

Internal distribution code:

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

**Datasheet for the decision
of 20 February 2014**

Case Number: T 0303/10 - 3.3.03

Application Number: 01954119.2

Publication Number: 1311619

IPC: C08L95/00, C08L91/06

Language of the proceedings: EN

Title of invention:

USE OF A BITUMEN/WAX COMPOSITION

Patent Proprietor:

BP OIL INTERNATIONAL LIMITED

Opponents:

Total Marketing Services
Sasol Wax GmbH

Headword:

Relevant legal provisions:

RPBA Art. 13(3)
EPC R. 80
EPC Art. 123(2), 123(3), 84, 83, 54, 56

Keyword:

Late-filed requests - admitted (yes)
Late-filed requests - scope of debate not extended
Amendment occasioned by ground for opposition - amendments allowable (yes)
Sufficiency of disclosure given as far as non inventive embodiment is concerned
Novelty of second non-medical use acknowledged
Inventive step of the second non-medical use denied

Decisions cited:

G 0002/88, G 0006/88, G 0002/10

Catchword:



**Beschwerdekammern
Boards of Appeal
Chambres de recours**

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 0303/10 - 3.3.03

**D E C I S I O N
of Technical Board of Appeal 3.3.03
of 20 February 2014**

Appellant: BP OIL INTERNATIONAL LIMITED
(Patent Proprietor) Chertsey Road
Sunbury-on-Thames,
Middlesex TW16 7BP (GB)

Representative: Hill, Simon Stephen
BP International Limited
Global Patents & Technology Law
Chertsey Road
Sunbury-on-Thames, Middx TW16 7LN (GB)

Respondent: Total Marketing Services
(Opponent 1) 24 Cours Michelet
92800 Puteaux (FR)

Representative: August & Debouzy avocats
6-8 avenue de Messine
75008 Paris (FR)

Respondent: Sasol Wax GmbH
(Opponent 2) Worthdamm 13-27
20457 Hamburg (DE)

Representative: Schupfner, Georg
Müller Schupfner & Partner
Patent- und Rechtsanwaltspartnerschaft mbB
Schellerdamm 19
21079 Hamburg (DE)

Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 23 December
2009 revoking European patent No. 1311619
pursuant to Article 101(3) (b) EPC.**

Composition of the Board:

Chairman: M. C. Gordon
Members: F. Rousseau
C. Vallet

Summary of Facts and Submissions

I. The appeal by the Patent Proprietor (Appellant) lies from the decision of the Opposition Division, posted on 23 December 2009, revoking European patent No. 1 311 619, originally filed as International Patent Application PCT/GB2001/003384 and published under WO 2002/016499.

II. The decision was based on two sets of claims submitted on 10 December 2009 during the oral proceedings as the Patent Proprietors' main and first auxiliary requests. Claim 1, 7 and 8 of the main request read as follows:

"1. Use of a wax as a hydrocarbon-containing-fuel resistant additive for a bitumen, wherein the wax is a petroleum or synthetic wax having a softening point of above 50°C and is added to the bitumen in an amount of 0.5 to 10 wt.% of the resulting wax/bitumen blend.

7. Use as claimed in any preceding claim, wherein the wax is added to a bitumen to form a binder, which is mixed with aggregate.

8. Use as claimed in claim 7, wherein the wax and bitumen are mixed in the presence of the aggregate, or wherein the wax is mixed with the bitumen prior to the addition of aggregate."

The claims of the auxiliary request differed from those of the main request in that in claim 1 the expression "hydrocarbon-containing-fuel resistant additive" was replaced by "hydrocarbon-fuel resistant additive".

III. Two notices of opposition were filed requesting revocation of the patent in its entirety on the grounds that its subject-matter lacked novelty and inventive step (Article 100(a) EPC) and was insufficiently disclosed (Article 100(b) EPC). The documents submitted before the Opposition Division included:

- D3a: Encyclopaedia of Chemical Technology, third edition, volume 24, pages 466-481, 1984
- D5: Sasobit® against tracking, The new additive for bitumen, Schumann Sasol, May 1999
- D6: Shoenberger J. E., "Performance of fuel resistant sealers for asphalt concrete pavements", J. of Materials in Civil Engineering, Vol. 6, No. 1, February 1994, pages 137-149
- D12: Kühnle A. et al, "Fischer-Tropsch-Wachse" Fette Seifen Anstrichmittel 84, No. 4, 982, pages 156-162
- D12a: Translation into English of D12
- D14: US 3,000,808
- D24: "Asphaltbefestigungen als Gewässerschutzanlage bei Tankstellen", Bitumen 2/1996, pages 61-66
- D24a: Translation into English of D24
- D28: Comparative tests using different types of waxes submitted by Opponents 1 with letter of 30.09.2009
- D33: Data sheet Polyethylene wax EW7
- D34: Comparative tests submitted by Opponent 1 with letter of 28.10.2009
- D35: Comparative tests submitted by the Patent Proprietor with letter of 19.11.2009
- D35a: Replacement page 5 of D35 submitted with letter of 26.11.2009

IV. According to the reasons of the decision under appeal the wording "use of a wax as a hydrocarbon-containing-

fuel resistant additive for a bitumen" had to be read as "use of a wax to improve the resistance of bitumen against hydrocarbon containing fuel". The amended claims complied with the requirements of Articles 84, 123(2) and 123(3) EPC. Sufficiency of disclosure was also acknowledged, in particular in view of experimental evidence D35. The experimental evidence of the opponents - D28 and D34 - were deemed to be less convincing since these tests failed to prove that not all waxes covered by the operative claim resulted in the required improvement of hydrocarbon-containing fuel resistance. Novelty was acknowledged, in particular in view of D5 and D14. D5 described that adding a wax - Sasobit® - which corresponded to the wax as defined in operative claim 1, to bitumen increased the time until the bitumen/wax composition was dissolved in toluene, which was a fuel. Although such an extended dissolution time was considered to translate into an increased resistance to fuel of the bitumen wax composition, D5 did not disclose that the fuel resistance of the bitumen itself was improved as required by claim 1. With respect of D14, novelty over the use disclosed in example 7 thereof was acknowledged. The effect of improving fuel resistance was described, but the amount of wax, as required by operative claim 1 was not disclosed in D14. Furthermore no proof had been provided that the wax employed in example 7 of D14 had the required softening point. The claimed subject-matter was found to lack an inventive step over the closest prior art constituted by the teaching of D14, which also dealt with the issue of fuel resistance. In the absence of any evidence that the amount of wax and its softening point defined in claim 1 were interrelated the objective problems solved by said features could be dealt with separately. The evidence of D35 showed that the amount of wax specified - which

was lower than that disclosed in D14 (see above) - resulted in inferior fuel resistance. Thus the technical problem to be solved by the specified amount of wax was the provision of a use which was inferior to that of D14. The provision of such a disadvantage could not support an inventive step. Even if the problem to be solved by the amount of wax were to be formulated as the provision of an alternative use, such would be rendered obvious by the disclosure of D14 itself which suggested employing 9 wt.% wax. With regard to the softening point, there was no evidence of any technical effect associated therewith, meaning that the specified softening point was an arbitrary selection. The problem solved over D14 by the softening point was thus the mere provision of an alternative use.

The consequence was that neither of the distinguishing features over D14 could contribute to an inventive step. The same held true for the auxiliary request.

- V. With the statement setting out the grounds of appeal of 20 April 2010, the Appellant submitted two sets of claims as its Main and First Auxiliary Requests, the respective claim 1 of those requests reading as follows:

Main Request

- "1. Use of a wax as a hydrocarbon-containing-fuel resistant additive for a bitumen, wherein the wax is a synthetic wax having a softening point of above 50°C and is added to the bitumen in an amount of 0.5 to 10 wt.% of the resulting wax/bitumen blend.

