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**Datasheet for the decision
of 8 January 2025**

Case Number: T 2522/22 - 3.3.03

Application Number: 17151858.2

Publication Number: 3190152

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C08K5/14, H01B3/44, C08F210/02

Language of the proceedings: EN

Title of invention:
A CABLE AND PRODUCTION PROCESS THEREOF

Patent Proprietor:
Borealis AG

Opponent:
The Dow Chemical Company

Relevant legal provisions:
EPC Art. 56, 111(2), 114(2)
RPBA 2020 Art. 13(2)
EPC R. 116

Keyword:

Amendment after summons - exceptional circumstances (no)
Inventive step - main request - reasonable expectation of
success (yes)
Late filed auxiliary requests - admitted (yes)
Inventive step - main and auxiliary requests - partial problem
approach - obvious combination of features

Decisions cited:

J 0027/94



Beschwerdekammern

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Case Number: T 2522/22 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 8 January 2025

Appellant: The Dow Chemical Company
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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
23 November 2022 concerning maintenance of the
European Patent No. 3190152 in amended form.**

Composition of the Board:

Chairman D. Semino
Members: M. Barrère
L. Basterreix

Summary of Facts and Submissions

I. The appeal of the opponent lies from the interlocutory decision of the opposition division concerning maintenance of European Patent No. 3 190 152 in amended form on the basis of the claims of the main request filed with letter of 14 July 2022 and an adapted description.

II. Claim 1 of the main request read as follows:

"1. A process for the preparation of a cable comprising:

(I) in a high pressure process

(a) compressing ethylene and optionally one or more monomer(s) under pressure in a compressor, wherein a mineral oil compressor lubricant is used for lubrication,

(b) polymerising ethylene optionally together with one or more comonomer(s) in a polymerisation zone to obtain a low density polyethylene (LDPE) selected from a LDPE homopolymer or LDPE copolymer of ethylene with one or more comonomer(s), which LDPE homopolymer or LDPE copolymer of ethylene may optionally be unsaturated,

(c) separating the obtained LDPE, from the unreacted products and recovering the separated LDPE in a recovery zone;

(II) applying on a conductor at least a semiconductive layer comprising a semiconductive composition comprising carbon black and an insulation layer comprising a polymer composition comprising said LDPE, in any order;

characterized in that the polymer composition of the insulation layer has an electrical conductivity of 150 fS/m or less, when measured at 70°C and 30 kV/mm mean electric field from a non-degassed, 1 mm thick plaque sample consisting of a crosslinked polymer composition according to DC conductivity method (1)."

III. The following documents were *inter alia* cited in the decision of the opposition division:

D1: Global High Voltage Solutions, Dow Wire & Cable, Published in August 2008 by The Dow Chemical Company

D7: EP 1 695 996 A1

D9: L. R. Rudnick *et al.*, "Synthetic lubricants and High-Performance Functional Fluids, Revised and Expanded", CRC Press, 1999, pages 376 and 377

D14: JP-A-06/251624

D15: WO 98/14537

D18: EP 1 065 672 A2

D29: WO 2006/027261 A1

IV. In that decision the opposition division held, among others, that the subject-matter of claim 1 of the main request involved an inventive step starting from document D7 as the closest prior art.

V. The opponent (appellant) filed an appeal against said decision.

VI. With the rejoinder to the statement of grounds of appeal, the patent proprietor (respondent) filed ten sets of claims as auxiliary requests 1 to 10.

VII. With the letter dated 7 November 2024 the appellant filed the following document:

D33: US 5,575,965

VIII. Oral proceedings were held before the Board on 8 January 2025.

IX. The appellant requested that the decision under appeal be set aside and the patent be revoked.

The respondent requested dismissal of the appeal and maintenance of the patent on the basis of the main request considered allowable by the opposition division. In the alternative the respondent requested maintenance of the patent in amended form on the basis of one of auxiliary requests 1 to 10 filed with the rejoinder to the statement of grounds of appeal.

The respondent further requested remittal to the opposition division should the Board consider that D1 or D14 represents the closest prior art.

X. Reference is made to point II. above for the wording of claim 1 as maintained by the opposition division (main request of the respondent).

Claim 1 of auxiliary request 1 corresponds to claim 1 of the main request with the following modification of step (II) (deletions being indicated by the Board in ~~strike through~~ and **additions** in bold and underlined):

"(II) applying coextruding on a conductor at least a semiconductive layer comprising a semiconductive composition comprising carbon black and an insulation layer comprising a polymer composition comprising said LDPE, in any order".

Claim 1 of auxiliary request 2 corresponds to claim 1 of the main request with the following modifications of step (II):

"(II) applying on a conductor at least an inner semiconductive layer comprising a semiconductive composition comprising carbon black, and an insulation layer comprising a polymer composition comprising said LDPE, and an outer semiconductive layer which comprises a semiconductive composition with carbon black in any that order wherein the semiconductive layers are identical".

