Internal distribution code:

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

Datasheet for the decision of 15 December 2023

Case Number: T 0467/21 - 3.2.03

Application Number: 09787854.0

Publication Number: 2396455

IPC: C23C28/00, C25D3/06, C25D3/12, C25D5/14

Language of the proceedings: EN

Title of invention:
CHROME-PLATED PART AND MANUFACTURING METHOD OF THE SAME

Patent Proprietor:
Nissan Motor Co., Ltd.
Atotech Deutschland GmbH & Co. KG

Opponents:
MacDermid, Incorporated
Schneider, Peter

Headword:

Relevant legal provisions:
EPC R. 76(2)(a), 103(1)(a)
EPC Art. 100(c), 100(b), 113(1), 111(2)
RPBA 2020 Art. 11, 12(4), 13(2)

Keyword:
Admissibility of opposition - (yes)
Sufficiency of disclosure - (yes) - undue burden (no) - enabling disclosure (yes) - reproducibility (yes)
Reimbursement of appeal fee - (no) - opportunity to comment (yes)
Remittal to the department of first instance - (yes)

Decisions cited:
T 0063/06, T 2514/16, T 0367/20, T 1076/21, G 0002/10, G 0001/12

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
Fax +49 (0)89 2399-4465

Case Number: T 0467/21 - 3.2.03

D E C I S I O N
of Technical Board of Appeal 3.2.03
of 15 December 2023

Appellant: (Patent Proprietor 1)	Nissan Motor Co., Ltd. 2, Takara-cho Kanagawa-ku Yokohama-shi, Kanagawa 221-0023 (JP)
Appellant: (Patent Proprietor 2)	Atotech Deutschland GmbH & Co. KG Erasmusstraße 20 10553 Berlin (DE)
Representative:	Grünecker Patent- und Rechtsanwälte PartG mbB Leopoldstraße 4 80802 München (DE)
Respondent: (Opponent 1)	MacDermid, Incorporated 245 Freight Street Waterbury CT 06702 (US)
Representative:	Page White Farrer Bedford House 21a John Street London WC1N 2BF (GB)
Respondent: (Opponent 2)	Schneider, Peter Obere Karspüle 41 37073 Göttingen (DE)
Representative:	dompatent von Kreisler Selting Werner - Partnerschaft von Patent- und Rechtsanwälten mbB Deichmannhaus am Dom Bahnhofsvorplatz 1 50667 Köln (DE)

Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted on 26 February 2021 revoking European patent No. 2396455 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman C. Herberhold
Members: B. Goers
N. Obrovski

Summary of Facts and Submissions

I. European patent No. 2 396 455 relates to a chrome-plated part with a substrate, a bright nickel layer, a noble nickel layer and a trivalent chromium layer formed thereon.

II. With the impugned decision, the opposition division revoked the patent in its entirety. It concluded that claim 8 of the main request (patent as granted) did not comply with the requirements of Article 123(2) EPC and that auxiliary requests 1 to 8 did not comply with the requirements of Article 83 EPC.

The patent proprietors ("appellants") appealed against this decision.

III. At the oral proceedings before the Board, the final requests were as follows.

IV. The appellants requested that the decision under appeal be set aside and that the patent be maintained as granted (main request) or, alternatively, that the patent be maintained as amended on the basis of one of auxiliary requests 1-15 filed with the statement of grounds of appeal. They further requested that the appeal fee be reimbursed and that the opposition filed by opponent 2 be held inadmissible.

Opponents 1 and 2 ("respondents") requested that the appeal be dismissed.

After the Board had announced that the patent as granted did not contain added subject-matter and that the invention was sufficiently disclosed, the parties

unanimously requested that the case be remitted to the opposition division for further prosecution.

V. The following evidence is relevant for this decision.

(a) Evidence which was already part of the opposition proceedings:

D1: Lausmann G A, "Chromium Plating" Leuze Verlag KG, 1st Edition (2007), pages 14-157

D2: Schario M: "Troubleshooting Decorative Nickel Plating Solutions (Part II of III Installments)", Metal Finishing, May 2007, pages 41 -44

D22: ASTM B764-94: "Standard Test Method for Simultaneous Thickness and Electrochemical Potential Determination of Individual Layers in Multilayer Nickel Deposit (STEP Test)", American Society for Testing and Materials (1994)

D24: Tremmel, R. A.: "Methods to improve the corrosion performance of microporous nickel deposits", Plating & Surface Finishing: Journal of the American Electroplaters' Society, October 1996, pages 24-28