Auxiliary Request

"1. Use of a wax as a hydrocarbon-containing-fuel resistant additive for a bitumen, wherein the wax is a synthetic Fischer Tropsch wax obtainable by reacting carbon monoxide with hydrogen at high pressures over a metal catalyst, having a softening point of above 50°C and is added to the bitumen in an amount of 0.5 to 10 wt.% of the resulting wax/bitumen blend."

The main and auxiliary request still contained claims 7 and 8 having the same wording as claims 7 and 8 underlying the contested decision.

VI. The Rejoinder of Opponent 2 was submitted with a letter of 3 November 2010. The rejoinder of Opponent 1 submitted with a letter of 3 November 2010 was resubmitted in amended form with a letter of 25 November 2010. The rejoinders of the Respondents referred, *inter alia*, to the following new documentary evidence:

- D41: S. Jahanmir, "Chain Length Effects in Boundary Lubrication" *Wear*, 102 (1985), pages 331-349
- D42: Critical Reports on Applied Chemistry Volume 25 "Gasoline and Diesel Fuel Additives", Edited by K. Owen; Society of Chemistry, John Wiley & Sons 1989, pages 1-17
- D44: DIN 1996, Part 6, October 1988
- D47: <http://en.wikipedia.org/wiki/Wax> 19 November 2010

VII. After the Board had summoned the parties to attend oral proceedings further submission of Respondents / Opponent 1 and Opponent 2 were made with letters of 20 December 2013 and 23 December 2013, respectively. *Inter*

alia D48 (Römpp Chemie Lexikon, 9th Edition, 1990, pages 1222-1224) was submitted by Respondent Opponent 2 with a letter of 23 December 2013.

- VIII. In preparation of the oral proceedings, the Board issued a communication on 22 January 2013, in which the Board in addition of the issues raised by the parties addressed the question of whether the function of the wax could be considered as a functional feature within the meaning of G 2/88. To that effect, the question arose whether claim 1 defined the use of a compound for achieving an effect within the meaning of decisions G 2/88 or the use of that additive in preparing a product, in particular a bituminous composition comprising a mixture of bitumen and of that additive.
- IX. Additional written submissions of Respondent/Opponent 2 were made with letter of 28 January 2014.
- X. At the oral proceedings before the Board, held on 20 February 2014, the Appellant submitted two sets of claims superseding the previous main and auxiliary requests, after the Board had reached the conclusion that the claims submitted with the statement setting out the grounds of appeal were to be construed as the use of the wax additive in the process of preparing a bitumen composition, i.e. a process of preparing a bitumen composition using a wax additive, in which case the function of the wax could not be considered as a functional feature within the meaning of G 2/88. The claims of those requests relevant for the present decision read as follows:

Main Request

- "1. Use of a wax as a hydrocarbon-containing-fuel resistant additive for a bitumen to improve the fuel resistance of the bitumen, wherein the wax is a synthetic wax having a softening point of above 50°C and is added to the bitumen in an amount of 0.5 to 10 wt.% of the resulting wax/bitumen blend.
3. Use as claimed in claim 1, wherein the wax is a Fischer Tropsch wax.
4. Use as claimed in claim 3, wherein the wax is obtainable by reacting carbon monoxide with hydrogen at high pressures over a metal catalyst."

Auxiliary Request

- "1. Use of a wax as a hydrocarbon-containing-fuel resistant additive for a bitumen to improve the fuel resistance of the bitumen, wherein the wax is a synthetic Fischer Tropsch wax obtainable by reacting carbon monoxide with hydrogen at high pressures over a metal catalyst, having a softening point of above 50°C and is added to the bitumen in an amount of 0.5 to 10 wt.% of the resulting wax/bitumen blend."

XI. The Appellant's arguments can be summarised as follows:

- a) The filing of the new main and auxiliary requests had been prompted by Board's indication at the oral proceedings that the formulation of the claims submitted with the statement setting out the grounds of appeal was not appropriate to define a second non-medical use within the meaning

of G 2/88. The new claims constituted an attempt to overcome the Board's objection that the fuel resistance of the additive in the previous sets of claims could not be considered as a functional feature of the claims in the sense of G 2/88. Hence, they should be admitted into the proceedings.

- b) Claim 1 of the Main request was in particular based on a combination of claims 1, 2 and 8 as originally filed in which one of the two options disclosed in claim 2 had been selected and the preferred amount of fuel resistant wax had been incorporated following the disclosure on page 4, line 7 of the application as originally filed. In addition, the general definition of the wax being "hydrocarbon-containing-fuel resistant" and that it was used to improve the fuel resistance of the bitumen was to be found in the application as originally filed on page 1, lines 20-21 and page 3, lines 19-20 as well as page 5, lines 23-25, respectively. Claim 1 of the main request complied with the requirements of Article 123(3) EPC because the definition of the wax additive and its amount had been restricted compared to claim 1 as granted.

- c) Concerning sufficiency of disclosure, D3a showed that the measurement of the softening point by the ring-and-ball method was conventional in the art for synthetic waxes having higher viscosity than amorphous waxes. An example of commercial wax which was defined by its softening point was given with D33. In addition, the attaining of an improved resistance to fuel could be verified by comparing the results obtained in the presence and

the absence of the wax additive. In this context, the present claims, although they were not specific in this respect, did not exclude that the wax could be used in the presence of aggregates. It was therefore the burden of the Respondents/Opponents to prove that the claimed invention was not sufficiently disclosed.

- d) As to novelty, D14 disclosed the use of a highly oxidised microcrystalline paraffin wax, which resin did not equate with synthetic waxes and therefore did not necessarily have a softening point above 50°C. Moreover, the Respondents had estimated the softening point of the oxidized wax of D14 assuming that the softening point of the bitumen/wax mixture would vary linearly as a function of the amount of wax. Such linear relationship, however, did not exist as demonstrated for Sasobit® by the data summarized on page 3 of D5. Novelty over D14 was therefore to be acknowledged.

- e) D5 merely disclosed that Sasobit® was to be used for heavily loaded areas, but did not disclose its use in the context of areas exposed to fuel spillage. The passage of D5 dealing with the solubility in toluene of Sasobit® and of bitumen only dealt with the separation of the binder and the aggregates from the bitumen composition. That passage could not be read in connection with the other passages of D5 relating to a different context. Therefore, there was no disclosure in D5 of Sasobit® improving the toluene or fuel resistance of the bitumen. Novelty over D5 was thus also given.

