca has to be present in order to avoid wrinkle formation. However, D1 does not provide any further teaching which could motivate the skilled person to to modify the Ca or Si contents such that the Ca/Si mass% ratio falls within the Ca/Si mass% ratio according to claim 1 of the patent.

The Board therefore is of the opinion that the experimental results in D1 do not provide an incentive to focus on Example 15, to pay attention to the Ca/Si mass% ratio or to modify the Ca or Si contents such that the Ca/Si mass% ratio falls within the claimed range when focusing on the properties of the plated steel sheet analysed in the experimental section of D1.

7.9 Starting from D1, also the remaining documents D6, D7 and D8 do not provide an incentive for the skilled person to adjust the Ca/Si mass% ratio or the composition of the upper plating layer into the claimed range in order to improve the post-paint corrosion and to suppress blistering, since none of these further documents is concerned with these problems. Already for this reason the combination is hindsight based.

Furthermore, none of D6, D7 and D8 discloses the importance of the Ca/Si mass% ratio to solve the underlying problem or any other related problem, see the following discussion in more detail.

7.9.1 D6 is concerned with Al-Zn alloy coated steel sheets having good corrosion resistance and bending workability for use as building materials and in domestic electrical equipment, see paragraph [0001]. This is achieved by providing a plated steel sheet wherein the plated layer comprises Zn, from 15 to 40 mass% Al, from 0.005 to 3 mass% Mg and in addition Si in an amount of 0.0005 to 0.05 mass% of the amount of Al, see claim 1 of D6.

According to D6, the amount of Ca - if added at all - is only important in dependence of the Mg amount, see paragraph [0036] of D6. There is no teaching in D6 to solve the aforementioned objective technical problem by forming a plating, wherein the upper layer has a Ca and Si content that results in a Ca/Si mass% ratio of 0.72 to 1.4. The plating composition of D6 does not even need to contain Ca, see Table 3. As discussed in the context of novelty, D6 merely discloses an average content of Ca and Si in the (whole thickness of the) plating layer and does not disclose the composition of the upper layer, see Table 6 of D6.

The average composition of Example 17 of D6 has a Ca and Si content which results in a Ca/Si mass % ratio of 0.52. No reason can be seen why the skilled person would select Example 17 within the disclosure of D6 when aiming to improve the plating of D1 and to select its amount of Ca out of context.

The same reasoning applies with regard to comparative example 22.

- 7.9.2 D7 is concerned with steel wires, not an Al-Zn coated steel sheet (as correctly set out in point II. B 5.7.1 of the decision). In fact, all of the examples in D7 pertain to steel wire. Moreover, none of the examples addresses blistering after painting and post-paint corrosion resistance.

Thus, there is no motivation to combine D7 with D1 with any reasonable expectation of solving the aforementioned technical problem.

- 7.9.3 D8 relates to hot-dip plated steel plates. Example 45 of D8 is the only specific example in D8 in which Ca and Si are present in the plated layer. It is not apparent why the skilled person would combine Example 45 from D8 with example 15 of D1, in particular, since the plating systems of D1 and D8 are quite different. Example 45 contains over 70 % Zn and 11 % Al, whereas the plating of Example 15 of D1 comprise only 33 % Zn and more than 60 % Al.

Moreover, the Ca/Si mass% ratio in Example 45 of D8 is 3 and hence above the ratio as defined in claim 1. If the skilled person focuses on the Ca/Si mass% ratio as argued by the opponent, no reason exists, why the

skilled person would only consider the Ca content of Example 45 and would disregard its Si content or Ca/Si mass% ratio.

In similar terms, no reason exists why the skilled person would consider the Ca content such as disclosed in paragraph [0046] of D8 in isolation. According to paragraph [0047] the plating may contain Ca to improve the "bare corrosion resistance". This has nothing to do with the problem of suppressing blistering after painting and improving post-paint corrosion resistance.

Furthermore, there is no further teaching or suggestion in D8 that controlling the Ca and Si content, in particular so that the upper layer has a Ca and Si content that results in a Ca/Si mass% ratio of 0.72 to 1.4, helps to suppress blistering after painting and improves post-paint corrosion resistance.

- 7.9.4 In summary, none of the arguments of the opponent based on D1 as the starting point is convincing. The subject-matter of claim 1 is not rendered obvious in view of D1.
- 8. Auxiliary request 1 - Article 56 EPC - further attacks
  - 8.1 Admittance of the various attacks under inventive step
    - 8.1.1 The patent proprietor argues that it was contrary to the requirements of Article 12(2) and Article 12(6) RPBA 2020 to resuscitate inventive step attacks based on D3, D6, D7, D8 as closest prior art.
    - 8.1.2 According to points 8 of the minutes of the oral proceedings before the opposition division, inventive step was discussed in detail starting from D1 as the

closest prior art. The discussion during the oral proceedings focused on the attacks based on D1 alone and based on D1 in combination with D8. Nevertheless, all further objections by the opponent under inventive step were maintained during the oral proceedings (see point 8, second sentence of the minutes) and are discussed in point II. B 5.7 ("objections from written procedure") of the contested decision.

The inventive step attacks developed during the opposition proceedings are based on D1 alone, based on D1 in combination with D6, D7, D8, based on D3 in combination with D6, D7, D8 and based on D6 or D7 on their own as summarised in the table on page 2 of the letter of opponent dated 2 June 2021.

In line with Article 12(2) RPBA 2020 these objections are part of the appeal proceedings. The admissibility of the objections was not an issue during the opposition proceedings and the opponent has not withdrawn the objections. Therefore, the principles laid out in Article 12(6) RPBA 2020 do not apply in this regard.

- 8.1.3 A further inventive step attack based on D8 alone has not been raised by the opponent neither in appeal proceedings nor in opposition proceedings, contrary to the argument of the patent proprietor. Hence no need exists for deciding on the admittance of an inventive step attack based on D8.
  
- 8.2 The Board indicated in its communication according to Article 15(1) RPBA 2020 as annexed to the summons to attend oral proceedings that it does not intend to discuss the alternative lines of attack starting from

D3, D6 and D7, because D3, D6 and D7 appear to be less promising as a starting point than D1.

As indicated above with regard to novelty, D6 does not come compositionally closer than D1. The same applies with respect to D7 and D3.

D7 deals with steel wires and therefore does not disclose a plated steel sheet as defined in claim 1.

Example 1 of Table 3 of D3 comprises 1.5% Si and 0,05 % Ca. Hence, the subject-matter of claim 1 differs from this disclosure in D3 by the same feature as compared to D1, i.e., the Ca/Si mass% ratio of 0.72 to 1.4. As evident from the remaining examples of D3, Ca is not even an essential element in the plating composition of D3 but only one of several possible additives to improve the appearance quality (see paragraph [0029]), in particular gloss (see paragraph [0004]).

Furthermore, none of documents D3, D6 and D7 addresses the technical problem mentioned in paragraph [0006] of the patent or provides any incentive that controlling the Ca/Si mass% ratio in the upper layer of a Al-Zn coating layer helps to suppress blistering after painting and improves post-paint corrosion resistance.

8.3 The preliminary assessment by the Board was not put into question by the opponent during the oral proceedings before the Board.

8.4 The Board therefore concludes that the subject-matter of claim 1 of auxiliary request 1 is not rendered obvious when starting from D3, D6 or D7.

9. Following from the above, it can be concluded that - after the withdrawal of the appeal by the patent proprietor - the remaining appeal of the opponent is not successful.

**Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:



C. Spira

C. Herberhold

Decision electronically authenticated