Claim 1 of auxiliary request 3 differs from claim 1 of the main request in that:

- the process is directed to the preparation of a "direct current (DC) power cable";
- step (II) is modified as follows:

"(II) applying on a conductor at least a semiconductive layer comprising a semiconductive composition comprising carbon black and an insulation layer comprising a polymer composition comprising said LDPE, in any order to form a direct current power cable"

- and an additional step (III) is introduced at the end of the claim as follows:

"(III) operating the direct current power cable at a voltage of 40 kV or higher".

Claim 1 of auxiliary request 4 corresponds to claim 1 of auxiliary request 1 with the following modification of step (b):

"(b) polymerising ethylene optionally together with one or more comonomer(s) in a polymerisation zone to obtain a low density polyethylene (LDPE) selected from a LDPE homopolymer or LDPE copolymer of ethylene with one or more **non polar** comonomer(s), which LDPE homopolymer or LDPE copolymer of ethylene may optionally be unsaturated"

Claim 1 of auxiliary request 5 differs from claim 1 of auxiliary request 4 in that the non polar comonomer(s) are **"selected from monounsaturated C₃ to C₁₀ alpha-olefin(s), a polyunsaturated comonomer(s); a silane group containing comonomer(s); or any mixtures thereof"**.

Claim 1 of auxiliary request 6 differs from claim 1 of auxiliary request 5 in that the process is directed to the preparation of a **"direct current (DC) power** cable".

Claim 1 of auxiliary request 7 combines the amendments of auxiliary request 3 with those of auxiliary request 5.

Claim 1 of auxiliary request 8 corresponds to claim 1 of the main request with the following modifications of steps (a) and (b):

"(a) compressing ethylene and ~~optionally~~ one or more monomer(s) under pressure in a compressor, wherein a mineral oil compressor lubricant is used for lubrication,

(b) polymerising ethylene ~~optionally~~ together with one or more comonomer(s) in a polymerisation zone to obtain a low density polyethylene (LDPE) ~~selected from a LDPE homopolymer or LDPE copolymer of ethylene with one or more comonomer(s), which LDPE homopolymer or LDPE copolymer of ethylene may optionally be unsaturated".~~

Claim 1 of auxiliary request 9 corresponds to claim 1 of auxiliary request 8 with the following modifications of step (b):

"(b) polymerising ethylene together with one or more comonomer(s) in a polymerisation zone to obtain a low density polyethylene (LDPE) copolymer of ethylene with one or more non polar comonomers selected from monounsaturated C₃ to C₁₀ alpha-olefin(s), a polyunsaturated comonomer(s); a silane group containing comonomer(s); or any mixtures thereof; which LDPE copolymer of ethylene may optionally be unsaturated".

Claim 1 of auxiliary request 10 corresponds to claim 1 of auxiliary request 8 with the following modifications of step (b):

"(b) polymerising ethylene together with one or more comonomer(s) in a polymerisation zone to obtain an an unsaturated low density polyethylene (LDPE) copolymer of ethylene ~~with one or more comonomer(s), which LDPE copolymer of ethylene may optionally be unsaturated~~ with at least one polyunsaturated comonomer, and optionally with other comonomer(s)".

The remaining claims of these requests are not relevant to this decision.

XI. The appellant's submissions, in so far as they are pertinent to the present decision, may be derived from the reasons for the decision below. They were essentially as follows:

(a) Admittance of late-filed submissions

Document D33 should be admitted into the proceedings.

Auxiliary requests 1 to 3 should not be admitted into the proceedings.

(b) Inventive step

The subject-matter of claim 1 of the main request and of auxiliary requests 1 to 10 lacked an inventive step over D7 as the closest prior art.

XII. The respondent's submissions, in so far as they are pertinent to the present decision, may be derived from the reasons for the decision below. They were essentially as follows:

(a) Admittance of late-filed submissions

Document D33 should not be admitted into the proceedings.

Auxiliary requests 1 to 3 should be admitted into the proceedings.

(b) Inventive step

The subject-matter of claim 1 of the main request and of auxiliary requests 1 to 10 involved an inventive step over D7 as the closest prior art.

Reasons for the Decision

Main request (patent as maintained by the opposition division)

1. Inventive step over document D7
 - 1.1 Closest prior art and distinguishing features
 - 1.1.1 The parties agreed with the opposition division (contested decision, page 10, points 54 and 56 of the reasons) that:
 - document D7 was the closest prior art for assessing inventive step and
 - the process of operative claim 1 differed from the disclosure of D7 at least in that:
 - (i) a mineral oil was used as a compressor lubricant and

- (ii) a semiconductive layer comprising carbon black was applied on the conductor (see D7, claim 30 and paragraph [0005]).

It was also undisputed that the required electrical conductivity (150 fS/m or less) for the polymer composition of the insulation layer was not explicitly disclosed in D7 and therefore constituted a further distinguishing feature.

The Board has no reason to deviate from these views.

