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**Datasheet for the decision  
of 30 January 2025**

**Case Number:** T 0298/23 - 3.2.01

**Application Number:** 10823928.6

**Publication Number:** 2488777

**IPC:** F16L15/00, E21B17/042

**Language of the proceedings:** EN

**Title of invention:**

WEDGE THREADS WITH A SOLID LUBRICANT COATING

**Patent Proprietor:**

Hydril Company

**Opponent:**

VALLOUREC OIL AND GAS FRANCE

**Headword:**

**Relevant legal provisions:**

EPC Art. 54(1), 54(3), 56, 100(a), 100(b)  
RPBA 2020 Art. 12(4), 13(1), 13(2), 15(1)

**Keyword:**

Grounds for opposition - insufficiency of disclosure (no) -  
novelty (yes) - inventive step (yes)  
Admittance of documents with statement of grounds of appeal -  
D13, D14, D16 (yes), D15 (no)  
Admittance of submissions and document after Art. 15(1) RPBA  
communication (no)

**Decisions cited:**

T 2350/16

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
**Chambres de recours**

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Case Number: T 0298/23 - 3.2.01

**D E C I S I O N**  
**of Technical Board of Appeal 3.2.01**  
**of 30 January 2025**

**Appellant I:** Hydril Company  
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**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
14 December 2022 concerning maintenance of the  
European Patent No. 2488777 in amended form.**

**Composition of the Board:**

**Chairman** G. Pricolo  
**Members:** B. Spitzer  
M. Blasi

## Summary of Facts and Submissions

- I. Both the opponent and the patent proprietor filed an appeal against the interlocutory decision of the opposition division finding that the European patent No. 2 488 777 as amended according to the third auxiliary request, the claims of which had been filed during the oral proceedings, meets the requirements of the EPC.
- II. The opposition had been filed against the patent as a whole on the basis of the grounds for opposition under Article 100(a) EPC together with Article 54 EPC (lack of novelty) and Article 56 EPC (lack of inventive step), under Article 100(b) EPC and Article 100(c) EPC.
- III. The documents cited in this decision include the following:
- D1: WO 2011/048455 A2
  - D2: US 2008/0054633 A1
  - D4: EP 1 046 779 A1
  - D10: US 6,971,681 B2
  - D13: Chambers Material Science and Technology Dictionary, P.M.B. Walker et al., Chambers Harrap Publishers Ltd, 1993
  - D14: Hawley's Condensed Chemical Dictionary, Van Nostrand Reinhold Company Inc., 1987
  - D15: The Chemistry of Corrosion Protection and Anti-Corrosion Coatings, Prospector<sup>®</sup>, Wally Kesler, September 2017
  - D16: Principles of Corrosion Engineering and Corrosion Control, Z. Ahmad, Elsevier Ltd., 2006
  - D17: Lubrifiants - Constitution, Techniques de l'ingénieur, Ref.: BM5341 V1, Jean Ayel,

10 July 1997

- IV. A communication of the Board pursuant to Article 15(1) RPBA was sent on 19 December 2024.
- V. The opponent filed further submissions with letters dated 9 January 2025 and 17 January 2025, the latter including document D17.
- VI. Oral proceedings before the Board were held on 30 January 2025.
- VII. Appellant I (patent proprietor) requested
- that decision under appeal be set aside and the opposition be rejected, i.e. that the patent be maintained as granted,
  - or, in the alternative, that the decision under appeal be set aside and that the patent be maintained as amended on the basis of the claims of auxiliary requests 1 or 2 filed with its statement of grounds of appeal on 21 April 2023,
  - or, that the patent be maintained as amended in the form of the third auxiliary request, as considered allowable by the opposition division,
  - or, that the decision under appeal be set aside and that the patent be maintained as amended on the basis of the claims of one of auxiliary requests 4 to 6 filed with its reply on 11 September 2023, or, on the basis of the claims of one of auxiliary requests 4b, 5b, 6b, filed on 10 June 2024, or on the basis of the claims of one of auxiliary requests 7 to 9 filed with its reply on 11 September 2023, or, on the basis of the claims of one of auxiliary requests 10 to 30, filed on 4 August 2022, or, on the basis of the claims of auxiliary requests 29b or 30b, filed on

10 June 2024.

Appellant I further requested the admittance of documents D13 to D16 and non-admittance of document D17 and of the associated submissions into the appeal proceedings.

Appellant II (opponent) requested that the decision under appeal be set aside and that the patent be revoked. Appellant II further requested that documents D13 to D16 and auxiliary requests 1, 2, 4 to 6, 4b, 5b, 6b, 7 to 30, 29b and 30b not be admitted and that document D17 and the associated submissions be admitted into the appeal proceedings.

VIII. Independent claims 1 and 14 of the patent as granted have the following wording (the feature references used by the opposition division are included in square brackets):

"**[a]** 1. A tubular connection comprising:  
**[b]** a pin member having external wedge threads configured to engage a box member having corresponding internal wedge threads; and  
**[c]** a solid lubricant coating permanently bonded on at least one of the internal and external wedge threads, wherein either  
**[d]** the solid lubricant coating comprises at least two material layers, **[e]** wherein at least one of the at least two layers comprises a corrosion inhibiting coating and **[f]** at least one of the at least two layers comprises a dry lubricant coating;  
or  
**[g]** the solid lubricant coating is a dry corrosion inhibiting coating combined **[h]** with a dispersion of

particles of solid lubricant therein ."