D25: Brugger, R.: "Nickel Plating" (1970), pages 224-245

(b) Evidence filed for the first time with the statement setting out the grounds of appeal (D31) and with the reply to the appeal (D33):

D31: Standard of General Motors Company GMW14688, February 2007, pages 1-7

D33 Harbulak, E. P.: "Simultaneous Thickness and Electrochemical Potential Determination of Individual Layers in Multilayer Nickel Deposits Using the Chrysler 'STEP' Test", Society of Automotive Engineers, Inc., Congress and Exposition, Cobo Hall, Detroit, pages 1-9, February 25-29, 1980

(c) Evidence filed by the appellant for the first time by letter of 7 December 2023:

D34: Dennis, J. K. and Such, T. E.: "Nickel and Chromium Plating", 3rd Edition, Chapter 10, Woodhead Publishing Ltd (1993)

VI. The wording of independent claims 1 and 8 of the main request (patent as granted) is relevant for this decision. Substantial amendments compared with independent claims 1 and 9 of the application as filed are marked in bold and strike-through.

Claim 1:

"*A chrome-plated part, comprising:*
a substrate (2);
a bright nickel plating layer (5b) formed over the substrate (2);
a noble potential nickel plating layer (5a) formed on the bright nickel plating layer (5b),
*wherein an electric potential difference between the bright nickel plating layer (5b) and the noble potential nickel plating layer (5a) is within a range from ~~40~~ **60** to 150 mV; and*
a trivalent chrome plating layer (6) formed on the noble potential nickel plating layer (5a) and having at least any one of a microporous structure and a microcrack structure,
wherein the trivalent chrome plating layer (6) contains 4.0 at% or more of carbon and has 10000/cm^2 or more of fine pores."

Claim 8:

"*A method of manufacturing a chrome-plated part, comprising:*
forming a bright nickel plating layer (5b) over a substrate (2);
forming a noble potential nickel plating layer (5a) on the bright nickel plating layer (5b),
wherein an electric potential difference between the bright nickel plating layer (5b) and the noble potential nickel plating layer (5a) is within a range from ~~40~~ ***60*** *mV to 150 mV;*
mixing carbon into a trivalent chrome plating layer (6) so that the trivalent chrome plating layer (6) contains 4.0 at% or more of carbon; *and*
forming the trivalent chrome plating layer (6) on the noble potential nickel plating layer (5a),
wherein the trivalent chrome plating layer (6) has 10000/cm^2 or more of fine pores."

VII. The appellants' arguments relevant to the present decision can be summarised as follows.

(a) Admissibility of respondent 2's opposition
Respondent 2's opposition was not admissible since the requirements of Rule 76(2)(a) EPC in conjunction with Rule 41(2)(c) EPC were not met.

(b) Article 100(c) EPC
The subject-matter of claims 1 and 8 did not extend beyond the content of the application as filed.

(c) Article 100(b) EPC
The European patent disclosed the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. The electric

potential difference (EPD) of the nickel layers was an intrinsic parameter of the materials used and could be measured with standard methods known in the art. The invention resided in the composition and combination of the metal layers, which were all produced with methods commonly known in the art. The adjustment of the electric potential, the carbon content and the fine pore (microporous) density were common general knowledge. In addition, the patent had examples which gave a skilled person sufficient information to carry out the invention, and the burden to proof that the invention was insufficiently disclosed lay with respondents, who had not submitted convincing counter-evidence.

(d) Reimbursement of the appeal fee
Reimbursement of the appeal fee was equitable by reason of a substantial procedural violation. At the oral proceedings before the opposition division, the appellants had been confronted with new arguments on lack of sufficiency of disclosure on which they did not have the chance to comment.

VIII. The respondents' arguments relevant to the present decision can be summarised as follows.

(a) Admissibility of respondent 2's opposition
Respondent 2's opposition was admissible.

(b) Article 100(c) EPC
The subject-matter of claims 1 and 8 extended beyond the content of the application as filed. This concerned the range "60 mV to 150 mV", the combination of the features "4.0 at% or more of carbon" and "10000/cm^2 or more of fine pores", the combination of the EPD range and the carbon content range, and the definition of the

step "mixing carbon into a trivalent chrome plating layer" in claim 8.

(c) Article 100(b) EPC
The European patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. The patent did not explain how to measure the EPD. Nor did it contain information on the amount of electric potential adjuster and the amount and particle sizes of the fine particles to provide the fine pores in the noble nickel plating solution. Finally, the patent did not explain how the trivalent chrome plating layer was produced or how the carbon content in the chrome plating layer was adjusted. The burden of proof shifted to the appellants in view of these deficiencies.