- f) Concerning inventive step, the closest prior art was represented by the disclosure of D14, in particular its example 7 dealing with pavement compositions. The subject-matter of claim 1 of the main request differed from that disclosure in that (i) the wax amount was lower than the amount of wax employed in the example in D14, (ii) the softening point of the wax according to claim 1 was restricted to values above 50°C whereas the softening point of the wax was not explicitly stated in D14 and (iii) the wax was a synthetic wax whereas according to D14 it was a highly oxidised microcrystalline paraffin wax, e.g. oxidised slack wax.
- g) Having regard to D14, the technical problem could be defined as the provision of a superior wax for fuel resistance of bitumen. This technical problem was solved by the use of a synthetic wax having a softening point of above 50 °C in an amount of 0.5 to 10 wt.%, as demonstrated by test reports D35 and D35a wherein the wax Vivamelt U64-66 could be considered to represent the wax used in D14. In particular Figures 1, 3 and 4 of D35 showed that the synthetic waxes EW7, Sasobit® and A-C 7686 were generally superior to Vivamelt U 64-66. If fuel resistance could be achieved according to the present invention with a lower amount of wax than in D14, that implied that the wax was more effective - that is, it was superior. In Example 6 of D14 the oxidised slack wax was used in the majority amount. In the present invention, the wax was merely added in an amount of 0.5 to 10 wt.%.
- h) The solution to the technical problem was not obvious from D14. D14 related to the use of a

different class of waxes, namely highly oxidised paraffin waxes. D14 did not suggest or teach the use of synthetic waxes, let alone a wax having a softening point above 50°C. For this reason at least, the claims of the main request were inventive in view of D14. Also, the general teaching of D14 was to use a ratio wax:petroleum residuum extending up to 4:1 which was higher than the amount of wax specified and claimed according to the present invention. Hence, the subject-matter of the main request was inventive. The claims of the auxiliary request corresponded to the main request except that the wax had been defined as a synthetic Fischer Tropsch wax obtainable by reacting carbon monoxide with hydrogen at high pressures over a metal catalyst. The test reports D35 and D35a showed that fuel resistance was achieved with 8 wt.% Sasobit® wax, whereas a minimum amount of 9 wt.% was mandatory in D14, the examples of D14 using even larger amounts. The experimental results supported the conclusion that the synthetic Fischer Tropsch waxes were generally superior to the waxes used in D14. Such superior performance would not be obvious to the person skilled in the art in view of D14 for the same reasons as for the main request. The subject-matter of the auxiliary request was therefore also inventive.

XII. The arguments of the Respondents can be summarised as follows:

- a) The new main and auxiliary requests submitted during the oral proceedings were late filed. Said requests could have been submitted earlier in the light of the issues raised in the Board's

communication. As to claim 1 of the main request, the combination of features specified, i.e. an amount of 0.5 to 10 wt.% of additive, the additive being a synthetic wax and a softening point of above 50°C for that additive, had been selected from various passages of the application as filed, in which they were attributed various degrees of preference. In particular, the range of 0.5 to 10 wt.% was disclosed for fuel resistant waxes but not for hydrocarbon-containing-fuel resistant waxes/additives. Also the Appellants had selected on page 5, lines 23-24 the feature that the additive should provide fuel resistance, whereas lubricant resistance was also disclosed. In the absence of any pointer to this combination of features in the application as filed, the subject-matter of claim 1 of the new main request was not allowable in view of Article 123(2) EPC, reference being also made to decision T 1511/07.

Furthermore, the application as filed did not disclose the wording "to improve the fuel resistance", but on page 5, line 23 to "impart fuel resistance properties". Moreover, the wording "a hydrocarbon resistant, preferably fuel resistant additive" in granted claim 1 defined that fuel resistant additives constituted a preferred sub-group of hydrocarbon resistant additives, which meant that the fuel to which the additive was resistant consisted of hydrocarbons only. Thus, the replacement of the wording "hydrocarbon resistant additive" by "fuel resistant additive" not only infringed the requirements of Article 123(2) EPC, but also those of Article 123(3) EPC. As examples of additives which were not encompassed by the granted claims, but were within the ambit of amended claim 1 were

mentioned additives which had resistance to a water-in-oil emulsion or a biofuel. It was also outlined that the deletion of dependent claims 7 and 8 did not comply with the requirements of Rule 80 EPC, because such deletion was not directed to overcoming a ground of opposition. In addition claim 1 still contained the wording "is added". Respondents Opponents 1 was of the opinion that the wording "Use of a wax as a hydrocarbon-containing-fuel resistant additive for bitumen" indicated that it was the use of the wax in bitumen that conferred resistance against hydrocarbon containing fuels to the mixture resulting from the addition of the wax to the bitumen. Respondents Opponents 2 argued citing D41 and D42 that an additive did not change the properties of the base material to which it was added, but allowed the resulting mixture to fulfil a requirement that the base compound did not itself fulfil. Therefore, the fuel resistance of the bitumen itself could not be changed by the addition of the wax, meaning that it was the wax which was defined to be resistant against hydrocarbon containing fuels. The fact that the Respondents attributed a different meaning to that wording showed that it was ambiguous, claim 1 of the main request therefore lacking clarity, contrary to the requirements of Article 84 EPC. Therefore, the late filed main request was prima facie not allowable.

- b) As regards the ground of opposition under Article 100(b) EPC, the patent did not provide any definition of the term "softening point" which was not a parameter common for waxes, those being usually classified by their congealing point. The

patent referred in paragraph [0007] to softening point and melting point for defining the wax, although those were not identical. The values for the congealing point and the melting point were also different as shown by D3a, page 479 and D48. In the absence of any definition for the test method to be employed for identifying the wax additive which was an essential feature of the invention, the skilled person would be deprived of the promise of the invention. Moreover, claim 1 did not indicate how to measure the improvement in fuel resistance. The only method indicated in the patent in suit was in the context where aggregates were present, although present claim 1 was not restricted to said embodiment. Moreover, the improvement of fuel resistance was a feature of the claimed invention, which improvement was not obtained by all synthetic waxes defined in claim 1 of the main request as shown by D28. Even experimental evidence D35 submitted by the Appellants demonstrated, for example for the wax "Vivamelt U 64-66", that the finding of whether or not an increase of fuel resistance was observed depended on the definition of said property and the method chosen for its measurement, in particular on whether the composition tested comprised aggregates. It was referred to the results of D35, i.e. to an asphalt immersion test shown in Figure 1 or to a bitumen immersion test shown in Figure 3 of that document. Therefore, the invention did not meet the requirements of sufficiency of disclosure.

- c) Concerning novelty, D5 disclosed the use of Sasobit®, i.e. the wax additive exemplified in the patent in suit, in amounts lying within the

presently claimed range and for covering the same surfaces as those defined in [0022] of the patent in suit. D5 also described that Sasobit® was resistant to toluene which compound was encompassed by the term "fuel". Considering that the expression "wax as a hydrocarbon-containing-fuel resistant additive for bitumen" meant that the wax had to be resistant against hydrocarbon containing fuels, Respondents - Opponents 2 concluded that the subject-matter of claim 1 lacked novelty over D5. In any event D5 disclosed that Sasobit® increased compaction and density of the bitumen concrete, the amount of voids being reduced. As it was well known for example from D24 that the amount of degradation of the bitumen by fuel depended on the accessibility of the fuel to bitumen, i.e. on the available surface area and penetrability of the bitumen composition, it was implicit that Sasobit® would not only provide an increase of compaction and density, but also an increase in fuel resistance. Respondents - Opponents 1 argued that the indication in D5 that Sasobit® was less soluble than bitumen when the binder was recovered from asphalt (bitumen concrete) in toluene, which was a fuel, represented a disclosure that Sasobit® was a fuel resistant additive. Claim 1 of the patent in suit which did not contain any additional technical information compared to D5 was therefore anticipated by that prior art. Furthermore, the resistance to fuel of that additive did not result in a new use of the additive. Novelty over D5 had therefore to be denied.