"14. A method of manufacturing a tubular connection having wedge threads according to claim 1, the method comprising:

machining internal wedge threads on a box member and external wedge threads on a pin member, wherein the internal and external wedge threads are configured to correspond;

and

permanently bonding a solid lubricant coating on at least one of the internal and external wedge threads, wherein either

the solid lubricant coating comprises at least two material layers, wherein at least one of the at least two layers comprises a corrosion inhibiting coating and at least one of the at least two layers comprises a dry lubricant coating;

or

the solid lubricant coating is a dry corrosion inhibiting coating combined with a dispersion of particles of solid lubricant therein."

IX. The parties' arguments, where relevant to this decision, can be summarised as follows.

(a) Admittance of documents D13 to D15 filed with the patent proprietor's statement of grounds of appeal

(i) Opponent

Documents D13 to D15 should not be admitted into the proceedings since they were late-filed and should have been filed earlier. In addition, they did not relate to a corrosion inhibiting coating as claimed but to inhibitors. Therefore, these documents were not

relevant.

(ii) Patent proprietor

Documents D13 to D15 should be admitted into the proceedings. They were filed for the first time in appeal as a direct response to the decision under appeal. These documents represented the skilled person's common general knowledge for the interpretation of document D1, i.e., that the epoxy resin layer was not a dry "corrosion inhibiting" coating. These documents were simple and referred to an essential feature of the claim.

(b) Admittance of document D17 filed by the opponent with its letter dated 17 January 2025 and the related submissions regarding the copper plating layer of document D1 filed with the appellant's letters of 9 January 2025 and 17 January 2025

(i) Opponent

The arguments based on the alternate embodiment in paragraph [0029] of document D1, specifically the copper plating layer, should be admitted. They were presented in letters dated 9 January 2025 and 17 January 2025, along with document D17 filed on 17 January 2025 as proof that copper was a corrosion inhibitor. The patent proprietor first raised the distinction between "corrosion resistant" and "corrosion inhibiting" in its statement of grounds of appeal. This constituted exceptional circumstances. Furthermore, document D17 was not complex and showed that soft metals like copper inhibited corrosion. Point I.3. of the letter dated 25 June 2024, stated only that the arguments were not, at that point, based



on the embodiment of paragraph [0029] of document D1.

(ii) Patent proprietor

The new submissions concerning the alternate embodiment with the copper plating layer disclosed in paragraph [0029] of document D1 and document D17, filed in favour of these arguments, should not be admitted in accordance with Article 13(2) RPBA since they were filed for the first time after the Board's communication under Article 15(1) RPBA. These arguments had never been presented before. On the contrary, in point I.3. of its letter dated 25 June 2024, the opponent explicitly stated that its arguments were not based on the embodiment disclosed in paragraph [0029] of document D1. They could and should have been filed with the reply to the patent proprietor's statement of grounds of appeal. Since then, no circumstances have arisen that could justify the late filing of these submissions and document D17. In addition, further search and time would be required for a proper counter-argumentation. Moreover, the content of document D17 did not support the opponent's argument that a copper plating layer was considered a corrosion inhibiting layer since the paragraph referred to by the opponent merely enumerated various corrosion inhibiting additives and alongside a list of soft metals. It was unclear whether the soft metals were mentioned in the context of corrosion inhibiting additives.

(c) Patent as granted: Novelty vis-à-vis  
Article 54(3) EPC-document D1

(i) Opponent

The subject-matter of claim 1 as granted was not new via-à-vis document D1, state of the art under Article 54(3) EPC.

The term "corrosion inhibiting layer" of claim 1 as granted was equivalent to "corrosion resistant layer". There was no difference between these terms.

The patent did not provide a definition for the term "corrosion inhibiting" (see patent, paragraphs [0019], [0022], [0023]). It did not even provide an example. The coating, comprising an epoxy resin containing particles of zinc disclosed in paragraph [0019] of the patent, was not directly linked to the corrosion inhibiting properties. The patent proprietor's limiting definition *a posteriori* was not acceptable.

Instead, the Merriam-Webster dictionary defined the noun "resist" as "*something (such as a coating) that protects against a chemical, electrical, or physical action*" and the verb "inhibit" amongst others as "*to prohibit from doing something*". In view of these definitions, the resistance effect was attributed to both chemical and physical action. As such, the "corrosion resistance" disclosed in document D1 covered a chemical action as the result to be achieved. "Corrosion inhibiting" simply implied to prevent a reaction and the verb "prevent" was used in paragraph [0019] of document D1 in the context of "corrosion resistance".

All these terms provided the same desired effect, since the documents in question did not limit them. The aim was at worst to slow down corrosion and at best to stop it. No structural limitation was implied with the feature "corrosion inhibiting coating" in claim 1 as

granted.