(d) Reimbursement of the appeal fee
The appellants had not been confronted with new arguments on lack of sufficiency of disclosure during the oral proceedings before the opposition division.

Reasons for the Decision

1. Admissibility of respondent 2's opposition

The appellants requested that respondent 2's opposition be held inadmissible since the identity of opponent 2 (the "person" indicated in Article 99(1) EPC) was not clearly and unambiguously identifiable at the end of the opposition period pursuant to Rule 76(2)(a) EPC in conjunction with Rule 41(2)(c) EPC.

However, respondent 2's opposition is admissible.

1.1 As to the requirements in accordance with Rule 41(2)(c) EPC, the notice of opposition must contain the opponent's name, address and nationality (given that the opponent here is a natural person), as well as the state where the residence or principal place of business is located.

Respondent 2's notice of opposition contains this information. The natural person Mr Peter Schneider was indicated as the opponent and "Germany" was indicated as the country of nationality, which is only required for natural persons (Rule 41(2)(c) EPC).

1.2 The appellants argued that the indicated address gave rise to "an unsolvable conflict regarding the identity of the opponent" since it corresponded to the address of the law firm "Kanzlei Fiedler, Ostermann & Schneider". They concluded that the address indicated in the notice of opposition was not Mr Schneider's residential address, contrary to the requirements of Rule 41(2)(c) EPC.

1.3 The Board is not convinced by these arguments. With respect to the opponent's address, Rule 41(2)(c) EPC only requires that it "shall be indicated in accordance with **applicable customary requirements for prompt postal delivery**" (emphasis added). Therefore, in accordance with the conclusions in the decision under appeal - even if the address is also the address of the law firm where Mr Schneider is partner - the criteria of Rule 41(2) (c) EPC are fulfilled.

As there are no apparent ambiguities as to opponent 2's identity, considerations as to opponent 2's true intention and respective corrections in accordance with the rationale of G 1/12 (see catchword) are not applicable in this case.

2. Main request - Added subject-matter, Article 100(c) EPC

The respondents maintained the following added-matter objections already discussed in the decision under appeal:

(a) The range "60 mV to 150 mV" in claims 1 and 8 was not originally disclosed.
(b) The combination of the features "4.0 at% or more of carbon" and "10000/cm^2 or more of fine pores" in claim 1 was not originally disclosed.
(c) In claim 8, "mixing carbon into a trivalent chrome plating layer" was not disclosed in combination with a carbon concentration of "4.0 at% or more of carbon". Furthermore, the mixing step was originally disclosed only in combination with the formation of a eutectic system.

(d) The definition of the electric potential difference (EPD) range and the carbon content range constituted a selection from two lists thereby singling out a combination of features not originally disclosed.

However, as discussed with the parties during the oral proceedings before the Board, the subject-matter of claims 1 and 8 is not unallowably extended for the following reasons.

2.1 Objection (a): EPD range "60 mV to 150 mV"

2.1.1 In claims 1 and 8 as granted, the upper boundary of the broadest originally disclosed range of the EPD of the nickel layers ("150 mV"; see claims 1 and 9 as originally filed) was combined with the lower boundary of the originally disclosed preferred range ("60 mV"; claims 2 and 13 as originally filed).

2.1.2 According to established case law, there is no general rule for the allowability of such a combination of the preferred narrower range and one of the part-ranges lying within the disclosed overall range. As set out in T 2514/16 with reference to decision G 2/10 (see T 2514/16, reasons 1.3 and 1.4), it is to be assessed - case by case - whether any such an amendment confronts the skilled person with new technical information they would not - even implicitly - derive directly and unambiguously, using common general knowledge, and seen objectively and relative to the date of filing, from the whole of the application as filed.

2.1.3 In the case in hand, the patent relates to the problem of corrosion prevention for nickel layers in the prior art, according to which exfoliation and blisters in the

nickel layer were observed at nickel layer EPD values of 60 mV or more. In the past, this problem required the EPD of the nickel layers to be limited to an "optimum range" of 20 to 40 mV (see A-publication, paragraph [0006]).

According to the application as filed, the contribution to overcome this limitation is to provide fine pores or microcracks in the trivalent chrome plating layer, thereby making it possible to apply EPD of the nickel layers of up to 150 mV or even more (see A-publication, paragraph [0019]). The application as filed does not provide any particular information regarding the significance of the 120 mV upper limit of the more narrower range defined in claims 2 and 13.