- 1.1.2 A further differentiating feature was identified by the opposition division (contested decision, page 10, paragraph 56), namely "a step of separating/recovering the LDPE". Although this alleged difference was contested by the appellant, neither the opposition division nor the respondent argued that it would contribute to the presence of an inventive step (rejoinder, page 19, paragraphs 83 and 84) accepting that the general process for making the LDPE is a well-known one. Therefore, the Board has no reason to consider that it could justify an inventive step and does not need to deal with this alleged difference any further in the present decision.

- 1.1.3 During the oral proceedings before the Board, the respondent further argued that the LDPE disclosed in D7 was not necessarily present in an insulation layer of a cable. In that respect, the Board agrees with the appellant that the insulation layer was one of two options disclosed in paragraph [0058] of D7: i.e. a semi conductive layer or insulation layer. In view of the fact that the insulation layer constitutes the closest embodiment to the subject-matter of claim 1 of the main request, it can be selected as springboard for

evaluating inventive step. Accordingly, starting from that specific embodiment of D7, the fact that the LDPE is present in the insulation layer is not considered to be a differentiating feature between claim 1 and the disclosure of D7.

1.1.4 Under these circumstances, the relevant distinguishing features for the assessment of inventive step are those identified under point 1.1.1 above.

1.2 Objective problem to be solved

1.2.1 According to the respondent, the use of mineral oil as compressor lubricant resulted in a LDPE polymer with reduced DC electrical conductivity (rejoinder, page 20, paragraph 87). The appellant did not dispute this fact, although they argued that this effect was linked to the absence in the lubricant of polar compounds, such as polyalkylene glycols (PAG) which can also be used as compressor lubricants (statement of grounds of appeal, page 16, first paragraph).

1.2.2 As D7 does not disclose the nature of the compressor lubricant, the Board considers that it cannot be assumed that the electrical conductivity of an insulation layer resulting of a LDPE according to D7 should be 150 fS/m or less (as required by claim 1 of the main request). The Board therefore agrees with the respondent that the objective problem to be solved by distinguishing feature (i) and the electrical conductivity should be formulated as the provision of a LDPE insulation layer having a reduced conductivity (in particular a conductivity of 150 fS/m or less).

1.2.3 A functional interdependence between the mineral oil compressor (distinguishing feature (i)) and the use of

a semiconductive layer comprising carbon black (distinguishing feature (ii)) has not been argued by the respondent, nor has any evidence been submitted in this respect. Hence, no technical effect can be associated to distinguishing feature (ii) so that the problem solved by it can only be the provision of a process to produce an alternative cable.

1.3 Obviousness

1.3.1 In view of the analysis above, what has to be established for the assessment of inventive step is whether each of distinguishing features (i) and (ii) is separately obvious in the light of the prior art (Case Law of the Boards of Appeal, 10th edition 2022, in the following "Case Law", I.D.9.3.2).

1.3.2 Accordingly, the Board will first evaluate whether it was obvious to use a mineral oil lubricant in order to reduce the conductivity of LDPE and of an insulation layer derived therefrom. In a second step the Board will assess whether the use of a semiconductive layer comprising carbon black was obvious for a skilled person wishing to provide a process for an alternative cable.

1.3.3 Obviousness of a mineral oil as compressor lubricant (distinguishing feature (i))

(a) With regard to feature (i), it was not contested that, by selecting a mineral oil lubricant, the skilled person would automatically achieve a LDPE based insulation layer having an electrical conductivity as defined in operative claim 1. In other words, should it be concluded that the choice of a mineral oil lubricant was obvious for a person

skilled in the art wishing to reduce that conductivity, the same conclusion would apply to the required electrical conductivity (150 fS/m or less) insofar as this is formally a further distinguishing feature.

- (b) The appellant argued that the choice of mineral oil as a compressor lubricant for producing LDPE used in electrical cables would have been obvious to a skilled person based on the teachings of, *inter alia*, documents D9 and D15 (statement of grounds of appeal, page 16, second full paragraph to page 18, fourth paragraph). Document D15 addressed lubricants for hyper compressors in LDPE production and highlighted the drawbacks of polyglycols, including negative effects on dielectric properties and higher costs relative to mineral oils. D15 explicitly suggested mineral oils as preferred base lubricants (page 3, lines 1-2, 19-22). Likewise document D9 taught that compressor lubricants were present at low levels in LDPE and noted that polyalkylene glycols impaired electrical properties, while mineral oils did not. D9 also discussed blending polybutenes with mineral oils to mitigate thickening issues under pressure. The appellant argued that D9 clearly supported the use of mineral oils in compressors for LDPE production, even if mixed with polybutenes, as the presence of additional components was not precluded by operative claim 1.
- (c) The respondent argued that the combination of D7 with D9 or D15 to justify the obviousness of using mineral oil as a compressor lubricant in the claimed process was flawed and based on hindsight (rejoinder, page 23, paragraph 99 to page 30,

paragraph 132). D15 was a patent document, not reflective of the general knowledge of a skilled person. Identifying the choice of the lubricant as a relevant one would require prior knowledge of the invention, as D7 itself did not highlight the nature of the compressor lubricant as a critical factor.