The documents D13 and D14 filed by the patent proprietor were not relevant in the current case since they only dealt with inhibitors and thus, additives, but not with corrosion inhibiting coatings. The patent itself did not disclose inhibitors. Document D16 only disclosed zinc as a metal more anodic than iron to prevent the corrosion of iron as an alternative method.

Consequently, the epoxy layer disclosed in document D1 was a corrosion inhibiting layer.

Based on this interpretation of the term "corrosion resistant", both alternatives R1A (features d to f) and R1B (features g and h) of claim 1 as granted were anticipated by document D1 (see document D1, Figure 2, paragraphs [0018] to [0028]).

If the term "corrosion resistant" was considered as a more generic term compared to "corrosion inhibiting", the case law on selection from lists could not be used to establish novelty because it was only a selection of a maximum of two or more elements, namely corrosion resistance as physical barrier and corrosion inhibition as chemical reaction (see decision T 2350/16).

Even if the term "corrosion resistant" was considered as being based on a different mechanism, namely a chemical or electro-chemical reaction reducing the corrosion rate, compared to "corrosion inhibiting", the subject-matter of claim 1 was still not new over document D1, which in paragraph [0029] disclosed a copper plating layer, the latter being a corrosion inhibiting layer, as evidenced by document D17.

The same arguments applied *mutatis mutandis* for claim 14 as granted.

(ii) Patent proprietor

Document D1, state of the art under Article 54(3) EPC, did not anticipate the subject-matter of claim 1.

In particular, document D1 did not disclose a corrosion inhibiting layer according to features e and g of claim 1 as granted. Specifically, both options R1A and R1B of claim 1 required a corrosion inhibiting coating. The opposition division had considered this coating to be present because of the first coating 310 of document D1, being, for example, an epoxy.

Corrosion resistance was not the same as corrosion inhibition. Corrosion resistance was a general term which was achieved by providing a barrier between the corroding agent and the substrate to be protected. In contrast, corrosion inhibition was a very specific term, meaning the chemical process of reducing the rate of corrosion. An "inhibitor" was a term generally known in chemistry, as shown by documents D13 and D14. Moreover, the patent gave an example for a corrosion inhibiting coating, namely an epoxy with zinc particles (see patent, paragraph [0019]). This difference was confirmed by document D16, which disclosed an epoxy as a corrosion resistant coating and disclosed zinc used in corrosion inhibiting coatings.

It was not a selection of a list as alleged by the opponent, since document D1 did not provide these two options.

Moreover, document D1 did not disclose the two layers

according to the first claimed embodiment R1A of claim 1 as granted, in particular, because the layers in document D1 were arranged side-by-side and not on top of each other.

(d) Sufficiency of disclosure (Ground for opposition under Article 100(b) EPC)

(i) Opponent

According to the opposition division (see decision under appeal, point 44) and the patent proprietor, the teachings of documents D4 and D10 were incompatible due to the negative effects of a coating on wedge threads, such as tight tolerances, reliability of the connection and full make up timing.

However, the patent pretended to exactly overcome these disadvantages without disclosing any corresponding technical feature (see patent, paragraphs [0010], [0026], [0028] and [0030]). Therefore, if the coating disclosed in document D10 for threaded joints could not be used for wedge threads as disclosed in document D4, an essential feature was missing, and the invention was insufficiently disclosed. The patent did not disclose why the coating as claimed worked for a wedge thread. Consequently, the claimed invention was insufficiently disclosed.

(ii) Patent proprietor

It was not impossible to combine features from documents D4 and D10, but their disclosures were so dissimilar that there was no suggestion that combining them might lead to the advantages achieved by realising the features of one in the context of the other. That

was different from the question of sufficiency of disclosure. For the claimed invention to be sufficiently disclosed, the skilled person merely needed to apply the claimed coating to a wedge thread. The opponent did not raise serious doubts substantiated by verifiable facts. In addition, the negative effects alleged by the opponent were not part of claim 1 as granted. The opponent had not expressed what feature of claim 1 could not be achieved. For inventive step the could-would approach was used. The could-part referred to sufficiency of disclosure while the would-part was relevant for inventive step. The claimed invention was sufficiently disclosed.

(e) Patent as granted: Inventive step in view of documents D4 and D10

(i) Opponent

The subject-matter of claim 1 as granted was not inventive starting from document D10 in combination with document D4.

Document D10, which was a document from the same technical field, was concerned with threaded pipes, particularly adapted for forming a threaded joint to join pipe segments into strings used in the oil and gas extraction industry (see document D10, paragraph [0010]). Document D10 was not primarily concerned with coatings but with threaded joints. The examples given in document D10 were two premium connections A and B (see document D10, column 5, lines 1 to 23). These premium connections were free-running threads, they provided already a metal-to-metal seal and torque shoulder. Therefore, it was a closest prior art for the evaluation of inventive step.

The subject-matter of claim 1 as granted differed from document D10 only in feature b, i.e., that the tubular connection was a wedge thread. The technical effect of the distinguishing feature was a better sealing property of the thread. This was acknowledged in paragraph [0004] of the patent which disclosed that in wedge threads, a thread seal may be accomplished through contact pressure caused by interference that occurs at make up over at least a portion of the connection between pin load flank and box load flank and between pin stab flank and box stab flank. Therefore, the objective technical problem to be solved was to improve the sealing properties of the thread.