2.1.4 From this information in the application as filed the skilled person directly and unambiguously understands that the effect of the invention is in particularly relevant for nickel layers with an EPD in the range of 60 to 150 mV or more. Above an EPD of 60 mV, blisters would occur without the provision of fine pores at the claimed microporous density in the chrome layer according to the invention.

Therefore, the Board agrees with the conclusion in the decision under appeal, that the EPD range of claims 1 and 8 of the main request does not extend the subject-matter beyond the content of the application as filed.

2.2 Objection (b): "4.0 at% or more of carbon" and "10000/cm^2 fine pores"

Objection (b) is not convincing either.

The added features of "10000/cm^2 of fine pores" and "4.0 at% or more of carbon" are disclosed in originally filed claims 1, 3 and 6 (second option).

2.3 Objection (c): mixing carbon into a ... plating layer

2.3.1 The wording "mixing carbon into a trivalent chrome plating layer (6) so that ..." is not literally disclosed in the application as filed.

The decision under appeal can insofar be agreed to that the added claim feature makes no reference to the plating method, while the term "mixing" is used in the application documents solely in conjunction with a wet plating process (see A-publication, paragraphs [0023] and [0024]).

2.3.2 According to the respondents, the mixing step was originally disclosed only as part of a wet plating process and, moreover, only such that a eutectoid is formed (see also paragraph [0023]). Neither feature was included in amended claim 8.

2.3.3 Before the Board can decide on a possible extension of the subject-matter, the amended wording first needs to be construed (see also T 367/20, reasons 1.3.2 et seq.).

The complete feature reads (emphasis added): "mixing carbon into a trivalent chrome plating layer (6) so that the **trivalent chrome plating layer** (6) contains 4.0 at% or more of carbon".

The respondents argued that the "mixing ... into"-step in claim 8 established a sequence of steps, i.e. it had to be understood such that "carbon is mixed into a

trivalent chrome plating layer as an independent step before forming the trivalent chrome plating layer on a noble potential nickel plating layer". However, this is not the interpretation to be applied in this case given the originally filed disclosure as a whole.

From the application documents as filed, the Board understands that the final-product carbon content of the trivalent chrome plating layer is the carbon content as homogeneously dispersed within the solidified layer. The skilled person immediately understands that mixing (i.e. homogeneously dispersing) the carbon into a pre-existing metal layer is not technically feasible. Instead, carbon has to be mixed into the precursor materials, independently of the method applied (including possibly a vapor deposition plating method as addressed in paragraph [0022]). For a plating layer with carbon dispersed within it, a mixing step is an inherent necessity in the preparation of the precursor materials.

2.3.4 The added feature in claim 8 relates to information (mixing of carbon into the precursor material of the layer) which is already implicitly disclosed, e.g. in claim 6 as filed by the wording "trivalent chrome plating layer contains 4.0 at% or more of carbon". The term "mixing" thus already has a basis in the implicit disclosure, e.g. in the combination of claims 1 and 6 of the application as filed, and does not constitute an unallowable intermediate generalisation.

The exact method of forming the plating layer and the disclosure of paragraphs [0023] and [0024] thus appear not to be decisive for the question of added subject-matter.

2.3.5 It is true that the application as filed relates the non-metal content, and in particular the carbon content to the formation of a eutectic mixture in the chromium layer (see paragraph [0023]). However, claim 1 - which is based on claims 1 and 6 as originally filed and defines the same composition as the product obtained by the process of claim 8 - does not include an explicit definition of a eutectic system. A mixing step for the carbon into the precursor materials is implicitly disclosed for claim 1, too.

Even if it were accepted that the application as filed described the formation of the eutectic system as the inherent result of the carbon content (see A-publication, paragraph [0023]), not explicitly mentioning this effect would not constitute an unallowable extension of subject-matter. Rather, such an inherent effect would likewise be included implicitly in the subject-matter of claim 8.

2.4 Objection (d): selection from two lists

The argument that the selection of the EPD sub-range in combination with the carbon content range unallowably extends the subject-matter is not persuasive.

As explained above (point 2.1.1), the EPD range of the noble potential nickel layer is restricted to the range in which the effect of the invention is particularly relevant. The carbon content is also restricted to a preferred value. It is further noted in this context that the EPD is a feature of the bright and the noble potential nickel plating layers, whereas the carbon content is a feature of the trivalent chrome plating layer. There is no reason why the properties of these

different layers should not be restricted to individual more preferred sub-ranges or values.