Regarding D15, the respondent also pointed out that, while it mentioned mineral oils as possible base lubricants, its focus was on lubrication performance in hyper compressors, not on electrical properties such as the DC conductivity. D15 did not address the use of scorch retarders, unsaturated LDPE, or the impact of mineral oils on DC electrical conductivity – key elements of the invention of D7.

As for D9, the respondent noted that it discussed polybutenes and their blending with mineral oils to address thickening under pressure, but it made no suggestion that mineral oils improved DC electrical conductivity. The argument that D9 taught away from polyalkylene glycols due to their adverse effects on electrical properties was, in the respondent's view, insufficient to establish that mineral oils would reduce DC conductivity without a hindsight-driven motivation.

The respondent therefore concluded that none of the cited prior art documents provided the skilled person with a reasonable expectation of achieving reduced DC conductivity through the use of mineral oil lubricants.

- (d) With regard to the choice of mineral oil as compressor lubricant, the Board agrees with the appellant for the following reasons:

As noted by the appellant, D7 relates to unsaturated polyolefin compositions (specifically LDPE compositions) for power cable insulation (statement of grounds of appeal, page 11, last paragraph). Paragraph [0027] of D7 states that the unsaturated polymer is preferably produced by high pressure radical polymerisation. It has not been disputed that the steps of compression (including the use of a compressor lubricant), polymerisation and recovery/separation are necessary and inherent in any high pressure polymerisation process. Therefore, the skilled person wishing to carry out a process as described in D7 must select a lubricant for ethylene compression. The respondent's argument that the skilled person would have no reason to consider this feature at all is therefore not convincing. It follows that any document relating to compressor lubricants in the field of LDPE production is relevant to a skilled person, including D9 and D15, even if it were to be concluded that the effect of the lubricant on conductivity was not directly addressed (see D9, page 376, figure 14 and page 377, table 8; D15, page 1, lines 6 to 10).

D15 teaches that, among the lubricants suitable for ethylene hypercompressors, polyglycols and mineral oils are known to be used. However, polyglycols are said to have a number of disadvantages including reduced dielectric properties of polyethylene which limits their use in electrical cables in particular (see D15, bridging paragraph between pages 1 and

2). Already for this reason, the Board considers that it was obvious for a skilled person wishing to reduce the DC conductivity of the LDPE compositions of D7 to use a mineral oil rather than polyglycols as compressor lubricant. In addition, while it is correct that the main focus of D15 is a polyolefin based lubricant (see claim 1 of D15), it is also clear that mineral oil can be added thereto as shown as in all inventive examples of D15 (see page 4, table I, examples X1 to X4).

The same conclusion can be reached on the basis of D9. This document teaches that the compressor lubricant should not have a deleterious effect on the end properties of LDPE (see D9, page 377 (part 1), table 8). In that respect, it is mentioned that polyglycols can have a detrimental effect on the electrical properties of polyethylene (see D9, page 377 (part 2), first full paragraph). By contrast, polybutene lubricants are preferred in the manufacture of LDPE destined for use in electrical applications. D9 also teaches that, if polybutene is used as compressor lubricant, the issue of thickening can be avoided by using a blend of polybutene and mineral oil (see D9, bridging paragraph between parts 1 and 2 of page 377). For these reasons, the Board considers that it was obvious for a skilled person wishing to provide a polyethylene composition having a reduced conductivity to use a blend of polybutene and mineral oil (which is not excluded by operative claim 1) as taught in D9.

- (e) The respondent argued that D9 and D15 neither disclosed any effect of the lubricant on DC conductivity nor explicitly mentioned that mineral

oil was advantageous for that purpose. However, according to established case law, obviousness is not only at hand when the results are clearly predictable but also when there is a reasonable expectation of success (Case Law, I.D.7.1). In the present case, it is clearly derivable from D9 and D15 that polyglycol lubricant have a detrimental effect on the electrical properties of polyethylene. Hence even if these documents do not explicitly mention the DC conductivity, the skilled person would not use these lubricants for electrical applications. By contrast, as noted previously, D9 and D15 suggest to use polyolefins (such as polybutene) preferably in combination with mineral oil. From these teachings, the skilled person would therefore have a reasonable expectation that mineral oils, either alone or in combination with polyolefins, would avoid the negative effects observed with polyglycols and maintain or even improve the dielectric properties of polyethylene, making them a suitable and obvious choice for electrical cable insulation applications.