- d) D14 disclosed mixtures of bitumen and an oxidised microcrystalline wax, which in view of paragraph

[0011] of the patent in suit and as shown by D3a on page 477, was a synthetic wax. Such type of wax had necessarily a softening point much higher than 50°C as was demonstrated by table 7 on page 478 of D3a. Furthermore, the softening point of the wax was not clearly defined in claim 1 and therefore could not be used to distinguish the subject-matter of claim 1 from D14. It was furthermore referred to D47 according which to wax characteristically melted above 45°C, which meant that the softening point was higher than 45°C. More specifically, the mixture of bitumen and oxidized wax in example 3 of D14 exhibited a softening point of 89°C, despite the use of a bitumen having a softening point of 52°C. It could therefore be deduced that the softening point of the wax was necessarily above 89°C. A comparison of the softening points of the bitumen - wax oxidate mixtures disclosed in Examples 1 and 2 of D14 which contained different known amounts of the same wax-oxidate allowed the softening point of the wax oxidate used in those examples to be computed, which necessarily was above 50°C. Moreover, the amount of wax used in D14 could be as low as 9 wt.% as indicated in column 3, lines 19-21, and claim 1 of D14 which disclosed a weight ratio wax / heavy petroleum residue of 0.1 to 1, the lower ratio being not limited to the preparation of pipe enamel charge formulations. Finally, the addition of the oxidized wax was disclosed by column 3, lines 11 and 15 and examples 3 and 7 to provide fuel resistance to the bituminous composition. Consequently, the subject-matter of claim 1 of the main request lacked novelty over D14.

e) As regards inventive step, the closest state of the art was constituted by D14 which described waxes having a softening point above 50°C, D3a confirming on page 474 that synthetic waxes had high softening point values. The comparison offered by the Appellant with Vivamelt U64-66 in D35 was not with a synthetic wax as used in D14, but a petroleum wax. It was clear from Figures 1 and 3 of D35 submitted by the Appellant that Fischer Tropsch waxes offered no unexpected benefits from the perspective of fuel resistance compared to other synthetic waxes. In fact, A-C 7686 a polyethylene wax performed better than the Fischer Tropsch wax. Moreover, the Appellant had not shown any effect resulting from the use of a wax having a softening point above 50°C. According to Opponent 2, any wax would provide an improvement of the fuel resistance, which for Fischer Tropsch waxes was shown by D12, page 162. Hence, the problem solved by the subject-matter of the main request over D14 could only be seen as the provision of an alternative. Adding a different synthetic wax such as Sasobit was however obvious in view of D5 for the skilled person. An inventive step should be therefore denied.

XIII. The Appellant (Patent Proprietor) requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request or alternatively on the basis of the auxiliary request both filed on 20 February 2014 at the oral proceedings.

XIV. The Respondents (Opponents 1 and 2) requested that the appeal be dismissed.

XV. At the end of the oral proceedings the decision of the Board was announced.

Reasons for the Decision

1. The appeal is admissible.

Admissibility of the new Main Request and Auxiliary Request

2. The Respondents Opponents 1 and 2 requested that the set of claims according to the main request and auxiliary request submitted during the oral proceedings before the Board should not be admitted into the proceedings.

3. Some of the criteria that a board shall apply in exercising its discretion to admit and consider amendments to a party's case after it has filed its grounds of appeal or reply include according to Article 13(1) RPBA complexity of the new subject-matter submitted, the current state of the proceedings and the need for procedural economy, while Article 13(3) RPBA adds that amendments sought to be made after oral proceedings have been arranged shall not be admitted if they raise issues which the Board or the other parties cannot reasonably be expected to deal with without adjournment of the oral proceedings.

4. The filing of the new main request and auxiliary request was prompted by the Board's conclusion announced at the oral proceedings that the wording chosen for claim 1 of the previous main and first auxiliary requests did not result in the fuel resistance resulting from the presence of 0.5 to 10 wt. % of the wax additive constituting a functional technical feature of that claim within the meaning of

decisions of the Enlarged Board of Appeal G 2/88 (OJ EPO 1990, 93) and G 6/88 (OJ EPO 1990, 114), whereby said functional feature appeared to be the sole potential distinguishing feature over prior art D5.

5. The insertion of the wording "to improve the fuel resistance of the bitumen" is for the purpose of putting claim 1 in the format of a second non-medical use claim within the meaning of decisions G 2/88 and G 6/88, claim 1 now containing as additional feature the function of the wax additive. Following the deletion from the previous main request and auxiliary request of dependent claims which specified the order of mixing of the bitumen, the wax and the aggregates, which claims cast doubt on the meaning of independent claim 1, there is no longer any reason to construe present claim 1 as directed to a use of a wax in the process for making a composition comprising, bitumen, wax and possibly aggregates. The wax is now defined to be present in order to achieve the function of improving "the fuel resistance of the bitumen", whereas in the previous version of the claims its "use" could be merely that it was present in the composition. Hence, these amendments are in direct response to the Board's finding that claim 1 of the previous requests could be considered to lack novelty over D5 as being not directed to a second non-medical use within the meaning of G 2/88 or G 6/88.

6. The Respondents' arguments that claim 1 of the new main request and auxiliary request would not be prima facie allowable having regard to the requirements of Articles 84, 123(2) and (3) EPC concern objections (see points 8 to 16 below) in relation to features or combination of features already present in the previous sets of claims. In other words, the formal objections

raised by the Respondents have not been triggered by the amendments made to the previous main and auxiliary requests. Moreover, since the opposition division and the parties had, before issuance of the Board's communication, interpreted the claims as relating to a second non-medial use, the amendments made do not in fact change the accepted or agreed meaning of the respective claims 1. Thus, the amendments made to the previous requests do not extend the scope or the framework of debate as compared to the interpretation underlying the decision under appeal, the statement of grounds of appeal and the reply of the parties thereto. Moreover, the Respondents' argument that the amendment would be contrary to the requirements of Rule 80 EPC fails to convince, because the amendments were occasioned by a ground of opposition, namely as already indicated in above point 5 to restore novelty over prior art D5 by making the improved fuel resistance defined to be provided by 0.5 to 10 wt.% of the wax additive a functional technical feature of claim 1.

7. Hence, the board, in exercise of its discretion under Article 13(1) RPBA, admits the new main request and auxiliary request into the proceedings.

Main Request

Article 123(2) EPC

8. Claim 2 as filed discloses in view of its dependency on claim 1 the use of a synthetic wax having a softening point of above 50°C as a hydrocarbon resistant, preferably fuel resistant additive for a bitumen.
9. In accordance with general knowledge, fuels tend to dissolve or soften the bitumen component of bituminous

surfaces (see for example page 1, lines 16-17 of the application as filed and document D6, page 137, first and second paragraph of the introduction). The passage bridging pages 1 and 2 of the application as filed also indicates that the invention provides the use of a wax as a hydrocarbon resistant, preferably lube oil or fuel resistant additive for a bitumen, which is consistent with the statement that the wax employed in the present invention (page 5, lines 23-25) may be used to impart fuel resistance properties against any hydrocarbon-containing fuels or lubricant, examples of fuels being disclosed to be motor fuels and aviation fuels, such as gasoline, diesel, av gas and jet fuels (page 5, lines 23-25 and claim 11 of the application as filed).

10. The above examples of fuels which dissolve or soften bitumen were known for the skilled reader at the date of filing to comprise various additives which do not consist of hydrocarbons. The same holds true for lubricants. The view expressed by the Respondents that the expression "hydrocarbon resistant, preferably fuel resistant" in original claim 1 and in the patent as granted, would mean that the fuel is a preferred embodiment of hydrocarbons and therefore must be understood to consist exclusively of hydrocarbons can only be arrived at by an exclusively semantic analysis of that expression taken in isolation of the overall technical disclosure of the application as filed. The analysis made by the Respondents of the objected expression ignores the technical reality underlying the problem addressed in the application as filed and therefore lacks the necessary objectivity required for an assessment of whether the amendments extend beyond the content of the application as filed (see G 2/10 (OJ EPO, 2012, 376), point 4.3 of the Reasons).

