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**Datasheet for the decision  
of 13 June 2025**

**Case Number:** T 0760/23 - 3.3.06

**Application Number:** 13852048.1

**Publication Number:** 2914548

**IPC:** C10G75/04

**Language of the proceedings:** EN

**Title of invention:**

PROCESS FOR REDUCING THE VISCOSITY OF HEAVY RESIDUAL CRUDE OIL  
DURING REFINING

**Patent Proprietor:**

Baker Hughes, a GE company, LLC

**Opponent:**

Clariant Produkte (Deutschland) GmbH

**Headword:**

Baker Hughes/Heavy residual crude oil

**Relevant legal provisions:**

EPC Art. 56, 83

**Keyword:**

Inventive step - auxiliary request (yes) - main request (no)  
Sufficiency of disclosure - (yes)

**Decisions cited:**

T 0234/86, J 0032/95, G 0001/21

**Catchword:**



**Beschwerdekammern**

**Boards of Appeal**

**Chambres de recours**

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**Case Number: T 0760/23 - 3.3.06**

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.06**  
**of 13 June 2025**

**Appellant:** Clariant Produkte (Deutschland) GmbH  
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**Representative:** Dehns  
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**Decision under appeal:** **Interlocutory decision of the Opposition**  
**Division of the European Patent Office posted on**  
**13 March 2023 concerning maintenance of the**  
**European Patent No. 2914548 in amended form.**

**Composition of the Board:**

**Chairman** J.-M. Schwaller  
**Members:** S. Arrojo  
C. Heath

## Summary of Facts and Submissions

- I. The present appeal was filed by the opponent against the decision of the opposition division to maintain European patent No. 2 914 548 in amended form on the basis of the claims according to the main request filed with letter of 22 February 2021, claim 1 thereof reading as follows:

*"1. A process for modifying heavy residual hydrocarbons to reduce viscosity comprising admixing the heavy residual hydrocarbons with an additive comprising: a first component which is an (alkoxylated)-(di or tri)-alkyl phenol-aldehyde (amine) resin; and a second component which is a synergist which is an imidazoline prepared using a tall oil fatty acid-amidoamine and a polyamine."*

- II. In the notice of appeal, the appellant requested that the decisions of the opposition division to hold oral proceedings by videoconference and to maintain the patent in amended form be set aside and that the patent be revoked in its entirety.
- III. In the statement of grounds of appeal, the appellant argued that the decision to hold the oral proceedings by videoconference was not justified in light of the conclusions reached in decision **G 1/21**. Alternatively, it requested that a question be referred to the Enlarged Board of Appeal on whether the conclusions in **G 1/21** concerning the format of oral proceedings were also applicable to proceedings before the first instance. Concerning the substantive matters, it argued that the invention defined in the claims as maintained by the opposition division was not sufficiently

disclosed and not inventive over D4 (US 7,674,365 B2) combined with the teachings in D5 (US 6,180,683 B1); over D1 (US 7,857,871 B2) combined with the teachings in D3 (US 5,707,946) or D9 (WO 01/96503 A2); or over D9 combined with the teachings in D1.

IV. In its reply, the proprietor (respondent) requested that the appeal be dismissed and the patent be maintained on the basis of the claims upheld by the opposition division (main request) or, as an auxiliary measure, that the patent be maintained on the basis of the claims according to one of the auxiliary requests 1 to 3 filed on 22 February 2021 or of one of the auxiliary requests 4 to 9 filed on 29 April 2022.

V. Claim 1 of **auxiliary request 1** reads as follows:

*"1. A process for modifying heavy residual hydrocarbons to reduce viscosity comprising admixing the heavy residual hydrocarbons with an additive comprising: a first component which is an (alkoxylated)-(di or tri)-alkyl phenol-aldehyde (amine) resin; and a second component which is a synergist which is an imidazoline prepared using a tall oil fatty acid-amidoamine and a polyamine; wherein the (alkoxylated)-(di or tri)-alkyl phenol- aldehyde (amine) resin is prepared by the acid or base catalyzed condensation of an alkylphenol with an aldehyde; and wherein alkyl groups of the alkylphenol are straight or branched and contain from 4 to 12 carbon atoms."*

Claim 1 according to **auxiliary request 2** reads as follows:

*"1. A process for modifying heavy residual hydrocarbons to reduce viscosity comprising admixing the heavy residual hydrocarbons with an additive comprising: a first component which is an alkoxyated-(di or tri)-alkyl phenol-aldehyde (amine) resin; and a second component which is a synergist which is an imidazoline prepared using a tall oil fatty acid-amidoamine and a polyamine."*

VI. In a communication dated 15 February 2024, the board reviewed the conclusions in G 1/21 and the various lines of reasoning in the case law. It concluded that there were grounds to infer that the principles set out in G 1/21 might also apply to proceedings at the first instance. The board pointed out that the appellant had not clearly stated whether they wished the case to be remitted to the opposition division or if it should be heard on its merits. The board further noted that the question of a potential procedural violation would arise only if the appeal were to succeed on substantive grounds. Even if the board were to find that a procedural violation had occurred and decided to remit the case, it emphasised that it had no authority to order that the new oral proceedings be held in person.

VII. In a submission dated 18 March 2024, the appellant requested that the case be remitted to the first instance with the order to take a new discretionary decision on the format of the oral proceedings. Further, it argued that auxiliary request 1 did not meet the requirement of inventive step, and indicated that if auxiliary requests 2 and 3 were discussed, it requested a decision according to the state of the file.

- VIII. In its submission dated 28 March 2024, the respondent argued that remittal of the case to the opposition division was not warranted, as the board was in a position to decide on all matters relevant to the appeal.
- IX. In an additional communication dated 13 February 2025, the board expressed its preliminary opinion that the main request and auxiliary request 1 were not allowable under Article 56 EPC; further, notwithstanding its preliminary view on the request for a remittal of the case to address the question of the format of the oral proceedings, such remittal would not appear necessary if the board were to maintain the patent on the basis of auxiliary request 2. This was in line with the appellant's submission dated 18 March 2024, in which a decision according to the state of the file was requested for auxiliary request 2. Moreover, the board noted that under the present circumstances, a remittal would have no bearing on the outcome of the proceedings, would not justify the reimbursement of the appeal fees, and would merely result in an unnecessary delay.
- X. In a submission dated 25 February 2025, the appellant confirmed that if the board maintained its preliminary opinion and intended to proceed with auxiliary request 2, no oral proceedings were requested and a decision according to the state of the file could be issued.
- XI. In a submission dated 29 May 2025, the respondent indicated that they would not attend the oral proceedings and that it was understood that the patent would be maintained on the basis of auxiliary request 2.

XII. In light of the above, the board is in a position to issue a written decision without holding oral proceedings, while respecting the parties' right to be heard (see Reasons 5. of the decision).

## **Reasons for the Decision**

### **1. Main request - Inventive step**

The requirements of Article 56 EPC are not met for the following reasons:

#### **1.1 Closest prior art**

##### **1.1.1 Documents D1, D4 and D9 have been cited as possible starting points for the inventive step argumentation.**

Document D1 discusses a method for reducing the pour point and inhibiting or retarding the formation of paraffin deposits in liquid hydrocarbons, such as crude oil and petroleum fuel, using imidazolines (see col. 1, lines 6-9). The problem underlying the invention in D1 was to ensure that the hydrocarbon stocks remain fluid and pumpable at low temperatures (see col. 1, line 64 to col. 2, line 3).

Document D4 (see col. 1, lines 13-17) relates to additives for handling heavy crude oils and residual fuel oils, in particular for dispersing asphaltenes, increasing demulsibility and reducing their viscosity (see col. 3, line 66 to col. 4, line 2). The proposed additive includes (see claim 1) a chelating aminocarboxylic acid C<sub>8</sub>-C<sub>22</sub> amine complex, C<sub>15</sub>-C<sub>21</sub> bis(2-hydroxyethyl)amide and a C<sub>15</sub>-C<sub>44</sub> imidazoline compound.



Document D9 discloses (see page 1, lines 7 to 10; page 4, lines 18-23) a method to enhance the cold flow properties of hydrocarbon feedstocks with high concentration of paraffins. The additive, which includes *inter alia* an alkyl phenol-aldehyde resin, is intended to lower the pour point and reduce the viscosity at low temperatures by inhibiting or delaying the formation of paraffin deposits in the heavy hydrocarbon feedstocks (see claim 1 and page 16, lines 23-28).