Moreover, all the originally disclosed embodiments address a chrome-plated part with a noble potential nickel layer falling within this range. This applies to the selection of the carbon content, too.

3. Main request - sufficiency of disclosure

In the decision under appeal the opposition division concluded that the patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. In particular, the opposition division concluded that the patent failed to provide sufficient information on the following issues:

(a) how to determine the EPD of the nickel layers
(b) how to adjust the electric potential of the nickel layers during the formation of these layers to achieve an EPD in the claimed range
(c) how to produce a trivalent chromium plating layer with the fine pore structure and density (hereinafter also referred to as "microporous density")

3.2 Burden of proof

According to established case law the burden of establishing insufficiency of disclosure generally lies with the opponents (here the respondents) since a presumption of validity exists for a granted patent (see Case Law of the Boards of Appeal, 10th edition, 2022, III.G.5.2.2(c) and T 63/06, reasons 3.3).

Whether this presumption can be rebutted depends on, *inter alia*, how strong the presumption is and what evidence is filed by the opponents (see T 1076/21, reasons 1.1 to 1.1.5). The mere fact that the opposition division decided there was a lack of sufficiency of disclosure is, as such, not sufficient to shift the burden of proof to the patent proprietor.

The patent provides examples 1 to 5 in Table 1 as embodiments of the invention defined in claims 1 and 9. The nickel layers of examples 6 and 7 lie outside the claimed EPD range, and for examples 8 and 9 microcracks are observed in the chrome plating layer rather than micropores.

The respondents failed to show that the information provided by the patent, and in particular the examples 1 to 5, is not sufficient to put the invention into practice taking due account of common general knowledge. This is explained in points 3.4 to 3.6 below.

3.3 Admittance of new evidence D31, D33 and D34

Documents D31, D33 and D34 are considered in the appeal proceedings.

3.3.1 In support of the arguments on sufficiency of disclosure, new evidence was submitted for the first time in the appeal proceedings: D31 was submitted with the statement setting out the grounds of appeal and D33 was submitted with respondent 1's reply. These submissions constitute amendments under Article 12(4) RPBA 2020.

Documents D31 and D33 address the question of whether EPD measurement between multiple nickel layers (point (a)) was commonly known to the skilled person and whether there was a single standard method within the common general knowledge. During the opposition proceedings, the patent proprietor argued that this was indeed part of the common general knowledge, the question also being at the heart of the opposition division's decision (reasons II.3.2.1). Providing further support for the alleged common general knowledge is thus neither a new line of attack nor does it shift the substantive discussion.

D31 is also *prima facie* relevant as it shows that at least one of the major car manufacturers uses ASTM B764 (i.e. the STEP test) for determining potential differences.

The parties did not contest the admittance of D33, which is likewise of *prima facie* relevance as it provides background information on the STEP test.

3.3.2 D34 was submitted by the appellant in response to the communication under Article 15(1) RPBA 2020. Its admittance is thus subject to the requirements of Article 13(2) RPBA 2020, under which any such submissions shall, in principle, not be taken into account unless there are exceptional circumstances, which have been justified with cogent reasons.

D34 is a textbook on "Nickel and chromium plating" and represents the common general knowledge in this field. Despite being submitted at a very late stage of the proceedings, it does not bring any new argument into the proceedings but is solely used to provide

additional proof of the common general knowledge already previously referred to by the appellant in the opposition-appeal proceedings.

3.4 (a) **Measurement of the EPD** of the nickel layers

The respondents held that the patent did not disclose a method for determining the EPD of the nickel layers. The respondents further argued that the range of values for the EPD as claimed was dependent on the electrolyte and electrode used and that the range was thus meaningless without a reference to a test method.

3.4.1 The only information concerning a device for measuring the EPD of the nickel layers is the reference to an "electrometer" in paragraph [0049] of the patent. An electrometer is an instrument for measuring an electric charge or an EPD, which is the parameter defined in claim 1 for characterising the nickel layers.

3.4.2 The EPD represents a parameter which is characteristic of a particular combination of nickel layers in a specific test environment (i.e. it is an intrinsic property of the combination of materials; see e.g. D1, page 149, chapter "Electrochemical potential" and Figure 3.11).

3.4.3 However, as also argued by the respondents, the determined EPD values for a given system of nickel layers can show variations depending on the measuring system set-up, i.e. the electrolytes and electrodes used (see e.g. D25, Table 5). A skilled person facing such a situation usually looks for a standard test that allows for comparable results. This is discussed in D33, which focuses on the determination of the thickness and the electrochemical potential of

individual layers in multilayer nickel deposits (D33, page 4). This document draws the following conclusion: "Because the actual potential observed between the layers in a multilayer nickel deposit is a function of the electrolyte used in stripping the deposit as well as the activity of the particular nickel deposit being tested, it is essential to standardize on a specific electrolyte composition so that the electrolyte is a constant when comparing test results."