11. Thus, the expression "hydrocarbon resistant, preferably fuel resistant" in original claim 1 and in the patent as granted in claim 1 as originally filed cannot be intended to be restricted to an additive which is resistant only to fuels consisting of hydrocarbons. The only technically sensible meaning of the term "preferably" in claim 1 as originally filed in the context of the technical field and disclosure of the application is that the additive provides resistance to hydrocarbons in general, preferably to hydrocarbons contained in fuels. The definition of the wax being a hydrocarbon-containing-fuel resistant additive in present claim 1 therefore does not change the definition of the wax provided in original claim 1, which meaning, due to the dependency applied also to original claim 2. Therefore that amendment cannot itself extend the content of the application as filed within the meaning of Article 123(2) EPC.
12. This limitation of the amount of wax to the preferred range of 0.5 to 10 wt.% of the resulting wax/bitumen blend is disclosed on page 4, lines 6-7 of the original application where amounts for the "fuel resistant waxes" are specified. This limitation represents a quantitative restriction of the range envisaged within the application as filed with the sole effect of excluding amounts of "fuel resistant" wax which are disclosed in the application as filed to be less preferred. This disclosure is given independently of the type of fuel resistant wax to be used, i.e. whether or not the wax is a petroleum wax or a synthetic wax having a softening point of above 50°C. In the absence of any indication that such preferred range was intended to apply exclusively to petroleum wax, i.e. the sole other general class of waxes disclosed in the application as filed, the application as filed

unambiguously disclosed as a preferable embodiment the use of a synthetic wax having a softening point of above 50°C in an amount of 0.5 to 10 wt.% of the resulting wax/bitumen blend.

13. The argument that the definition of a particular wax, i.e. of the synthetic type, a particular amount of wax and the nature of the fuels would constitute an undisclosed multiple selection of various variables within the teaching of the application as filed is not convincing. Said combination of features is not arbitrary but is supported by a direct and unambiguous disclosure in the application as filed, as shown in above points 8, 11 and 12, as well as an additional pointer for this combination of features in examples 1 and 2 which illustrate the subject-matter of claim 1 as now amended.

14. Consequently, the objection that the subject-matter of amended claim 1 would not meet the requirements of Article 123(2) EPC fails to convince.

Article 123(3) EPC

15. Compared to claim 1 as granted, the restriction of the definition of the wax additive to synthetic waxes and the limitation of their amount do not result in a broadening of the scope compared to granted claim 1. Moreover, in view of the meaning to be attributed to the expression "as a hydrocarbon-containing-fuel resistant additive" in amended claim 1 (see point 11 above), which is the same as in claim 1 as granted, amended claim 1 is not directed to a use which was excluded by the wording of claim 1 as granted. Hence, the objection of the Respondents that the subject-

matter of the Main Request would extend the protection conferred by the patent cannot persuade either.

Article 84 EPC

16. It is established case law that since an objection of lack of clarity under Article 84 EPC is not a ground of opposition, an objection of lack of clarity cannot be raised in opposition proceedings if the alleged lack of clarity already existed in the granted claims and has not been introduced by amendment made during the opposition proceedings. Claim 1 as granted defines the wax as a hydrocarbon resistant, preferably fuel resistant additive for a bitumen. Therefore, the alleged ambiguity of claim 1 as to whether the claim requires that the wax be resistant against hydrocarbon containing fuels or that the claim requires that the use of the wax in bitumen confers resistance against hydrocarbon containing fuels to the mixture resulting from the addition of the wax to the bitumen does not stem from amendments made subsequent to grant but is a result of the wording employed in claim 1 as granted. Thus, the objection of lack of clarity raised against claim 1 of the main request can not be considered in these appeal proceedings.

Assessment of the grounds of opposition - preliminary remark

17. Notwithstanding that Article 84 EPC is not a ground of opposition, it is nevertheless necessary to interpret the meaning of the expression "as a hydrocarbon-containing-fuel resistant additive for a bitumen to improve the fuel resistance of the bitumen" in the light of the patent in order to examine the invoked grounds of opposition. The meaning of "fuel resistance"

and its method of measurement require particular attention.

18. The passages on page 3, lines 14, 18, 36 and 50 of the patent in suit, in line with the wording of present claim 1, make clear that the product resulting from the addition of wax to bitumen is a blend of those products. From the definition of an additive in D41 and D42 cited by Respondents-Opponents 2 and paragraphs [0005] and [0013] of the patent stating that the wax additive is used to improve the fuel resistance of the bitumen, which function has now been introduced into claim 1, it is apparent that the expression "a hydrocarbon-containing-fuel resistant additive for a bitumen" is not meant to define that the wax additive itself should be resistant to hydrocarbon-containing-fuel, although such property might be necessary in order to achieve resistant to fuel of the obtained binder, but is intended to define that the addition of wax to the bitumen results in a resistance to fuel of the binder mixture (wax and bitumen) which resistance is higher than that of the bitumen component alone.

19. In the light of the technical problem underlying the present invention, namely that fuels tend to dissolve or soften the bitumen of the bituminous surface (see point 9 above), an improved "fuel resistance" can thus only be seen as a detectable - but unquantified as to its degree - reduction of softening or dissolution of the bituminous composition in the fuel to which it is exposed. In this context, attention needs to be paid not only to the absence of any restriction with respect to the quantification of such reduction, but also to the absence of any definition in respect of the method to be used to determine such resistance to softening or dissolution of the bituminous composition. Consequently

any method can be employed, whether described in the patent in suit or which method would be considered by the skilled person to be conventional in the art concerned. Such a method could be the Falling Ball Test - derived from a standard bitumen test - and employed by the Respondents Opponents 1 in Experimental Report D34 and by the Patent Proprietors in Experimental Report D35. Although the examples of the patent in suit are intended to illustrate the fuel resistance improvement in the framework of bituminous compositions comprising aggregates, claim 1 is, in the absence of any definition to that effect, not restricted and encompasses a use wherein the composition is free of aggregate. The tests employed by the Respondents Opponents 1 and by the Appellants Patent Proprietors in Experimental Reports D34 and D35, respectively demonstrate that this interpretation of the subject-matter claimed in respect of the presence of aggregates is in accordance with that of the parties.

Sufficiency of disclosure

20. The question to be answered when assessing sufficiency of disclosure is whether the invention as defined in the claims can be performed by a person skilled in the art throughout the whole area claimed without undue burden, using common general knowledge and having regard to further information given in the patent in suit. In the present case, the question has to be answered whether the use of 0.5 to 10 wt.% of a synthetic wax having a softening point above 50°C in bitumen leads to a mixture having a fuel resistance which is better than that of the bitumen without said wax.

21. Synthetic waxes suitable for providing fuel resistance are described in claim 4 and in paragraph [0008] of the patent in suit to include Fischer Tropsch waxes. It is not disputed that those waxes and their synthesis are well known to the skilled person so that their definition in claim 1 does not lead to a lack of sufficiency of disclosure. They are defined in paragraph [0010] of the patent in suit to have melting points between 65 and 105°C, for example, 68 to 105°C. A preferred example of a Fischer Tropsch wax is indicated to be sold under the trade mark Sasobit®, this wax melting at approximately 100°C (paragraph [0010]).
22. It is also undisputed by the parties that a synthetic Fischer Tropsch wax obtainable by reacting carbon monoxide with hydrogen at high pressures over a metal catalyst, having a softening point of above 50°C, such as Sasobit®, when added to the bitumen in an amount of 0.5 to 10 wt.% of the resulting wax/bitumen blend, provides fuel resistance within the meaning of the patent in suit. Such effect is demonstrated by experimental reports D34 and D35, provided by the Respondents - Opponents 1 and the Appellants, respectively, as well as by the examples of the patent in suit.
23. The Respondents' argument that the choice of the measurement method for determining the softening point has an influence on the values obtained is a matter of determining the limits of the present claim 1, i.e. a matter of clarity of the claimed subject-matter, which alleged lack of clarity does not arise as a result of any amendment made in opposition or appeal proceedings, but was already present in claim 2 of the granted patent on which present claim 1 is based.