- 1.1.2 The opposition division concluded that D4 represented the closest prior art, because it was the only document concerned with the reduction of the viscosity of heavy residual hydrocarbons. Documents D1 and D9, on the other hand, disclosed processes for the reduction of the pour point of different hydrocarbon fractions such as crude oils or petroleum fuels.
- 1.1.3 The board sees no reason to disagree and will thus rely on D4 as the starting point, from which the subject-matter of claim 1 at issue differs in that the additive comprises an (alkoxylated)-(di or tri)-alkyl phenol-aldehyde (amine) resin.
- 1.2 Problem solved by the invention
  - 1.2.1 The opposed patent (pars. [0022]-[0025]) discloses nine examples according to the claimed invention and four comparative examples to assess the viscosity reduction of a heavy residual hydrocarbon fraction when treated with a certain additive. The additive used in all tests is described as '*a blend of an alkoxylated phenol resin (80%) and imidazoline (20%)*' with no further information. Tests are conducted using varying amounts of additive and different percentages of cutter stock

to assess efficacy across a range of viscosities. The observed reduction in viscosity of the heavy residual hydrocarbon feedstock ranges from 33% to 97%.

- 1.2.2 The appellant argued that the patent provided no evidence that the addition of an alkyl phenol aldehyde resin had any effect on viscosity reduction. Therefore, the only problem addressed by the invention was to propose an alternative process for reducing viscosity. This argument is consistent with the conclusions of the opposition division on this point.
- 1.2.3 According to the respondent, the results obtained in the examples of the patent would demonstrate that the the claimed invention significantly reduced the viscosity of heavy residual hydrocarbons. Moreover, when comparing the viscosity reduction values obtained in the examples with those achieved in D4 with imidazoline alone, it was apparent that the incorporation of the alkyl phenol resin significantly contributed to this effect. The problem solved by the invention was therefore to improve the reduction of the viscosity of heavy residual hydrocarbons.
- 1.2.4 The board concurs with the appellant in that the additive used in the tests of the patent is not representative of the process defined in claim 1 at issue, because the first component of the additive according to claim 1 is described as an '*(alkoxylated)-(di- or tri-alkyl phenol-aldehyde-(amine) resin*', whereby the parentheses signify that the presence of the alkoxylated groups is optional. By contrast, the tests in the patent are carried out with a first component described as an '*alkoxylated phenol resin*'. Although the backbone of the component in both cases is a phenol resin (i.e. a phenol-formaldehyde resin), the

definition of the alkoxyated groups as optional in claim 1 implies that the invention also encompasses embodiments with additives containing non-alkoxyated phenol resins.

1.2.5 Even though it is common practice to extrapolate the effects observed in the exemplary embodiments of a patent beyond their specific scope, such an extrapolation is not justified in the present case because the presence or absence of alkoxyated groups not only alters the chemical structure of the resin but also significantly affects key properties, such as hydrophobicity. Since the viscosity-reducing effect is likely influenced by these properties, it would be unreasonable to assume that the same or similar results observed with an alkoxyated phenol resin would also be achieved using a non-alkoxyated phenol resin.

1.2.6 The board thus considers that the only problem solved by the invention is the provision of an alternative process for the treatment of heavy residual hydrocarbons.

1.3 Obviousness of the proposed solution

1.3.1 Document D5 (abstract; col. 1, lines 6-22; claim 1) discloses an additive comprising *inter alia* an alkyl phenol resin for dispersing asphaltenes in crude oils such as heavy heating oil or marine oil.

1.3.2 The opposition division concluded that the dispersion of asphaltenes was not necessarily equivalent to a reduction in viscosity, as asphaltenes only formed deposits under unstable conditions. Therefore, in the absence of such conditions, the additives would not affect the viscosity of the feedstock. As a result, D5

could not be considered to teach that an alkyl phenol resin could be used to reduce viscosity, and the skilled person would have no reason to consult this document when seeking alternative processes to improve viscosity. Furthermore, even if the asphaltene dispersants disclosed in D5 were considered to be viscosity improvers, the skilled person would still have no incentive to combine components from different additives, since both D4 and D5 described the individual components as part of synergistic combinations.