The person skilled in the art would have considered document D4 since both documents were from the same field. The threaded joint of document D10 and the wedge thread of document D4 only differed in the axial distance, i.e., varied in thread width, but not in the form of the joint. Moreover, the starting point in document D4 was a threaded tubular connection (see document D4, paragraph [0002]) and document D4 addressed the problem of the axial control of the connection at final make up for wedge threads (see document D4, paragraphs [0003] and [0004]). In addition, document D10 explicitly disclosed that the coating could be applied to every type of thread and every type of joint (see document D10, column 5, lines 36 to 40).

Furthermore, documents D10 and D4 addressed the same technical problems, such as elimination of pipe dope due to environmental reasons and plastic deformation (see document D10, column 1, lines 35 to 54; see document D4, paragraphs [0025] and [0026]), improved

sealing (see document D10, column 5, lines 1 to 34; see document D4, paragraph [0003]), improved galling resistance (see document D10, column 1, lines 11 to 12; see document D4, paragraph [0003]).

Since document D4 disclosed a wedge thread as a solution to the above-mentioned objective technical problem, the person skilled in the art would have adapted the thread known from document D10 accordingly and would have arrived at the claimed solution.

There was no contra-indication, as stated by the opposition division and as argued by the patent proprietor. The patent proprietor's arguments regarding high torques, tight tolerances, and wear characteristics were not part of the objective technical problem and would not have prevented the person skilled in the art from applying the coating known from the premium connections in document D10 to the wedge threads known from document D4.

On the contrary, the person skilled in the art was aware of the difficulties in sealing non-wedge threads, such as the free-running threads disclosed in document D10. This was e.g. acknowledged in document D2, paragraph [0009]. Thus, the state of the art suggested to the skilled person that transforming a non-wedge thread - such as connections A and B in document D10 - into a wedge thread, as in document D4, could improve sealing the thread. Since the coating was already disclosed in document D10, the person skilled in the art would have arrived at the claimed invention.

The subject-matter of claim 1 as granted was also not inventive starting from document D4 in combination with document D10.



The starting point was the embodiment of Figure 6 of document D4. The subject-matter of claim 1 as granted differed from this embodiment in features c to g, namely the solid lubricant coating. The technical effect was to avoid excess pipe dope and, thus, plastic deformation in the threaded sections (see patent, paragraph [0027]). The same effect was achieved in document D4 by a helical relief groove which was located at the root/crest interface to ensure that pipe-dope entrapment did not plastically deform the connection during power-tight make-up (see document D4, paragraph [0025] and Figure 6). Therefore, the objective technical problem was simply to find an alternative solution to prevent plastic deformation in the threaded sections.

Document D10 dealt with the same objective technical problem. According to column 1, lines 43 to 53 of document D10, *"overdoping" "has the consequence that, during make up of the connector, the excess of dope cannot be evacuated through the end of the threaded portions of the pipe segments. The trapped dope can thus develop high pressure within the connector, and under circumstances such pressure is able to produce plastic deformation of the pipe segments in the threaded portion and even the collapse of the male member of the joint."* As a solution to the above-mentioned objective technical problem, document D10 disclosed a solid lubricant coating according to features c to h of claim 1 as granted. For the same reasons as mentioned above, the skilled person would have combined the teachings of documents D4 and D10. These documents were from the same technical field and the solid lubricant coating of document D10 was

suitable for all type of threads (see document D10, column 5, lines 36 to 40). Furthermore, if the only contribution of the invention was to propose an alternative solution, there would be no need to justify the selection of that solution. Therefore, the person skilled in the art would have applied the solid lubricant coating disclosed in document D10 to the wedge thread known from document D4 and thus, would have arrived at the claimed invention.

The arguments for claim 1 as granted applied *mutatis mutandis* for claim 14 as granted.

(ii) Patent proprietor

The subject-matter of claim 1 as granted was not rendered obvious by a combination of documents D10 and D4. This also applied to the subject-matter of claim 14 as granted.

Starting from document D10 the objective technical problem was not how to provide a thread seal as alleged by the opponent. The opponent's formulation of the objective technical problem already contained a pointer to the solution, since there were many ways to seal a connection. This resulted in an *ex post facto* view. The objective technical problem had to be reformulated in a more general way. The objective technical problem was the improvement of the reliability of the thread connection, in general, which comprised the sealability of the connection. These issues were addressed in paragraphs [0027] and [0028] of the patent. The solution according to claim 1 as granted was the use of a solid lubricant coating instead of a pipe dope.

Without knowledge of the invention, the person skilled

in the art would not have applied the solid lubricant coating disclosed in document D10 in the context of a premium connection (see document D10, column 5, lines 1 to 23) to a wedge thread as known from document D4 since these two types of connections were completely different. The threads of the premium connections in document D10 had a constant distance, were free-running and a torque only occurred at shouldering, while the wedge threads in document D4 required tight tolerances between engaging thread surfaces and had to withstand increased torque during make-up (see document D4, paragraph [0003]; patent, paragraphs [0026] and [0027]).