24. Therefore, no insufficiency of disclosure can be identified at least insofar as Fischer Tropsch waxes are concerned.
25. Further, the results provided in the above Experimental Reports D34 and D35, however, are contradictory on the influence of other synthetic waxes having a softening point above 50°C on the fuel resistance of the bitumen. However, in view of the conclusions reached in respect of the requirements of Article 56 EPC (see below) the question of whether or not sufficiency of disclosure would be given for other synthetic waxes which fall within the broad definition given in claim 1 is not decisive for the present decision and therefore can be left unanswered.

Novelty

26. Novelty of the claimed use was objected to in view of the disclosures of each of the prior art documents D5 and D14.

Novelty over D5

27. It is not disputed that D5 discloses the addition to bitumen of amounts of 1.5, 3.0 and 4.5 wt.% of the additive Sasobit®, which is a synthetic wax fulfilling the definition of claim 1, and more specifically of claim 4, of the main request, i.e. a Fischer Tropsch wax obtainable by reacting carbon monoxide with hydrogen at high pressures over a metal catalyst, having a softening point of above 50°C (cf patent in suit paragraph [0010]). The Sasobit® additive is described in D5 to dissolve easily and quickly in bitumens (page 2) and to impart improved compaction and

workability as well as resistance to deformation (tracking) to compositions comprising aggregates and bitumen. The Sasobit®-modified bitumens are therefore recommended for highly loaded surfaces, including motorways, approaches to traffic lights, container depots, goods storage areas, lorry parks, airport runways and aircraft parking bays.

28. According to point 10.3 of the Reasons of G 2/88 "With respect to a claim to a new use of a known compound, such new use may reflect a newly discovered technical effect described in the patent. The attaining of such a technical effect should then be considered as a functional technical feature of the claim (e.g. the achievement in a particular context of that technical effect). If that technical feature has not been previously made available to the public by any of the means as set out in Article 54(2) EPC, then the claimed invention is novel, even though such technical effect may have inherently taken place in the course of carrying out what has previously been made available to the public".
29. As shown in the patent in suit (see above point 22), incorporation of 0.5 to 10 wt.% of Sasobit® in bitumen provides improved fuel resistance compared to bitumen alone. It was not disputed that other synthetic waxes belonging to the class of which Sasobit® is a member, i.e. waxes having a softening point of above 50°C and which are Fischer Tropsch waxes obtainable by reacting carbon monoxide with hydrogen at high pressures over a metal catalyst would exhibit the same effect in the context where fuel resistance is sought. The attaining of such a technical effect is therefore to be considered - as far as waxes of that specific class are

concerned - as a functional technical feature of present claim 1.

30. The only issue under dispute concerning novelty over prior art D5 is whether the functional feature defined in present claim 1, namely to impart fuel resistance to the bitumen/wax mixture which is higher than that of the bitumen, was made available in D5. In that respect, the Respondents considered that page 9 of D5 entitled "Recovery of the Binder from Asphalt" which describes that the Sasobit® additive is less soluble than bitumen in toluene would disclose said functional feature. It was in particular pointed out in D5 that the use of Sasobit® resulted in a prolonged extraction time, meaning that extraction should be continued even if the solvent leaving the extraction thimble became colourless, i.e. even if all bitumen has already been extracted. The difference in solubility and the difficulty of extracting Sasobit® after all bitumen has been already extracted when seeking to determine the binder content or when recovering the binder for further examination could suggest, but however does not necessarily and inevitably constitute an unambiguous disclosure for the skilled person, that the addition of Sasobit® to bitumen would have the function of modifying the fuel resistance of the bitumen. To draw such conclusion would require an indication that this difference in solubility of bitumen and Sasobit® would necessarily result in a decrease of solubility of the mixture of the two components, which indication is however absent from D5.

31. Moreover, page 9 of D5 is merely concerned with the determination of the binder content or the recovery of the binder material from asphalt for examination, which is disclosed to be carried out by method DIN 1996, Part

6, identified as document D44 in the present appeal proceedings. Rendering the extraction of the binder under toluene more difficult when determining the binder content or recovering the binder material from the asphalt for examination (i.e. further testing of that binder as indicated on page 2, point 1 of D44) is rather a disadvantage linked to the use of Sasobit® when recovery or testing of the binder is sought after use. Hence, it cannot objectively be inferred from page 9 of D5 that the reasons for using Sasobit® disclosed in D5, i.e. its function according to that document, was to render the bitumen more resistant to toluene.

32. The other passages of D5 do not disclose either that the purpose of using Sasobit® is to achieve the function of achieving resistance against fuel. The emphasis in D5 is rather on providing a bituminous binder suitable for use on heavily trafficked roads (page 2, introduction), i.e. areas subjected to a high volume of traffic movement. This focus is emphasised by the measurements reported on page 5 relating to wheel tracking trials in the context of heavily trafficked roads bearing large numbers of movements of heavy goods vehicles. The disclosure of pavement areas in D5 where motor vehicles are present consequently does not provide a disclosure of a context where fuel resistance is implicitly or primarily required. Fuel or solvent spillage is normally not a problem for asphalt pavement areas on roadways, because, as explained in D6, in such areas and conditions spilled fuel tends to be worn off or evaporate as a result of the speed and movement of vehicles (see D6, paragraph bridging pages 137 and 138). Fuel problems, however, are encountered in specific contexts not directly connected with the problem addressed by in D5, namely under conditions where sufficient fuel spillage accumulation occurs to

cause damage to the asphalt concrete pavement (see D6, paragraph bridging pages 137 and 138), in line with the pavement areas such as service station forecourts, driveways, car parks defined in paragraph [0022] of the patent in suit where the presently claimed use is in particular beneficial.

33. Hence, the function of Sasobit® attributed by the authors of D5 to that additive is merely to provide improved resistance to deformation (tracking) in the context of highly loaded surfaces and at the same time to give improved compaction and workability.

34. D24 has been cited by the Respondent/Opponent 2 as evidence that the higher degree of compaction and the reduction of the void volume provided by Sasobit® as disclosed in D5 would result in a lower penetration of the fuel into the pavement comprising Sasobit®, implying an improved fuel resistance provided by that additive. As shown above in point 32 the passages on pages 1 to 8 of D5, including those dealing with improved compatibility and reduction of void volume on page 4 do not address situations where excessive fuel spillage accumulation occurs. Therefore the skilled person would not read the passages of D5 relating to improved compaction and void reduction provided by Sasobit® in the light of a context where damage arising from fuel spillage would be of concern for the skilled person. Moreover, Respondent-Opponent 2 did not provide any evidence that the increase of compaction obtained with Sasobit®, compared to the level of compaction already obtained without that additive, would be recognised by the skilled person as implying an increased level of fuel resistance. Therefore, the argument of Respondent-Opponent 2 reduces to the question of whether it would have been obvious to use

Sasobit® for improving fuel resistance. This is however solely a matter of inventive step, but is not pertinent when deciding whether that function is disclosed in D5.