- 1.3.3 In the board's view, the content of D5 cannot be disregarded on the grounds that it allegedly fails to demonstrate a contribution of the alkyl phenol resin to the reduction of the viscosity, because as explained above, the patent itself provides no evidence that an alkyl phenol resin would provide this (or any other) effect. This is reflected in the problem addressed by the invention, which has been reformulated in the less ambitious terms of providing an alternative process for the treatment of heavy residual hydrocarbons. In light of this broad objective, any indication that an additive may offer a functional benefit or simply fulfil a role in the treatment of heavy residual hydrocarbon fractions would suffice to justify its inclusion in the process described in D4. In other words, as long as the incorporation of an alkyl phenol resin into the feedstock is known or suggested in the technical field, the specific purpose, whether viscosity reduction or otherwise, is not decisive.

Since D5 explicitly teaches that the alkyl phenol additive enhances the dispersion of asphaltenes in heavy residual oils, it would be evident to the skilled person to consider incorporating this additive into the

process disclosed in D4 when exploring alternative treatment processes. The skilled person would thus arrive at the subject-matter of claim 1 without exercising inventive skills.

The board further notes that this conclusion remains valid even if incorporating the teachings of D5 into the process of D4 entails combining both additives, rather than selecting individual components. This is so because claim 1 employs the open term '*comprising*', which also encompasses mixtures of two additives, each containing one of the relevant components.

- 1.4 The board thus concludes that the subject matter of claim 1 according to the main request is obvious in light of the combination of D4 and D5, and therefore does not meet the requirement of inventive step.
2. Auxiliary request 1 - Inventive step
  - 2.1 Claim 1 of this request corresponds to that according to the main request with the additional requirements that the alkyl phenol resin is prepared by the acid or base catalysed condensation of an alkyl phenol with an aldehyde, and that the alkyl groups are either straight or branched and contain from 4 to 12 carbons.
  - 2.2 Since Document D5 teaches that the alkyl phenol can be obtained from acidic or basic catalysis (see col.1, lines 64-65) and that the alkyl preferably contains 4 to 12 carbons (see col. 2, line 50), the same arguments and conclusions presented for the main request apply to this request. The subject-matter of claim 1 at issue is therefore not inventive in view of D4 combined with the teachings of D5, so the requirements of Article 56 EPC are not met.

3. Auxiliary request 2 - Sufficiency of disclosure

The requirements of Article 83 EPC are met for the following reasons:

- 3.1 The appellant argued that the process according to claim 1 required that the imidazoline be prepared by a reaction of a tall oil fatty acid-amidoamine and a polyamine. Such reaction would however not lead to the formation of an imidazoline but to a different product. Even though the amidoamine molecule could be converted into an imidazoline via a cyclisation reaction, this did not take place in the presence of a polyamine. Since the patent contained no information on how to obtain an imidazoline from a tall oil fatty acid-amidoamine and a polyamine, the invention could not be carried out with the information at hand.
- 3.2 The board has concluded that the invention is sufficiently disclosed because claim 1 at issue does not define a step of obtaining imidazoline via a reaction between a tall oil fatty acid-amidoamine and a polyamine, but instead refers more generally to preparing the imidazoline using a tall oil fatty acid-amidoamine and a polyamine. It is known in the field that fatty acids (e.g. tall oil fatty acids) react with polyamines to form fatty acid-amidoamines, which may subsequently undergo a cyclisation reaction to yield the imidazoline. The overall process for obtaining imidazoline therefore involves, as a whole, the use of both a polyamine (as one of the initial reactants) and tall oil fatty acid-amidoamines (as intermediate compounds). Even if one were to assume that the term 'using' in the context of producing imidazoline with a tall oil fatty acid-amidoamine and a polyamine leaves some uncertainty as to how these substances are to be

employed, this would constitute – as the opposition division correctly concluded – an issue of clarity rather than sufficiency of disclosure. More specifically, the skilled person would be able to resolve the only potential difficulty in carrying out the invention – namely, how to 'use' the specified substances to obtain imidazoline – by applying common general knowledge, given that the underlying chemical reaction is well known in the field.