The question to be answered is whether such a standard was in place for determining the EPD of nickel layers and was commonly used in the art before the priority date of the patent.

3.4.4 A standard for EPD test methods for nickel layers is defined in D22 (ASTM test norm B764-94). For this test, a standard electrolyte ("stripping solution") and a standard reference electrode are prescribed (see D22, chapters 5.1 and 5.7). This test is also referred to as the "STEP test". The stripping solution to be used according to D22 is also disclosed in D33 as the "preferred formulation" (see Table 1).

An electrometer as referred to in paragraph [0049] of the patent encompasses such equipment used for the "STEP test" in D22.

The STEP test is referred to and applied in various disclosures in the technical field. The appellant relies on documents D1, D2, D22, D24, D31 and D32 as evidence; see for example:

- D1, pages 152 and 155 and Figure 3.12: The STEP test is referred to as the "standard test method for simultaneous thickness and electrode potential

determination of individual layers in multilayer nickel deposits"

- D2, page 43: The "potential difference" between nickel layers is "checked by using the industry-accepted method outlined in ASTM-B-764 [D22]"
- D24, page 26, central column, last paragraph, refers to a "STEP tester" as the method to determine the EPD (Figure 6)
- D31, point 3.2.3.1: EPD of nickel deposits is determined "following ASTM B764 [D22]"
- D34, page 276, second paragraph: "STEP test can be utilized to determine the electrochemical potential of each layer in a double-layer nickel deposit"

None of these disclosures considers it necessary to reveal any details with respect to the STEP test (such as the stripping solution or the electrodes used). This further supports the notion that the STEP test was known as a commonly accepted standard in the art.

The respondents' assertation that the STEP test was not the only standard used in the art (reference was made to possible different standards in Germany or Japan) was not supported by any evidence.

3.4.5 The respondents did not provide any suitable evidence to cast doubt on the reproducibility of the results of the STEP test either. In particular, they did not present any comparative tests in this respect.

It is furthermore to be noted that variations of the EPD value as a result of the limited accuracy of the test method (or due to the use of a different standard) would be an issue related to the definition of the "forbidden area" defined in claim 1 by the EPD range. According to established case law (see Case Law of the

Boards of Appeal, 10th edition, 2022, II.C.8.2.2(a)) the definition of the "forbidden area" of a claim is usually considered to be a matter related not to Article 83 EPC but rather to Article 84 EPC which cannot be invoked against granted claims in the opposition-appeal proceedings (see G 3/14, catchword).

3.4.6 In view of the above, it is convincingly established that at the priority date of the patent the STEP test (D22) was the commonly used standard (common general knowledge) to determine the EPD of multiple nickel layers by means of an electrometer. A skilled person thus considers this test when reading the patent. Therefore, the fact that the patent does not mention this test does not give rise to a lack of sufficiency of disclosure.

3.5 (b) Adjusting the electric potential of the **noble potential nickel plating layer** such that the EPD between the nickel layers is in the claimed range

According to the patent, the EPD is adjusted by adding an electric potential adjuster to the plating bath for forming the noble potential plating layer (see paragraphs [0028] and [0029]; chloral hydrate is used in the examples; see [0046]). It is true that the patent does not specify the amounts of chloral hydrate added to the noble nickel plating solutions of the examples.

However, the patent explains that there is a direct relation between the amount of the electric potential adjuster and the EPD in Table 1 (see paragraph [0046]: "the additive amount of the electric potential adjuster was adjusted to be the potential differences"). The task of adjusting the amount of chloral hydrate in the

noble nickel plating solution until the EPD criterion is fulfilled is a routine task and does not put an undue burden on the skilled person. In examples 6 and 7 and comparative examples 3, 4 and 7, in which the required EPD is not achieved, the amount of chloral hydrate was obviously insufficiently adjusted.

As far as the respondents made reference to the effect of further additives like carbon on the EPD (reference was made to D1, page 151, Table 3.1), these additives are - contrary to the information in Table 1 of D1 - part of the chrome plating solution and not of the noble nickel plating solution.