35. Consequently, D5 neither discloses that Sasobit® is added as an additive for bituminous compositions destined for areas where fuel resistance is a problem, nor that it could provide in that context improved fuel resistance. As the achievement of fuel resistance in such a context was not been made available by D5, then the use according to claim 1 is novel over D5.

Novelty over D14

36. D14 concerns according to its broadest aspect defined in claim 2 compositions comprising oxidized macrocrystalline paraffin wax having naphtha solubility not substantially above 40% and heavy asphaltic petroleum residuum selected from the group consisting of solid asphalt and viscous liquid residuum reducible to asphalt in a weight ratio of said oxidized wax to said heavy petroleum residuum from about 0.1:1 to about 4:1, said-oxidized wax and said petroleum residuum mixed under stripping conditions at a temperature from about 450 °F to about 530°F. Said oxidized macrocrystalline paraffin wax can be made by catalytic air oxidation of slack waxes, semi-refined or refined waxes (column 2, lines 23-28). The disclosure of such catalytic oxidation step means that said paraffin waxes are synthetic waxes, in line with the information provided in paragraph [0011] of the patent in suit, also confirmed by D3a on page 477 representing the general knowledge of the person skilled in the art. The definition of an upper limit for the naphtha solubility of the wax oxidate, determined in Stoddard solvent (D14, column 2 line 3), expresses a maximum degree of

- solubility of the wax oxidate in a specific mixture of hydrocarbons.
37. Those compositions are especially useful as a protective coating, in particular pipe enamel, or a paving material (D14, column 1, lines 23-25; column 3, lines 9-15), resistant to hydrocarbon oils, or as speciality fuel (column 1, line 25). The weight ratio of wax oxidate to asphaltic residuum should, according to column 3, lines 19-31 be between about 0.1:1 and about 1:1, preferably about 0.5:1, for pipe enamel charge formulations, whereas higher weight ratio of wax oxidate to asphaltic residuum between about 0.3:1 and 4:1 and preferably between about 0.5:1 and 3:1 should be used in an oil-resistant paving composition (column 3, lines 48-51). In gelled fuels, i.e. the third application disclosed in D14, the weight ratio of wax oxidate to asphaltic residuum is between 2:1 and 1:1 (column 3, line 69).
38. Examples of protective coatings comprising the wax oxidate are produced in Examples 3, 5 and 8, the composition of Examples 3 and 8 being shown to exhibit resistance to crude mineral oil. D14 also shows in Examples 7 and 11 that the presence of the wax oxidate imparts improved resistance to fuel spillage to the pavement composition, which in the absence of that additive was seriously affected by the spilled fuel which leached the binder and loosened the aggregate surface.
39. Concerning the question of whether D14 discloses as required by present claim 1 that the synthetic wax exhibits a softening point above 50°C, it is undisputed that the softening point of the wax oxidate employed in D14 is not explicitly indicated. The allegation of

Respondents - Opponents 2 that such disclosure would be implicit because oxidized slack waxes are known to have a softening point above 50°C is not supported by appropriate evidence. Table 7 of D3a to which reference was made relates to another type of waxes, namely low molecular weight polyethylene (see page 477, last paragraph), while D47 which does not mention oxidized slack wax merely mentions that waxes characteristically melt above 45°C, i.e. not necessarily above 50 °C. Nor has any experimental evidence that one of the conventional methods for measuring the softening point of oxidized slack wax would necessarily lead to a value of above 50°C been provided. According to the established jurisprudence of the Boards of Appeal, each of the parties to the proceedings carries the burden of proof for the facts it alleges. If a party whose arguments rest on these alleged facts does not discharge its burden of proof, this goes to the detriment of that party (see Case Law of the Boards of Appeal of the European Patent Office, 7th edition, 2013, III.G.5). Therefore, the fact that oxidized slack waxes are used in D14 does not mean that the synthetic waxes employed in D14 necessarily exhibit a softening point above 50 °C.

40. As to the question whether it can be inferred from D14 that a wax oxidate having a softening point above 50°C is used in the exemplified embodiments of D14, the examples referred to by the Respondents are analysed as follows.

41. The softening point disclosed in Examples 1 and 2 of D14 is that of the composition resulting from blowing with air the mixture of heavy liquid asphalt residuum and oxidate wax at temperature of 480-500 °F. Since blowing with air at those temperatures is reported in

column 1, lines 26-45 of D14 to affect the chemical and physical properties of the charge mixture, and the blowing time is different in both examples with an identical air-flow rate (11 hours in example 1 vs. 8,5 hours in example 2), it cannot be assumed that the softening point of the bitumen is necessarily the same in both examples. As there is no indication of the degree to which the properties of the bitumen composition, in particular its softening point, are affected by different air blowing times, a calculation of the softening point of the oxidate wax based on softening points of the compositions obtained in examples 1 and 2 is meaningless. Therefore, the arguments of the Respondents-Opponents 1 that the softening points of wax oxidate disclosed in Examples 1 and 2 could be computed to be above 50°C based on the softening point values of the mixtures obtained in those examples must be dismissed.

42. A softening point of the wax oxidate used in Example 3 was computed by the Respondents based on the softening points of the final composition and that of the steam reduced asphalt before air blowing at 480-500 °F for 12 1/2 hours. Again, this calculation fails to take account of the modification of the steam reduced asphalt that takes place during air blowing. It also ignores the presence of reduced cycle fuel which constitutes the main component of the charge according to Example 3. Hence, the calculation made by the Respondents is not appropriate to determine the softening point of the wax oxidate.

43. The batches of experimental paving binders I to III disclosed in Example 6 of D14 contain an oxidized slack wax in an amount of 75, 50 and 60 wt.%, respectively, whereby batches I and II consist of a mixture of

oxidized slack wax and bitumen, differing in the proportions employed. A comparison of the softening point of batch I and batch II obtained after air blowing and having a softening point of 125°F (51°C) and 120 °F, respectively, would only be appropriate to provide an indication that the oxidized wax was the component having the highest softening point, and therefore be above 125°F (51°C), on the premise that the air blowing treatment, in particular air rate and time, was identical for batches I and II. Example 6, however, does not give any indication with respect to the conditions employed for the air blowing treatment (air rate and time). Furthermore the diverging conditions employed in Examples 1 to 3 do not lend any support to an assumption that the air blowing conditions used for batches I and II were necessarily identical.

44. Furthermore, amounts of wax of at most 10 wt.%, based on the total amount of wax/bitumen, are disclosed in D14 only in relation to pipe enamel charge formulations, where it is used in an amount between about 0.1:1 and about 1:1 (see point 37 above). Other applications require ratios of at least 0.3:1 (see also point 37 above). Therefore, an inferred disclosure of a softening point of above 50°C for the wax oxidate in Example 6 which relates to oil-resistant paving compositions, said type of compositions comprising a ratio of wax oxidate to bitumen of at least 0.3:1 according to the general teaching of D14, cannot be read by the skilled reader of D14 in association with a different ratio of 0.1:1 because said different ratio is only recommended for a different type of application. In this respect, the general ratio of 0.1:1 to 4:1 disclosed in claim 1 or claim 2 of D14, would not be read by the skilled person as relating to

paving composition, in view of the explicit information provided in column 3, lines 48-51 that the lowest ratio of wax oxidate to bitumen to be used for paving material is 0,3:1. On the contrary, claims 1 and 2 of D14 give the broadest definition of the compositions for which protection is sought which compositions contain, depending on their use, varying ratios of wax oxidate and bitumen defined as sub-ranges of the general range in the description of D14 (see point 37 above).