Although document D10 mentioned in column 5, lines 37 to 40 that a solid lubricant coating could be applied to every type of thread and every type of joint this referred to the cylindrical or frusto-conical shape of the envelope of the peaks of the threads and not to the axial dimension of the thread. There was no specific disclosure that the coating was suitable for wedge threads.

The opponent's argument that documents D10 and D4 addressed the same technical problems had to be considered in relation to the corresponding threads and their corresponding circumstances. For example, document D10 addressed the occurrence of galling in threads in sliding contact, which was not comparable to the resistance to galling in wedge threads with full-surface contact and high torques.

The person skilled in the art would not have applied the solid lubricant coating known for premium connections in document D10 to the wedge threads known from document D4. Not only was there no expectation of

success, but there were also clear disincentives, such as high torques, significant wear during multiple make and breaks, and the required tight tolerances in wedge threads (see document D4, paragraph [0003]; see patent, paragraphs [0026] and [0027]).

Without hindsight, the person skilled in the art would not have arrived at the claimed invention.

Starting from document D4, the subject-matter of claim 1 as granted differed in features c to h. Even if the objective technical problem was to find an alternative to the groove in Figure 6 of document D4, the skilled person would not have replaced the pipe dope by a solid lubricant coating. This constituted pure hindsight. Replacing the pipe dope with a solid lubricant coating, the skilled person would have lost the benefits provided by the pipe dope (see patent, paragraphs [0005] and [0006]; see document D4, paragraph [0003]). In addition, there were clear disincentives for the person skilled in the art to use the solid lubricant coating known for non-wedge threads on wedge threads, as mentioned above.

### **Reasons for the Decision**

1. Admittance of documents D13 to D15 filed with the patent proprietor's statement of grounds of appeal
- 1.1 Documents D13 to D16 were filed for the first time with the patent proprietor's statement of grounds of appeal. Thus, they are to be regarded as an amendment of its appeal case in the sense of Article 12(4), first sentence, RPBA, and may be admitted only at the discretion of the Board (Article 12(4), second

sentence, RPBA). The Board shall exercise its discretion in view of, *inter alia*, the complexity of the amendment, the suitability of the amendment to address the issues which led to the decision under appeal, and the need for procedural economy (Article 12(4) RPBA).

- 1.2 The documents D13 and D14, pre-published specialised dictionaries, describe an inhibitor in general and document D16, a pre-published reference book, is about corrosion control by inhibition. These documents are short, present the skilled person's common general knowledge at the time of filing the patent and address the disputed feature, "a corrosion inhibiting coating" of claim 1 as granted vis-à-vis the term "corrosion resistant" of document D1.

Therefore, the Board admitted documents D13, D14 and D16 into the proceedings in accordance with Article 12(4) RPBA.

- 1.3 Document D15 is a document published in 2017 i.e., seven years after the priority date of the patent. Thus, it does not represent the skilled person's common general knowledge at the date of filing of the application on which the patent in suit was granted and is not relevant for the present case.

Therefore, the Board did not admit document D15 into the proceedings in accordance with Article 12(4) RPBA.

2. Admittance of late-filed document D17 and associated submissions

- 2.1 The opponent's arguments based on the alternate embodiment with the copper plating layer in

paragraph [0029] of document D1 were filed for the first time with its letters dated 9 January 2025 and 17 January 2025. Document D17 was filed as evidence for the copper plating layer of document D1 being considered as corrosion inhibiting layer with the opponent's letter of 17 January 2025. Accordingly, document D17 and the associated submissions constitute an amendment to the opponent's appeal case made after notification of the communication under Article 15(1) RPBA.

- 2.2 In accordance with Article 13(2) RPBA such an amendment shall, in principle, not be taken into account unless there are exceptional circumstances, which have been justified with cogent reasons by the party concerned.
- 2.3 Even if taking into account the filing of the patent proprietor's arguments concerning the feature "corrosion inhibiting layer" of claim 1 as granted for the first time with its statement of grounds of appeal, the opponent could and should have filed document D17 and the associated submissions in relation to "corrosion inhibiting coating" with its reply to the patent proprietor's statement of grounds of appeal. The Board did not see any exceptional circumstances which justified the late filing 13 days prior to the oral proceedings.
- 2.4 In exercising its discretion under Article 13(2) RPBA, the Board may also take into account criteria applicable as set out in Article 13(1) RPBA. One of these criteria requires a party in the case of an amendment to demonstrate that the amendment, *prima facie*, overcomes the issues and does not give rise to new objections.

