

Internal distribution code:

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

**Datasheet for the decision
of 26 September 2024**

Case Number: T 1639/22 - 3.3.06

Application Number: 16790958.9

Publication Number: 3371280

IPC: C10L1/06, C10L1/02, B60W10/06

Language of the proceedings: EN

Title of invention:
FUEL COMPOSITION

Patent Proprietor:
Shell Internationale Research Maatschappij B.V.

Opponent:
TotalEnergies Marketing Services

Headword:
Shell/PHEV fuel

Relevant legal provisions:
EPC Art. 100(b), 83

Keyword:
Sufficiency of disclosure - (yes)

Decisions cited:

G 0001/03

Catchword:



Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0

Case Number: T 1639/22 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 26 September 2024

Appellant: Shell Internationale Research Maatschappij B.V.
(Patent Proprietor) Carel van Bylandtlaan 30
2596 HR The Hague (NL)

Representative: Shell Legal Services IP
PO Box 384
2501 CJ The Hague (NL)

Former respondent: TotalEnergies Marketing Services
(Former opponent) 24 Cours Michelet
92800 Pureaux (FR)

Representative: Casalonga
Casalonga & Partners
Bayerstraße 71/73
80335 München (DE)

Decision under appeal: **Decision of the opposition division of the
European Patent Office posted on 2 May 2022
revoking European patent No. 3371280 pursuant to
Article 101(3) (b) EPC.**

Composition of the Board:

Chairman J.-M. Schwaller
Members: S. Arrojo
O. Loizou

Summary of Facts and Submissions

I. An appeal was filed by the patent proprietor against the decision of the opposition division to revoke European patent No. 3 371 280, whose claim 1 reads as follows:

"1. Use of a liquid fuel composition in a spark ignition internal combustion engine for providing an improvement in CO₂ emissions, wherein the liquid fuel composition has a final boiling point of less than 190°C, and wherein the spark ignition internal combustion engine is comprised within the powertrain of a plug-in hybrid electric vehicle".

II. In the appealed decision, the opposition division concluded that the ground of opposition under Article 100(b) EPC prejudiced the maintenance of the patent as granted, and that the claims according to auxiliary request 1 did not satisfy the requirement of sufficiency of disclosure under Article 83 EPC.

III. In the statement of grounds of appeal, the appellant requested as the main request that the contested decision be set aside and the case be remitted to the opposition division for further prosecution on the basis of the claims as granted or, as an auxiliary measure, on the basis of the claims according to auxiliary request 1.

IV. In the reply, the opponent and respondent requested that the appeal be dismissed.

- V. In its preliminary opinion, the board presented the most relevant arguments from both sides, but left the conclusion open on the question of sufficiency of disclosure.
- VI. With a submission dated 31 July 2024, the opponent withdrew its opposition and indicated that it would not attend the oral proceedings.
- VII. With a submission dated 20 September 2024, the appellant addressed the issues raised in the board's preliminary opinion and indicated that, if the new arguments were found to be persuasive, its main request would be that the oral proceedings be cancelled and a written decision be issued setting aside the decision of the opposition division.
- VIII. After assessing the new arguments made by the appellant and in view of the withdrawal of the opposition by the sole opponent, the board finds itself in the position to issue a written decision without holding oral proceedings.

Reasons for the Decision

- 1. Main request - Sufficiency of disclosure

The board has concluded that the opposition ground under Article 100(b) EPC does not prejudice the maintenance of the patent for the following reasons:

- 1.1 The subject-matter of claim 1 at issue defines the use of a liquid fuel having a final boiling point (hereinafter 'FBP') of less than 190°C in an internal combustion engine (hereinafter 'ICE') of a plug-in hybrid electric vehicle (hereinafter 'PHEV') to achieve

an improvement in CO₂ emissions. The invention is therefore based on the idea of using a fuel with a low FBP to achieve the technical effect of reducing the CO₂ emissions of a PHEV.

- 1.2 According to the patent (pars. [0005] and [0006]), the liquid fuels currently developed for conventional ICE engines are not optimised for the ICE units used in HEVs or PHEVs. In hybrid vehicles, the combination of an electric and an ICE engine allows the latter to be optimised for a narrower operating range. The patent also explains how electric drives can be tuned to provide smooth torque at low speeds, but points out that there are some limitations and problems when operating at higher speeds. The key idea in the patent is thus to find fuel formulations that are better suited to the way ICE units are used in hybrid vehicles to further reduce the CO₂ emissions of PHEVs.
- 1.3 The examples in the patent (see Table 1) compare five fuels with different FBPs and conclude (see Table 3 and Figure 1) that fuels with a lower FBP produce lower CO₂ emissions. The vehicle used in the tests is a Toyota Prius hybrid electric vehicle (hereinafter 'HEV') that has been converted to a PHEV using a technology called Amberjac ©, which upgrades HEVs to PHEVs.
- 1.4 The opposition division concluded that the invention was insufficiently disclosed because there was not sufficient information in the patent as to how the effect of reducing CO₂ emissions could be achieved over the entire scope of the claim. The decision was in particular based on the following arguments:
 - 1.4.1 The experiments in the patent were not representative of PHEVs, as they were conducted in a modified HEV.

Since it was known that HEVs and PHEVs operated differently, the results of the experiments were not representative of the invention and should not be taken into account.