4. Auxiliary request 2 - Inventive step

The requirements of Article 56 EPC are met for the following reasons:

- 4.1 It is first noted that the appellant has explicitly requested a decision according to the state of the file without raising any objection under Article 56 EPC.
- 4.2 For the sake of completeness, the board will provide a short argumentation on why this request overcomes the inventive step objections against the higher ranking requests.
- 4.3 Claim 1 at issue corresponds to claim 1 according to the main request, wherein the alkoxyated groups are no longer defined as being an optional aspect (i.e. the parenthesis has been deleted).
- 4.4 Problem solved by the alleged invention

By specifying that the alkyl phenol resins are alkoxyated, the issue discussed in point 1.2 above no longer applies. The examples in the patent are thus considered to demonstrate that the additives defined in

claim 1 at issue effectively improve the viscosity of heavy residual hydrocarbons.

4.5 Non-obviousness of the proposed solution

The cited prior art documents relate to additives containing alkyl phenol resins rather than alkoxyated alkyl phenol resins. In any case, none of the cited prior art documents suggests that an additive containing an alkoxyated alkyl phenol resin would improve the viscosity of a heavy residual hydrocarbon fraction.

The board thus concludes that the amendments to claim 1 at issue overcome the inventive step objections raised against the higher ranking requests and thus, that the invention is not rendered obvious by the cited prior art.

The requirement of inventive step is thus met.

5. Further procedural issues

5.1 In its initial submissions, the appellant contended that the opposition division's decision to conduct oral proceedings by videoconference without its consent constituted a substantial procedural violation.

5.2 In its first communication, the board expressed its preliminary agreement with some of the arguments made by the opponent and asked for a clarification on how they wished to proceed.

5.3 The appellant then clarified that they were requesting a remittal of the case to the first instance with an order to issue a new decision on the format of the oral



proceedings, in order to remedy the alleged procedural violation and allow for a discussion of the substantive merits of the case in a new oral proceedings.

- 5.4 In its second communication, the board addressed the substantive issues and expressed the preliminary view that the patent should be maintained on the basis of auxiliary request 2. At that stage, it was noted that the appellant had explicitly requested – both during the opposition proceedings and in the appeal proceedings – that a decision according to the state of the file be issued for auxiliary request 2. This gave rise to a potential ambiguity regarding the ranking and interpretation of the appellant's procedural requests. If the appellant's initial request for remittal to the opposition division were granted – so that a new decision could be issued on the format of the oral proceedings – such oral proceedings would, regardless of their format, be unnecessary, as all substantive issues would already have been addressed. In other words, if the board were to confirm its intention to maintain the patent on the basis of auxiliary request 2 and then remit the case as requested by the appellant, there would be no remaining issues to be addressed in a new oral proceedings before the opposition division.

The board also indicated that the remittal would not lead to the reimbursement of the appeal fee, because the alleged procedural error did not concern a failure by the opposition division to follow procedural steps unambiguously prescribed by the EPC or well-established case law (see T 234/86, Headnote 3 and J 32/95, Reasons 4.1).

In view of these observations, the board invited the parties to clarify their positions and procedural requests.

5.5 In response, the appellant confirmed its request for a decision according to the state of the file with respect to auxiliary request 2. Accordingly, if the board were to uphold its preliminary opinion and proceed on the basis of auxiliary request 2, no further oral proceedings would be necessary, and a written decision could be issued.

5.6 The respondent subsequently indicated that they would not attend the oral proceedings, and that it was understood that a written decision would be issued to maintain the patent on the basis of auxiliary request 2.

5.7 In view of these submissions, the board has reached the following conclusions:

i) Both the appellant and the respondent have exhausted their arguments with respect to the main, first and second auxiliary request. Consequently, no oral proceedings have been requested or are required for the discussion of any of these requests.

ii) As the board has confirmed its preliminary opinion that the main and first auxiliary requests were not allowable, and that the patent should be maintained on the basis of auxiliary request 2, there is no necessity to hold oral proceedings – either before the board or before the opposition division.

iii) In light of the above, the appellant's initial request for remittal to the first instance with an

order to issue a new decision on the format of the oral proceedings has become moot, or at the very least, has become subsidiary to its request for a decision according to the state of the file for auxiliary request 2.

- 5.8 It follows that it is not necessary to issue a decision on the request for remittal with an order to issue a new decision on the format of the oral proceedings, nor on the question of a possible substantial procedural violation.

## **Order**

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

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division with the order to maintain the patent in amended form on the basis of the claims of auxiliary request 2 filed on 22 February 2021, and a description to be adapted where appropriate.

The Registrar:

The Chairman:



N. Schneider

J.-M. Schwaller

Decision electronically authenticated