- 2.5 The copper plating layer of paragraph [0029] of document D1 is disclosed as corrosion-resistant alloy. Document D17 was filed by the opponent as evidence that it was also a corrosion inhibiting layer. However, as stated by the patent proprietor, document D17 does not unambiguously disclose that a copper plating layer is a corrosion inhibiting layer. Chapter 3.1.3.1 of document D17 discusses organic matrix coatings and states that some of these coatings contain corrosion inhibiting additives, providing examples of such additives. It also mentions soft metal powders and flakes, including copper. However, there is not a direct disclosure that the soft metals are presented as examples for corrosion inhibiting additives.
- 2.6 In view of these considerations, the Board found that document D17 did not *prima facie* constitute a disclosure supporting the allegation that the copper plating layer in document D1 was a corrosion inhibiting layer. Therefore, the submissions associated with document D17 were not considered *prima facie* relevant for the consideration of novelty of the claims as granted vis-à-vis document D1.
- 2.7 The Board therefore decided not to admit document D17 and the associated submissions into the appeal proceedings under Article 13(2) and (1) RPBA.
3. Patent as granted: Novelty in view of Article 54(3) EPC-document D1 (ground for opposition under Article 100(a) EPC in combination with Article 54 EPC)
- 3.1 Document D1, which entered into the national phase before the EPO as EP 2 486 317, is state of the art

under Article 54(3) EPC.

3.2 The claim 1 as granted has two options. Option 1 referred to by the parties as R1A comprises features a to c and d to f; option 2 referred to by the parties as R1B comprises features a to c and g and h. Both options R1A and R1B of claim 1 as granted require a corrosion inhibiting coating (features e and g). The opposition division had considered this coating to be present in document D1 because of the first coating 310 of document D1, being, for example, an epoxy (see decision under appeal, Reasons, point 19). It is in particular disputed whether document D1 discloses a corrosion inhibiting coating.

3.3 Therefore, a core issue is the interpretation of the term "corrosion inhibiting coating" in the context of the features of claim 1 as granted and the term "corrosion resistant" in the context of document D1, in particular, the epoxy coating.

3.3.1 The Board shares the patent proprietor's view that the term "corrosion inhibiting" used in the patent and the term "corrosion resistant" used in document D1 are not synonyms, but describe different concepts. Although the term not being defined in the patent, the patent gives an example for a corrosion inhibiting layer, which is an epoxy layer with particles of zinc (see patent, paragraph [0019], claim 2). "Corrosion inhibiting" in the patent is related to an (electro-)chemical reaction which slows down or prevents corrosion, while the term "corrosion resistant" in document D1 refers to a barrier layer which resists corrosion.

3.3.2 This is supported by documents D13 (Chambers Materials Science and Technology Dictionary) and D14 (Hawley's



Condensed Chemical Dictionary). The Board does not share the opponent's view that the dictionaries D13 and D14 were not relevant since they defined the term "inhibitor" whereas the patent did not disclose inhibitors but a "corrosion inhibiting coating". Although it is not contested that the patent itself does not mention "inhibitors", but rather a corrosion inhibiting coating and corrosion inhibiting properties, the mechanism for inhibition is the same in the current context - namely, to retard or prevent a reaction, as opposed to forming a barrier.

- 3.3.3 The above interpretation is also supported by document D16, a handbook "Principles of Corrosion Engineering and Corrosion Control" filed by the patent proprietor. Although the opponent argued that document D16 distinguishes between the use of inhibitors and the use of metals more anodic than iron, the Board notes that document D16 makes a clear distinction between applying coatings having high resistivity, such as epoxies, on the one hand, and preventing corrosion by using inhibitors or metals more anodic than iron on the other hand.
- 3.3.4 The Board is not convinced by the opponent's view that a corrosion inhibiting coating and a corrosion resistant coating were synonyms. The Merriam-Webster definitions filed by the opponent according to which "resist" means "*something (such as a coating) that protects against a chemical, electrical, or physical action*" and "inhibit" means "*prohibit from doing something*" are in line with the above interpretation.
- 3.3.5 The terms "corrosion resistant" and "corrosion inhibiting" do not provide the same desired effect as alleged by the opponent. The action of slowing down or,

at best, stopping corrosion is attributed to "corrosion inhibiting" as in the patent, while a barrier layer, such as the epoxy coating in document D1, is subsumed under the term "corrosion resistant".

- 3.4 In light of the above interpretation of the term "corrosion inhibiting coating", the Board comes to the conclusion that document D1 does not disclose a corrosion inhibiting coating.
- 3.4.1 The epoxy coating in document D1 is corrosion resistant but does not inhibit corrosion. The epoxy resin disclosed in document D1 is free of a corrosion inhibiting additive and does not have corrosion inhibiting properties.
- 3.4.2 The opponent referred to paragraph [0019] of document D1, which discloses that the chemical coating prevents galling and corrosion of the thread surfaces. However, in light of the above, this is no pointer to a corrosion inhibiting layer. Therefore, the epoxy coating in document D1 does not anticipate features e and g of claim 1 as granted.
- 3.4.3 Furthermore, by referring to decision T 2350/16, the opponent argued that the case law on selection from lists could not be applied here to establish novelty, because it was not a question of (long) lists, as they were used in chemistry, but only of a selection of two or three elements. The Board notes that there is indeed no list, but there are two different concepts. Since document D1 does not disclose the claimed concept of a "corrosion inhibiting coating", document D1 does not take away novelty of the subject-matter of claim 1.

3.5 The same conclusion applies for the subject-matter of claim 14 as granted, directed to a method of manufacturing a tubular connection having wedge threads according to claim 1.