- (f) The respondent further pointed out that there were three cases related to the opposed patent in which the Board already concluded that the use of a mineral oil lubricant was not obvious for a person skilled in the art wishing to reduce the DC electrical conductivity of a LDPE composition (rejoinder, page 23, paragraph 98 with reference to the opposition against the European patents No. 2499175, 2499176 and 2499197).
- (g) The question raised by the respondent is whether the decisions taken by the Board in related cases

are binding on the present Board. It is settled case-law that the binding effect of a decision under Article 111(2) EPC applies only to the case decided upon (J 27/94, OJ 1995, 831). Although the cases cited by the respondent are to some extent related to the present case, they are nevertheless different, so that the present Board is not bound by their conclusions. In any event, the respondent has not shown that the facts and arguments put forward by the parties in the related cases were the same, which would justify that, for the sake of consistency, the present Board should reach the same conclusion.

- (h) For these reasons the choice of mineral oil as compressor lubricant was obvious for a person skilled in the art wishing to provide a LDPE insulation layer having a reduced conductivity.

1.3.4 Obviousness of a semiconductive layer comprising carbon black (distinguishing feature (ii))

- (a) In agreement with the appellant (statement of grounds of appeal, page 14, third and fourth full paragraphs; letter dated 7 November 2024, bridging paragraph between pages 2 and 3), the Board notes that paragraph [0005] of D7 discloses that power cables typically include a semiconductive layer. Furthermore it is known from D18 or D29 that carbon black can be used in a semiconductive layer of a power cable (see D18, claim 1; D29, page 1, first paragraph). These facts were not disputed by the respondent.
- (b) On this basis, the Board considers that it was obvious for a skilled person wishing to provide a

process to produce an alternative cable, to include a carbon black containing semiconductive layer in the cable structure.

- 1.4 As both distinguishing features are found to be obvious, the subject-matter of operative claim 1 does not involve an inventive step starting from D7 as the closest prior art.

Auxiliary request 1

2. Admittance

- 2.1 Auxiliary request 1 was filed by the respondent with the rejoinder to the statement of grounds of appeal. Its admission to the proceedings is subject to the discretionary power of the Board.

- 2.2 According to the respondent, auxiliary request 1 corresponded to auxiliary request 1 filed with letter dated 14 July 2022 during opposition proceedings. It was submitted to ensure that claim 1 was unambiguously novel over D1 (rejoinder, page 32, paragraph 142). The respondent further argued that auxiliary request 1 would have been admitted by the opposition division if it had had to take this request into account. Not admitting auxiliary request 1 in appeal would in effect penalise the respondent for having won in the opposition proceedings.

- 2.3 The appellant requested that auxiliary request 1 not be admitted to the proceedings. They contended that the respondent had not provided any reason why this request could not have been filed earlier and argued that requests initially filed in opposition proceedings

should not automatically be admitted in appeal proceedings.

2.4 The Board notes that auxiliary request 1 was initially filed on 14 July 2022, before the final date for submitting amendments under Rule 116 EPC (which was set at 15 July 2022). Furthermore the purpose of that request was clearly identified since the patent proprietor indicated that the reason for filing this request was to ensure that claim 1 was novel over D1 (letter dated 14 July 2022, page 6, paragraph 32; rejoinder, page 32, paragraph 142). Although it was not explained why this request could not have been filed at an earlier stage of the opposition proceedings, the Board is not convinced that this criterion alone should justify the non-admittance of a request during the opposition proceedings, contrary to the situation in appeal proceedings (see Article 12(6) RPBA). Rather, the Board considers relevant the fact that auxiliary request 1 was clearly filed in order to overcome an objection of lack of novelty (as a ground for opposition) and within the time limit laid down under Rule 116 EPC (i.e. two months before the oral proceedings before the opposition division).

2.5 Under these circumstances, the Board finds it appropriate to exercise its discretion under Article 114(2) EPC by admitting auxiliary request 1 into the proceedings.

3. Inventive step over document D7

3.1 Claim 1 of auxiliary request 1 differs from claim 1 of the main request in that the semiconductive layer and the insulation layer are applied by co-extrusion (emphasis by the Board). It was not disputed by the

parties that the co-extrusion was an additional process feature distinguishing operative claim 1 from D7 as the closest prior art (distinguishing feature (iii)). The Board has no reason to depart from that view.

3.2 Under point 1. of the present decision, the Board explained why the subject-matter of claim 1 of the main request was found not to involve an inventive step over document D7. In the present section, the Board therefore focuses on the question whether the additional feature of operative claim 1 (the co-extrusion) can justify the acknowledgement of an inventive step.

3.3 In order to address the obviousness of the co-extrusion, the appellant relied on document D33, the admittance of which was contested by the respondent. The Board therefore needs to assess whether this document can be admitted into the proceedings before it can evaluate the inventive step of operative claim 1.

3.4 Admittance of document D33

3.4.1 Document D33 is a new item of evidence filed by the appellant with the letter dated 7 November 2024 and therefore after notification of the Board's communication under Article 15(1) RPBA (dated 15 October 2024). Its admission to the proceedings is therefore subject to the discretionary power of the Board in accordance with Article 13(2) RPBA.

3.4.2 According to that provision, any amendment to a party's appeal case shall, in principle, not be taken into account unless there are exceptional circumstances, which have been justified with cogent reasons by the party concerned.