3.6 (c) Producing the **trivalent chrome plating layer** with the claimed carbon content and microporous density

The respondents argued that the chrome plating solutions in the examples were not described with all the information needed to repeat the step of forming the trivalent chrome plating layer. While the respondents did not question that the invention could be repeated if a research program were set up, they considered this to be an undue burden for the skilled person. Their objections regarding missing information where threefold:

- The "TriChrome Plus process made of Atotech Deutschland GmbH" as used in the examples (see paragraph [0047] of the patent) was not further explained or part of the common general knowledge.
- The amount and species of additives in the chrome plating solution (to achieve the carbon, iron and oxygen content) were not revealed in the examples.
- It was not explained how to achieve the claimed microporous density of the chrome plating layer.

The Board is not convinced by these arguments. The invention can be carried out on the basis of the information in the patent and the common general knowledge. This is elaborated on further in the following paragraphs.

3.6.1 For the examples according to the invention (1 to 5), the chrome plating layer was produced by the "TriChrome Plus process made of Atotech Deutschland GmbH". This process is indeed not further explained in detail in the patent.

The TriChrome Plus process is a commercially applied process for forming a trivalent chrome plating layer; this is undisputed. It is mentioned, for example, in the textbook on "Chromium plating" (D1, page 83, point 2.4.2) as being "on the market [...] for general applications". Like in the patent, it was not considered necessary in D1 to specify the details of this plating process. Consequently, the process is considered to be commonly known to a skilled person. Whether this commercial process has been modified over time is irrelevant here, since it produces a trivalent chrome plating layer in any case. The carbon content and the microporous density can be adjusted independently.

Moreover, neither claim 1 nor claim 9 requires the TriChrome Plus process to be the only chrome plating process feasible for the invention. D1 discloses that various other trivalent chrome plating processes are commercially available (see again D1, chapter 2.4.2, "Cr(III) processes"). The patent also discloses alternatives. Comparative example 7 uses the "Envirochrome process made of Canning Japan

K.K." (paragraph [0047]). The fact that comparative example 7 does not fall under the invention (the EPD value and the carbon content are too low) is not sufficient proof that the Envirochrome process or other trivalent chrome plating processes are not feasible for the invention, since this could well be related to the amount of additives used.

3.6.2 The respondents also argued that the allegedly known TriChrome Plus process was further modified by the addition of carbon, iron and oxygen, for which neither the precursor material in the plating solution nor its concentration was defined. The invention defined in claim 1 solely considers carbon as an additive.

The respondents did not dispute that additives for chrome plating solutions to increase the carbon content (as well as the oxygen or iron content) in the plating layer are generally known in the art. The Board considers the adjustment of the amount of carbon using such additives in the plating solution to be a routine exercise for a skilled person in view of the known target values disclosed in Table 1 of the patent. Moreover, the respondents had not shown that the choice of the additives acting as a carbon source was critical to the invention.

It is true that claims 1 and 8 solely mention carbon as an additive element in the chrome layer, while the examples of the invention also indicate that iron and oxygen are present. However, claims 1 and 8 do not exclude the presence of the further elements. Whether further element species have to be included in the subject-matter of the independent claims is thus not an issue of sufficiency of disclosure.

Whether this may have an impact on the formulation of the objective technical problem if assessing compliance with Article 56 EPC will, after remittal (see point 4. below), be up to the opposition division to decide.

3.6.3 Finally, the respondents argued that the patent did not disclose the amount and size of the fine particles to be added to the noble nickel layer plating solution in order to promote the formation of the density of "fine pores" in the chrome plating layer. The term "fine pores" was solely characterised in the patent as being a "microporous" structure (paragraphs [0010] and [0017]). Furthermore, according to example 5, fine particles were not even essential for achieving the microporous density claimed.

The fact that the microporous density is already achievable without using any particles at all (as reported in example 5) shows that the information on the particle size and distribution is not critical for achieving the claimed microporous density according to the invention. Claims 1 and 8 do not require the use of fine particles either. For this reason alone, the absence of this information cannot be an issue of insufficient disclosure.

A lack of sufficient disclosure does not arise even if the examples 1 to 4 (using fine particles) are considered. Selecting and applying fine particles in the nickel plating solution in order to impart a certain microporous density on the subsequent chrome plating layer is part of the common general knowledge. This is described, for example, in textbooks D1 and D34 (see D1, pages 147 to 149: "Porous chromium and microcracks by nickel solutions" and D34, pages 288 and 289: "Micro-porous chromium"). Like in embodiments of

the patent, fine silica particles are used as additive to the nickel plating solution. D34 describes that a minimum of 20 000 pores/ cm^2 ("200 pores/mm^2") allows for a "reasonable corrosion resistance" and e.g. 80 000 pores/ cm^2 allows for "good performance". D1 mentions an optimum range "between 16. 000 and 48 000 pores/ cm^2"). The particle size of the fine particles disclosed in D34 is "approximately 0.02 µm". As to the amoun and the particle size and its distribution, it is further stated that these "must be controlled and agglomeration must be avoided", i.e. these selections are within the knowledge of the skilled person.