3.6 Conclusion on novelty

The subject-matter of the claims as granted is new over document D1 (Article 54(1) and (3) EPC). Since no other novelty objections had been raised, the ground for opposition under Article 100(a) EPC together with Article 54(1) EPC does not prejudice the maintenance of the patent in its granted version.

4. Sufficiency of disclosure (ground for opposition under Article 100(b) EPC)

4.1 In the context of the considerations relating to inventive step especially in the light of point 44 of the Reasons of the decision under appeal, according to which documents D4 and D10 were incompatible, the opponent raised with its statement of grounds a new objection under Article 100(b) EPC according to which the description was "insufficiently disclosed". By referring to paragraphs [0010], [0026], [0028] and [0030] of the patent, it argued that the patent itself did not solve the problems mentioned in these paragraphs.

4.2 The Board does not share the opponent's view for the following reasons.

4.2.1 First, the requirement of sufficiency of disclosure under Article 100(b) EPC or Article 83 EPC, respectively, relates to the invention which is defined in the claims as the latter define the matter for which

protection is sought, and in particular to the combination of structural and functional features of the claimed invention. There is no legal basis for extending such a requirement also to encompass other technical aspects possibly associated with the invention (such as results to be achieved or technical effects) mentioned in the description but not required by the claimed subject-matter. Therefore, an objection of insufficient disclosure cannot successfully be based on an argument that the application or patent, respectively, would not enable a skilled person to achieve a non-claimed technical effect (see also Case Law of the Boards of Appeal of the European Patent Office, 10th edition, July 2022, "Case Law", II.C.3.2.).

4.2.2 Second, according to established case law, the same level of skill has to be applied when considering sufficiency of disclosure and inventive step. However, when considering the two questions of sufficient disclosure and inventive step, the knowledge of the skilled person differs. For inventive step purposes, the skilled person knows only the prior art; for sufficiency of disclosure, the skilled person knows the prior art and the disclosed invention (see Case Law, I.D.8.3).

4.2.3 The opponent did not submit any specific arguments why the knowledge of the skilled person would not be sufficient for carrying out the invention.

4.3 Conclusion on sufficiency of disclosure

In summary, the claimed invention is disclosed in a manner sufficiently clear and complete for it to be carried out by the person skilled in the art and,

hence, the ground for opposition under Article 100(b) EPC does not prejudice the maintenance of the patent as granted.

5. Patent as granted: Inventive step in view of documents D4 and D10 (ground for opposition under Article 100(a) EPC in combination with Article 56 EPC)

5.1 The opposition division concluded that the subject-matter of claim 1 of the third auxiliary request involved an inventive step. In points 44 and 46 of the Reasons of the decision under appeal, the combination of document D4 and document D10 was addressed, considering both scenarios in which either document D4 or document D10 served as the closest prior art. The Board notes that the opposition division's conclusion regarding the inventive step of the subject-matter of claim 1 of third auxiliary request applies *mutatis mutandis* for claim 1 as granted.

5.2 As stated by the opposition division, the reasoning in relation to inventive step of the subject-matter of claim 1 is comparable for both options, R1A and R1B, of claim 1 as granted. Hence, the following considerations apply to both options R1A (features a to f) and R1B (features a to c, g and h).

5.3 The parties agree that the document D4 discloses a wedge thread according to features a and b of claim 1 as granted and that document D10 discloses a solid lubricant coating according to features c to h of claim 1 as granted for a non-wedge thread (feature a).

5.4 Inventive step starting from document D10 in combination with document D4

5.4.1 Distinguishing features, technical effect and objective technical problem

The parties agree that the subject-matter of claim 1 as granted differs from document D10 in feature b.

The Board shares the patent proprietor's view that the technical effect of a wedge thread is improved reliability of the thread connection, including enhanced sealing (see patent, paragraphs [0004], [0006], [0026] and [0027]). Thus, the objective technical problem is to improve the reliability of the thread connection in general, including the improved sealing of the connection.

The Board is of the opinion that the opponent's formulation of the objective technical problem, to improve sealing of the thread, includes part of the solution offered by the invention, which leads to an *ex post facto* view. Although a thread seal can result from the use of a wedge thread due to the contact pressure between load flanks and stab flanks (see patent, paragraph [0004]), the different mechanisms of wedge and non-wedge threads must be considered. The respective circumstances play a role in the reliability of the connection. Furthermore, sealing properties might be improved through various options, such as optimising the metal-to-metal seal, using a different type of seal, adding additional metal-to-metal seals, etc. Therefore, limiting the technical effect to the sealing of the threads is too narrow for a fair and objective assessment of inventive step.

5.4.2 Obviousness of the solution

The Board refers to the established case law, according

to which, when assessing whether the claimed invention was obvious to the person skilled in the art in view of the closest prior art and the objective technical problem, the Boards of Appeal apply the could-would approach (see Case Law, I.D.5.). Accordingly, it is not decisive whether the skilled person could have arrived at the claimed subject-matter, but rather whether they would have done so in the expectation of a solution to the underlying objective technical problem or in the expectation of an improvement or an advantage.