- 3.4.3 The appellant argued that D33 was submitted in reaction to the Board's provisional opinion stating that, "in the absence of evidence for the alleged fact that co-extrusion was known and obvious to the skilled person in the relevant technical field, the objections of lack of novelty and lack of inventive step of the appellant are incomplete and unlikely to succeed" (letter dated 7 November 2024, page 7, first and fifth paragraphs; point 12.3 of the communication under Article 15(1) RPBA). Claim 1 of D33 provided evidence that co-extrusion was a known process for applying the protective layers of a cable. The appellant further stated that the Board's statement was interpreted as an invitation to file further evidence and should be admitted for that reason.
- 3.4.4 The respondent requested that D33 not be admitted into the proceedings as there were no exceptional circumstances put forward by the appellant (letter dated 17 December 2024, page 20, paragraph 89).
- 3.4.5 The Board notes that D33 addresses the obviousness of the co-extrusion feature of claim 1 of auxiliary request 1. That request was, however, initially filed during the opposition proceedings. Consequently, if the appellant had wished to challenge this feature by providing new evidence, they could have done so during the opposition proceedings or at the latest with their statement of grounds of appeal.
- 3.4.6 With regard to the cited statement of the Board's preliminary opinion, it merely indicated the reason why the co-extrusion feature was possibly to be considered as inventive, but was not to be interpreted as an invitation to submit further evidence (point 12.3 of

the communication under Article 15(1) RPBA, see also point 18). In the light of the foregoing, the Board does not see any exceptional reasons which would justify admitting document D33 into the proceedings.

3.4.7 In view of this, document D33 is not taken into account (Article 13(2) RPBA).

3.5 Problem solved by the co-extrusion feature

3.5.1 According to the respondent, the use of co-extrusion is advantageous as all layers can be applied and, if necessary, vulcanised simultaneously (rejoinder, page 33, first full sentence). Therefore, it was stated during the oral proceedings that the objective problem to be solved was the provision of an efficient process allowing to obtain an insulation layer with a reduced conductivity.

3.5.2 The appellant did not contest the advantage of co-extrusion alone, but argued that the partial problem approach should be applied to that feature as there was no evidence that it interacted with any of the distinguishing features identified in the context of the main request.

3.5.3 The Board agrees with the respondent that co-extrusion can be seen as an efficient method allowing to apply multiple layers on a cable conductor in one go. However, the Board also agrees with the appellant, there is no evidence on file that co-extrusion provides any additional effect going beyond said improved efficiency. In other words, the Board fails to recognise a functional interdependence between the mineral oil compressor (distinguishing feature (i)), the use of a semiconductive layer comprising carbon

black (distinguishing feature (ii)) and the co-extrusion (distinguishing feature (iii)). Under these circumstances, what has to be established for the assessment of inventive step is whether each of these features is separately obvious in the light of the prior art (Case Law, I.D.9.3.2). As noted under point 1.3 of the present decision, distinguishing features (i) and (ii) were found to be obvious for a person skilled in the art wishing to solve the partial problems addressed by these features.

3.5.4 Accordingly, for auxiliary request 1, what remains to be assessed is whether it was obvious for a skilled person wishing to improve the efficiency of the process of D7 (partial problem solved by distinguishing feature (iii)) to apply the semiconductive layer and the insulation layer by co-extrusion.

3.6 Obviousness of the co-extrusion feature

3.6.1 According to the appellant, it was known from D18 (paragraph [0042]) and therefore obvious to apply the different polymeric layers of a cable by co-extrusion (letter dated 13 September 2023, page 2, penultimate paragraph).

3.6.2 The respondent criticised that D18 had neither been mentioned in the statement of grounds of appeal nor in the contested decision (letter dated 17 December 2024, page 20, paragraph 88). During the oral proceedings, the respondent argued that D18 would not disclose that the different layers of a cable could be applied by co-extrusion even if that technical term was mentioned in paragraph [0042].

3.6.3 As to the respondent's allusion that the reference to D18 was filed late, the Board notes that this document was mentioned in the statement of grounds of appeal (page 14, fourth full paragraph). While it is true that D18 was not cited in the grounds of the contested decision, it is pointed out that there was no need for the opposition division to discuss this document in the context of auxiliary request 1, since the patent was maintained on the basis of the main request. Consequently, the Board does not see why the reference to D18 in the context of auxiliary request 1 should be disregarded.

3.6.4 As noted by the appellant, paragraph [0042] of D18 discloses that cables containing a semiconductive composition can be produced by extrusion. In the list of possible extrusion techniques, an example of co-extrusion is given. Although D18 does not explicitly disclose that the co-extrusion can be used to coat a conductor with a semiconductive composition and an insulation composition, it is obvious to the skilled person that this type of application can be applied to various polymeric compositions such as the one mentioned in operative claim 1. Furthermore, it was not disputed by the parties that the skilled person would immediately recognise the advantage of co-extrusion in terms of process efficiency (for the same reason that the effect of co-extrusion was recognised for the formulation of the technical problem without corresponding experimental evidence in the opposed patent).