The Board is not persuaded by the respondents argument that examples 8 and 9 and comparative example 3 did not produce fine pores at all, or at least not in the claimed range, meaning that the conditions for forming the fine pores in the claimed range were not sufficiently disclosed this is not persuasive.

All of the examples and comparative examples in the patent use slightly different compositions of the plating solution, as is apparent either explicitly from Table 1 or - as explained above - implicitly from the resulting microporous density and EPD values in Table 1.

3.6.4 The respondents failed to sufficiently demonstrate the alleged strong interrelation of the EPD of the nickel layers and the carbon content and the microporous density of the chrome layer such that the examples of the invention could not be repeated by a skilled person without undue burden. As there are embodiments of the invention disclosed in the patent (examples 1 to 5) which the respondents also failed to show are not credible or not repeatable without undue burden, the

comparative examples falling outside the claims do not call the sufficient disclosure of the invention into question.

4. Remittal

In their notice of opposition both respondents raised further objections under the ground of opposition pursuant to Article 100(a) in conjunction with Article 56 EPC. However, the decision under appeal was solely based on the grounds of opposition under Article 100(b) and (c) EPC.

The parties unanimously requested that the case be remitted to the opposition division.

Not remitting the case to the opposition division would mean the Board having to take a first and final decision on inventive step in opposition-appeal proceedings instead of reviewing the decision in a judicial manner, which is the primary object of the appeal proceedings (Article 12(2) RPBA 2020).

Therefore, special reasons pursuant to Article 11 RPBA 2020 present themselves, and the case is - following the parties' respective requests - remitted to the opposition division for further prosecution under Article 111(2) EPC.

5. Reimbursement of the appeal fee

The appellants requested that the appeal fee be reimbursed pursuant to Rule 103(1)(a) EPC by reason of a substantial procedural violation. They argued that

reimbursement was equitable because the decision to revoke the patent under Article 83 EPC had been based on arguments on which they did not have chance to comment. Therefore, the appellants' right to be heard had been violated. The arguments in question related to missing information in the patent - in particular in paragraphs [0045] to [0047] - since the patent allegedly failed to sufficiently define critical parameters such as:

- the concentration of the electric potential adjuster
- the parameters related to the fine particle, such as size and amount
- the complete details of the TriChrome Plus process, in particular the composition of the plating solution

5.1 First, it is noted that respondent 1 already submitted arguments related to these points in writing before the oral proceedings by letter dated 27 November 2020, meaning that the appellants' had been in a position to comment on these arguments.

5.2 But even if it were considered - for the sake of argument - that these arguments had been raised (at least partly) for the first time only at the oral proceedings before the opposition division, no violation of the appellants' right to be heard is apparent from the minutes or the decision under appeal.

5.2.1 If no party objects to the contents of the minutes, as in the case in hand, they are regarded as true record of the events during the oral proceedings.

According to the minutes, the appellants did not argue that they had been surprised by respondent 1's arguments, nor did they indicate that they required more time to consider them. Instead, these arguments were discussed during the proceedings and refuted by the appellants by substantive counter-arguments (see minutes, point 8.2: "Regarding the alleged missing information ...").

5.2.2 The appellants' argument that their opportunity to comment under Article 113(1) EPC had been insufficient at such short notice is not persuasive either.

In this situation of an alleged violation of the right to be heard at oral proceedings the appellants had access to various procedural options, including:

- a request that respondent 1's arguments not be admitted
- a request for more time to consider the arguments
- a request for adjournment of the oral proceedings

It is not apparent from the minutes or the decision under appeal that the appellants in any way addressed a violation of their right to be heard during the oral proceedings before the opposition division. Nor did they submit any of the above procedural requests.

The Board thus concludes that the appellant had sufficient opportunity to comment on respondent 1's arguments during oral proceedings.

5.3 Therefore, the appellants' right to be heard under Article 113(1) EPC was not violated. Reimbursement of the appeal fee under Rule 103(1)(a) EPC is thus not equitable.

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 for further prosecution.
3. The request for reimbursement of the appeal fee is refused.

The Registrar: The Chairman:

C. Spira C. Herberhold

Decision electronically authenticated