Concerning the combination of document D10 with document D4, the core question is whether the person skilled in the art would - not only could - have applied the solid lubricant coating known from document D10 to a wedge thread as known from document D4. The sole examples given in document D10 concern a "premium connection" (see document D10, column 5, lines 1 to 34; Figures 1 and 2). The Board concurs with the patent proprietor's view, that the skilled person would not have applied the solid lubricant coating of document D10 to the wedge thread of document D4, particularly due to the major differences between non-wedge threads, such as the premium connections known from document D10, and wedge threads known from document D4. In contrast to non-wedge premium connections, wedge thread connections require tight tolerances of the flanks, must withstand increased torque during make-up, and are subject to high wear during multiple make and breaks (see document D4, paragraph [0003]; see patent, paragraphs [0026], [0027]). A coating could have negatively influenced the reliability of the connection.

Without corresponding indications, the selective adoption of only the features of the solid lubricant

coating without the pipe joints for which the coating is used in document D10, is based on hindsight.

5.4.3 The opponent's arguments are not convincing:

According to the opponent, the premium connection in document D10 and the wedge thread in document D4 differed only in the constant versus variable thread width. However, the Board notes that the increasing thread width of wedge threads results in a different mechanism. While non-wedge premium connections are free-running, i.e. in sliding contact, wedge threads are designed to have flank interference and root/crest interference that both increase as the connection is made-up. Therefore, the requirements for these connections are not comparable. Document D4 addresses these special requirements of wedge threads in paragraph [0003], in relation to threaded tubular connections discussed in paragraph [0002].

Against this background, the disclosure of document D10, column 5, lines 37 to 40 that a solid lubricant coating could be applied to *"every type of thread and every type of joint"* refers to - according to this passage - *"a cylindrical or frusto-conical shape of the envelope of the peaks of the threads and not to the axial dimension of the thread"*. This does not apply to the special threaded pipe connections, such as wedge threads. There is no specific disclosure in document D10 that the coating is suitable for wedge threads and the corresponding conditions.

Although both documents, D4 and D10, pertain to the field of threaded joints for pipes in the oil and gas extraction industry, document D10 does not indicate that the properties of the solid lubricant coating



described for threaded pipe joints in general are also present in wedge threads. In particular, document D10 discloses the avoidance of galling over multiple make-ups and break-outs, and consistent shouldering torque over multiple uses of the threaded connector in the context of free-running "premium connections". These properties, however, are not transferable to wedge threads where much higher torques occur and tight tolerances between engaging thread surfaces are required.

5.5 Inventive step starting from document D4 in combination with document D10

5.5.1 Distinguishing features, technical effect and objective technical problem

The embodiment shown in Figure 6 of document D4 which addresses the problem of "overdoping" can be taken to represent the closest prior art. It discloses a wedge thread with a helical relief groove located at the root/crest interface to ensure that pipe-dope entrapment does not plastically deform the connection during power-tight make-up (see document D4, Figure 6, paragraph [0025]). The subject-matter of claim 1 as granted differs from this embodiment in features c to h.

The Board concurs with the opponent's view that the technical effect of the distinguishing features is to avoid excess pipe dope and, thus, plastic deformation in the threaded sections (see patent, paragraph [0027]). Thus, the objective technical problem is to find an alternative solution. This formulation of the problem has not been disputed by the patent proprietor.

### 5.5.2 Obviousness of the solution

Document D10 is concerned with threaded pipe connections, for example, premium connections, which are free-running non-wedge threads (see document D10, column 5, lines 1 to 23). Document D10 deals with the same objective technical problem, namely "overdoping" (see document D10, column 1, lines 43 to 53). As mentioned above (see point 5.4.2 and 5.4.3), there are major differences between wedge threads and non-wedge threads. Under these technical circumstances, the skilled person would not have applied the coating known from a premium connection in document D10 as an alternative solution for the wedge thread known from document D4.

### 5.5.3 The opponent's arguments are not convincing.

It is true that in case of an alternative solution for a known problem, it is not necessary to show an improvement over the prior art for an inventive step to be present (see also Case law, I.D.4.5.). However, the Board points out that the solution must be an appropriate solution. Since document D10 does not disclose the suitability of the coating for conditions in wedge threads, and given the different requirements for wedge and non-wedge threads, the use of the coating as an alternative in the embodiment of Figure 6 of document D4 is not obvious to the skilled person. The same reasons, as mentioned above, apply.

With regard to the opponent's arguments concerning the same technical field and the suitability of the coating for every type of thread and joint, reference is made to point 5.4.3 above.

## 5.6 Conclusion on inventive step

In light of the above, the subject-matter of claim 1 as granted is not obvious in view of documents D4 and D10 (Article 56 EPC). The same conclusion applies *mutatis mutandis* for claim 14 as granted, directed to a method of manufacturing a tubular connection having wedge threads according to claim 1. Therefore, the ground for opposition under Article 100(a) EPC together with Article 56 EPC does not prejudice the maintenance of the patent in its granted version.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The opposition is rejected.

The Registrar:

The Chairman:



N. Schneider

G. Pricolo

Decision electronically authenticated