45. Consequently, in view of the general principle consistently applied by the Boards of Appeal for concluding lack of novelty that there must for the skilled reader be a direct and unambiguous disclosure in the state of the art of subject-matter falling within the scope of what is claimed, it can only be concluded that D14 has not been shown to disclose a bitumen comprising a wax oxidate with a softening point of above 50°C in an amount of 0.5 to 10 wt.% based on the amount of said wax oxidate and bitumen. The subject-matter of the claims according to the main request is therefore novel over D14.

Inventive Step

Closest state of the art

46. The patent in suit is directed to the use of a wax to improve fuel resistance of a bitumen composition (see point 9 above). The use of a wax oxidate in bituminous compositions in order to provide improved fuel resistance of the bituminous composition belongs to the state of the art, as evidenced by D14 (see above points 37 and 38). Thus, the Board considers, in agreement with the Appellant and the Respondents that D14

represents the closest state of the art and, hence, takes it as the starting point when assessing inventive step.

Technical problem and solution

47. In view of this state of the art, the Appellant defined the problem underlying the patent in suit as the use of a wax imparting superior fuel resistance to bitumen. As the solution to this problem, claim 1 of the main request proposes the use of 0.5 to 10 wt.% of a synthetic wax having a softening point above 50°C in bitumen, said amount being based on the total amount of wax and bitumen.

48. To demonstrate the alleged superior fuel resistance brought about by the claimed use the Appellants relied on experimental report D35. This report compares the effect on fuel resistance of a specific synthetic wax having a softening point above 50°C, in particular Sasobit®, with the effect arising from Vivamelt U 64-66 that the Appellants considered to represent the oxidate wax additive D14. Vivamelt U 64-66 is, according to Table 1 of D35, i.e. according to Appellants' information, a petroleum slack wax. Therefore, the comparison with Vivamelt U 64-66 does not, contrary to the Appellants' argument, represent a comparison with D14 which uses exclusively oxidized macrocrystalline paraffin waxes, such as those resulting from catalytic air oxidation of slack waxes (see points 39-44 above). Hence, experimental report D35 is not suitable to demonstrate that the synthetic waxes defined in claim 1 of the main request impart a better fuel resistance than the additive known from D14.

49. According to the jurisprudence of the Boards of Appeal, alleged but unsupported advantages cannot be taken into consideration in respect of the determination of the problem underlying the invention (see Case Law of the Boards of Appeal of the European Patent Office, 7th edition, 2013, I.D.4.2). Since in the present case the alleged superior fuel resistance brought about at low concentration by the synthetic wax defined in claim 1, in particular Sasobit®, when replacing the wax used in D14, lacks the required experimental support, the technical problem as defined in point 47 above needs reformulation. Therefore, starting from the teaching of D14 the objective problem solved by the subject-matter according to claim 1 of the main request is merely the use of another additive in bitumen which imparts fuel resistance within the meaning indicated in above point 19, i.e. which provides a detectable - but undefined as to its degree - reduction of softening or dissolution of the bituminous composition in the fuel to which it is exposed.

Obviousness

50. It remains to be decided whether or not the proposed solution to the problem underlying the patent in suit, namely the use of a synthetic wax having a softening point of above 50°C in an amount of 0.5 to 10 wt % on the resulting wax/bitumen blend, is obvious in view of the state of the art. One possible wax is for example a Fischer Tropsch wax obtainable by reacting carbon monoxide with hydrogen at high pressures over a metal catalyst, as defined in claim 4 of the main request.
51. Fuel is known to dissolve or soften the bitumen component of bituminous surfaces since bitumen is a petroleum-based product obtained in the distillation of

crude oil (see D6 representing the general knowledge of the skilled person, page 137, first paragraph). The oxidized wax additive used in D14 for improving fuel resistance is defined in claim 1 of the document to have limited solubility in naphtha solvent, also referred to as Stoddard solvent (column 2, line 3), both expressions conventionally employed to denote a mixture of hydrocarbon solvents. In view of the difference in solubility in hydrocarbon solvents of the bitumen component and additive used in D14 for providing fuel resistance, to which it is implicitly referred in claim 1 of D14 by the definition of the limited solubility in naphtha solvent of the wax oxidate, the skilled person merely wanting to use another additive providing fuel resistance within the meaning indicated in above point 19, in particular to an undefined degree, will search for an additive which is also known to have a lower degree of solubility in hydrocarbon solvents than bitumen.

52. As shown in point 27 above Sasobit® - which undisputedly is a Fischer Tropsch wax obtainable by reacting carbon monoxide with hydrogen at high pressure over a metal catalyst and which has a softening point of above 50°C - is an additive known to the skilled person in the field of concrete pavement, in particular in view of D5 describing the use of that additive for bitumen in amounts of 1.5, 3.0 and 4.5 wt.% of the resulting bitumen/additive mixture. The same document discloses on page 9 that due to the presence of Sasobit® in the bitumen, recovery of the binder with toluol must be modified in terms of the extraction method and time in view of the difference of solubility between Sasobit® and bitumen in that solvent (see point 30 above). The lack of room-temperature solubility of Fischer Tropsch waxes in commonly used

solvents is also confirmed by D12 according to which although Fischer Tropsch paraffins dissolve clearly at elevated temperature in the usual wax solvents, such as benzine (which like naphtha solvent is a mixture of hydrocarbon solvents), turpentine oil or toluol, at room temperature they are only sparingly soluble (D12, page 162, left-hand column, first paragraph and translation thereof D12a in English, page 5, third paragraph from the bottom). In view of this known marked difference in solubility in hydrocarbons between bitumen and Fischer Tropsch waxes, as well as the extended extraction time disclosed in D5 required for recovering the bitumen-Sasobit® binder mixture, the skilled person would have been prompted to use Sasobit® for improving the fuel resistance of bituminous compositions to an undefined degree, e.g. using the concentration of that additive in bitumen disclosed in D5. By doing this the skilled person would arrive in an obvious manner at an embodiment falling within the ambit of present claim 1 of the main request.

53. The Appellant's argument that an inventive step should be acknowledged since the general teaching of D14 was to use higher amounts of wax than those defined in present claim 1 fails to convince. The objective problem solved over D14 as analysed above is not to use another additive in bitumen which provides superior or even the same degree of fuel resistance as the additive of D14 (evidence to that effect has not been provided, even with respect to Sasobit®) but a less ambitious one, i.e. the mere use of an additive which results in a resistance to fuel of the binder mixture (wax and bitumen) which is higher than that of the bitumen component alone, but undefined to its degree (see above point 49). Under these conditions, the skilled person seeking to solve that less ambitious problem would

consider it obvious in view of the properties of Fischer Tropsch waxes and Sasobit® known from D12 and D5, respectively, to try the concentration in bitumen of Sasobit® disclosed in D5.

54. Consequently, claim 1 of the main request which encompasses the obvious use of Sasobit® does not meet the requirements of Article 56 EPC at least as far that embodiment is concerned. The main request is therefore not allowable.

Auxiliary Request

55. Claim 1 of the auxiliary request differs from that of the main request solely in that the synthetic wax is specified to be a Fischer Tropsch wax obtainable by reacting carbon monoxide with hydrogen at high pressures over a metal catalyst. The amendment made in claim 1 has no effect on the assessment of inventive step given in points 46-54 above and the conclusion drawn in this respect, because claim 1 of the main request still encompasses the use of the Sasobit® additive. Therefore, the subject-matter according to claim 1 of the auxiliary request is obvious and does not involve an inventive step (Article 56 EPC).

Order

For these reasons it is decided that:

The appeal is dismissed

The Registrar:

The Chairman:



E. Goergmaier

M. C. Gordon

Decision electronically authenticated