3.7 Under these circumstances, in the light of D18 and common general knowledge, it was obvious to a skilled person wishing to improve the efficiency of the process of D7 to apply the coating layers by co-extrusion. As

all distinguishing features are found to be obvious, the subject-matter of operative claim 1 does not involve an inventive step starting from D7 as the closest prior art.

Auxiliary requests 2 and 3

4. Admittance

4.1 Auxiliary requests 2 and 3 were filed by the respondent with the rejoinder to the statement of grounds of appeal. Their admission to the proceedings is subject to the discretionary power of the Board.

4.2 The appellant requested that auxiliary requests 2 and 3 not be admitted to the proceedings. They contended that the respondent had not provided any reason why these requests could not have been filed earlier. In addition, the appellant criticised that auxiliary requests 2 and 3 diverged from the subject-matter claimed in auxiliary request 1 and should therefore not be admitted (letter dated 7 November 2024, page 8, first full paragraph).

4.3 According to the respondent, auxiliary requests 2 and 3 corresponded to auxiliary requests 2 and 3 filed with letter dated 14 July 2022 during opposition proceedings. Auxiliary request 2 was submitted to ensure that claim 1 was unambiguously novel over D1 and to overcome the objection of lack of inventive step starting from document D7 as the closest prior art (rejoinder, page 33, paragraphs 144 and 146). Auxiliary request 3 was filed to address *inter alia* the objections of lack of inventive step relying on D14 (rejoinder, page 33, paragraph 147). The respondent further argued that the auxiliary requests were

diverging because different objections needed to be addressed (rejoinder, page 36, paragraph 160).

4.4 The Board notes that auxiliary requests 2 and 3 were initially filed on 14 July 2022, before the final date for submitting amendments under Rule 116 EPC (which was set at 15 July 2022). Furthermore the purpose of these requests was clearly identified both in opposition and appeal proceedings (letter dated 14 July 2022, page 6, paragraph 33 to page 8, paragraph 40; rejoinder, page 33, paragraphs 144, 146 and 147). Although it was not explained why these requests could not have been filed at an earlier stage of the opposition proceedings, the Board is not convinced that this criterion alone should justify the non-admittance of a request during the opposition proceedings, contrary to the situation in appeal proceedings (see Article 12(6) RPBA). While it is true that the subject-matter covered by these requests diverges from that of auxiliary request 1, the Board notes that the patent proprietor was faced with several different objections of lack of novelty and lack of inventive step. It is therefore equitable that, in response to these objections, the patent proprietor be given the opportunity to address one or more of these objections by filing a reasonable number of divergent requests.

4.5 Under these circumstances, the Board finds it appropriate to exercise its discretion under Article 114(2) EPC by admitting auxiliary requests 2 and 3 into the proceedings.

5. Inventive step over document D7 - Auxiliary request 2

5.1 Claim 1 of auxiliary request 2 differs from claim 1 of the main request in that the cable structure comprises

an inner semiconductive layer comprising a semiconductive composition comprising carbon black, an insulation layer comprising a polymer composition comprising said LDPE, and an outer semiconductive layer which comprises a semiconductive composition with carbon black in that order wherein the semiconductive layers are identical (the additions are underlined by the Board).

- 5.2 In the present section, the Board focuses on the question whether the additional features of operative claim 1 (the presence of two identical semiconductive layers in a specific order) can justify the acknowledgement of an inventive step. In that respect it was not disputed that these features represented an additional difference over the disclosure of D7 as the closest prior art (hereinafter referred to as distinguishing features (iv)) and the Board has no reason to depart from that view.
- 5.3 Problem solved by distinguishing features (iv)
- 5.3.1 According to the respondent, the manufacturing process is simplified if a single composition can be used for both semiconductive layers (rejoinder, page 33, paragraph 146). During the oral proceedings, the respondent further stated that the use of identical semiconductive layers made it easier to avoid incompatibility issues between the insulation layer and the semiconductive layers and that the partial problem approach was appropriate in the context of auxiliary request 2 (i.e. that there was no functional interdependence between the mineral oil compressor (distinguishing feature (i)), the use of a semiconductive layer comprising carbon black

(distinguishing feature (ii)) and distinguishing features (iv)).

5.3.2 The appellant contended that the patent proprietor had provided no example of the present arrangement of coating layers (corresponding to distinguishing features (iv)). Furthermore, the opposed patent did not contain any statement that these features could be advantageous. Therefore, the objective problem solved by features (iv) should be seen as the provision of an alternative cable.

5.3.3 In principle, the Board agrees with the appellant that there is no clear basis in the opposed patent for the alleged advantages linked to the arrangement of the layers as defined in claim 1 of auxiliary request 2. However, the Board considers it acceptable that the use of the same composition (rather than different ones) for the semiconductive layers simplifies the manufacturing process of the cable. It is also logical that having identical semiconductive layers makes it easier for a person skilled in the art to ensure good compatibility of the insulation layer with both semiconductive layers: indeed, if an inner semiconductive layer and a top insulation layer are compatible, it can reasonably be expected that the same insulation layer will also be compatible with an identical outer semiconductive layer, thereby simplifying material selection and reducing the risk of interfacial issues. Therefore, the Board accepts the technical effects identified by them.

5.3.4 Accordingly, for auxiliary request 2, what remains to be assessed is whether it was obvious for a skilled person wishing to simplify the process of D7 and to avoid incompatibility issues between the layers to

apply two identical semiconductive layers with an insulation layer in-between (distinguishing features (iv)).

5.4 Obviousness of distinguishing features (iv)

5.4.1 According to the appellant, it was known from D29 (claim 18) and therefore obvious to apply an inner semiconductive layer, an insulation layer and an outer semiconductive layer whereby the semiconductive layers were identical (letter dated 13 September 2023, page 15, second and fourth full paragraphs).

5.4.2 The respondent argued that D29 did not offer a direct instruction to use the same material in both semiconductive layers (letter dated 17 December 2024, page 24, paragraphs 106 and 107).

5.4.3 As noted by the appellant, claim 18 of D29 discloses a cable construction comprising a conductor, an inner semiconductive layer, an insulation layer and an outer semiconductive layer. In addition, claim 18 specifies that at least one of the two semiconductive layers comprises a composition according to any one of the claims 1 to 13. While it is true that claim 18 does not disclose that the two semiconductive layers are identical, the Board considers this option to be obvious for a person skilled in the art, in particular if both layers are derived from a composition as defined in any one of the claims 1 to 13 of D29. Furthermore, it was not disputed by the respondent that the person skilled in the art would immediately recognise the advantages of identical semiconducting layers in terms of process simplicity and compatibility of the layers (for the same reasons as the ones for which those effects were recognised in the formulation

of the technical problem without experimental evidence, let alone a proper basis, in the opposed patent).

5.5 Under these circumstances, in the light of D29 and common general knowledge, it was obvious to a skilled person wishing to improve the simplicity of the process of D7 while avoiding incompatibility issues to apply two identical semiconductive layers with an insulation layer in-between. As all distinguishing features are found to be obvious, the subject-matter of claim 1 of auxiliary request 2 does not involve an inventive step starting from D7 as the closest prior art.

6. Inventive step over document D7 - Auxiliary request 3

6.1 Claim 1 of auxiliary request 3 differs from claim 1 of the main request in that:

(v) the cable is a direct current (DC) power cable;

(vi) the cable is operated at a voltage of 40 kV or higher.

6.2 In the present section, the Board focuses on the question whether the additional features of operative claim 1 (features (v) and (vi)) can justify the acknowledgement of an inventive step.

6.3 The appellant essentially argued that there was no difference between a DC power cable and an alternating current (AC) power cable in their construction (letter dated 13 September 2023, page 15, last paragraph and page 16, third paragraph). In any event the cables of

D7 could be operated both under AC or DC conditions and at voltages higher than 66 KV (paragraph [0050] of D7).

6.4 With respect to D7, the respondent contended that this document was not concerned specifically with DC cables. Hence distinguishing features (v) and (vi) were further selections from paragraph [0050] of D7 (rejoinder, page 35, paragraph 153).

6.5 The line of defence put forward by the respondent is limited to the argument that distinguishing features (v) and (vi) required selections from D7. The Board notes that these features are explicitly mentioned in paragraph [0050] of D7 (as noted by the appellant, see point 6.3 above). Therefore, in the absence of proof of an effect linked to these features, the Board considers that the selection of DC cable operated at a voltage of at least 40 kV is an arbitrary selection within the disclosure of D7 and therefore obvious for a skilled person.

6.6 Under these circumstances, the subject-matter of claim 1 of auxiliary request 3 does not involve an inventive step starting from D7 as the closest prior art.

Auxiliary requests 4 to 10

7. Auxiliary requests 4 to 10 were initially filed to address other objections than the inventive step objection starting from D7 as the closest prior art (rejoinder, page 35, paragraph 154 to page 36, paragraph 159). During the oral proceedings before the Board, the respondent agreed that the conclusion reached for the higher-ranking requests would also apply to auxiliary requests 4 to 10 (minutes of the oral proceedings, page 3, third paragraph). Therefore,

the Board concludes that the subject-matter of claim 1 of auxiliary requests 4 to 10 likewise lacks an inventive step starting from D7 as the closest prior art, for the same reasons as discussed with respect to the main request and auxiliary requests 1 to 3.

8. As a result, none of the pending requests fulfils the requirements of Article 56 EPC, and the patent must be revoked. There is further no need to address any other issue. In particular, the respondent's conditional request for remittal to the opposition division is moot since neither D1 nor D14 were considered as the closest prior art for assessing inventive step.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



D. Hampe

D. Semino

Decision electronically authenticated