- 1.4.2 The results of test report D5 (submitted by the opponent) also showed that there was no clear correlation between the CO₂ emissions and the FBP of the liquid fuels. Even if, as argued by the proprietor, the tests in D5 might have been carried out with a depleted battery, the results were still applicable because the claims did not require the battery to be charged.
- 1.4.3 The experiments also did not clearly show that the technical effect of reducing CO₂ emissions was achieved, because only 5 fuels had been tested. These fuels did not only differ in the FBP but also in other aspects, so it could not be concluded that the observed differences were related to this particular parameter.
- 1.5 The board has reached the following conclusions:
 - 1.5.1 Although, as noted in the preliminary opinion, the selection of a modified HEV to test the behaviour of fuels in PHEVs may raise some legitimate questions, the board is not convinced that this justifies disregarding the results in the examples of the patent. PHEVs are mainly characterised by the presence of both an ICE and an electric motor with a battery. The batteries used in PHEVs generally differ from those used in HEVs in that they can be plugged-in to be recharged and in that they are powerful enough to allow pure electrical driving for short trips.

The Amberjac © modified Prius used in the tests of the patent includes all of the above essential characteristics of PHEVs. As can be seen from D10 (3rd and 4th pages), the thus modified Prius includes a socket for plugging in the battery, a more powerful battery which allows the vehicle to operate in purely electrical mode for 30 miles (about 50 km) and an ICE unit which activates at speeds higher than 31 mph (50 km/h). These characteristics are consistent with what D12 (see page 9) presents as the key elements of PHEVs: an ICE unit which is generally activated at higher speeds and a pluggable battery which is mostly used to power the vehicle at lower speeds (e.g. urban driving). The additional details on the control and operation of the electric and fuel modes in D7 (see page 5) do not appear to establish a clear difference to the operation of the modified Prius, but even if they did, there is no reason to conclude that the details given in this document would justify narrowing the interpretation of the term 'PHEV' beyond the key aspects discussed above.

The board thus concludes, in the absence of convincing evidence to the contrary, that the Amberjac © modified Prius used in the tests of the patent can be regarded as a PHEV in the sense of the invention.

- 1.5.2 The board is also not convinced that D5 would invalidate the tests in the patent, as the results presented in this report do not appear to reflect how PHEVs are normally operated. In particular, despite the fact that the tests were conducted with a conventional PHEV, the abnormally high CO₂ emissions (175-183 g/km of CO₂ vs. usual values of 30-100 g/km) suggest, as argued by the appellant and recognised by the opposition division, that the battery of the PHEV used in D5 was depleted and did not contribute to power the

vehicle. The ICE unit in the experiments was therefore operated as a conventional ICE in a non-hybrid vehicle in all the cycles of the test, so the results merely indicate that there is no particular advantage in CO₂ emissions when the PHEV is only powered by the ICE. These observations do not really contradict the advantages alleged in the patent and are in fact consistent with the results presented in point 8 of the experimental report D9 filed by the appellant, which indicates that no clear (or only minor) advantages were observed when a conventional ICE vehicle was operated with fuels having a lower FBP.

Although, as argued by the opposition division, neither the claims nor the patent specifies that the battery used in the PHEV according to the invention should be charged, this appears to be implicit when reading the patent and the claims with a mind willing to understand. In this respect, it is noted that the underlying idea of the contested patent (see pars. [0005] and [0006] and point 1.2 above) is to find fuel formulations that are better adapted to how ICE units are conventionally operated in PHEVs. This is also reflected in the experiments of the patent, which are carried out using the standard New European Driving Cycle (NEDC) and include (see page 2 of D5) low speed urban cycles (with a predominant use of the electric motor) and high speed extra-urban cycles (with a predominant use of the ICE). The assumption that the uses according to the invention would include embodiments in which the battery is entirely depleted is a technical nonsense, since in such cases the PHEV would be essentially equivalent to a conventional ICE vehicle with the added weight of the electric drive system. This is contrary to the main teaching of the invention which is to optimise the characteristics of

the fuel for the way in which ICEs are operated in PHEVs, i.e. with an electric motor to power the vehicle at low speed cycles, and the ICE being used predominantly at higher speeds.

The board therefore concludes that the invention does not encompass uses with a depleted battery and that consequently the results in D5 are irrelevant.

- 1.5.3 For the sake of completeness, the board also notes that even if it were considered that the claims formally encompass embodiments in which the battery is depleted, this would not necessarily mean that the requirements of sufficiency of disclosure are not met. The argument would then be that the subject-matter of claim 1, which requires achieving the effect of improving CO₂ emissions, includes non-working embodiments, i.e. uses which would not achieve the defined effect of reducing CO₂ emissions. According to decision G 1/03 (Reasons 2.5.2), where there is a large number of conceivable alternatives, the inclusion of non-working embodiments is not detrimental [to the requirement of sufficiency of disclosure] provided that "the specification contains sufficient information on the relevant criteria for finding suitable alternatives over the claimed range with reasonable effort". In the present case, the use of the liquid fuel in a PHEV with a depleted battery would be such a 'non-working' embodiment. The relevant question would therefore be whether the skilled person would be able to recognise (from the specification or from common knowledge) that the CO₂ reduction is mainly achieved when both the electric motor and the ICE are operating. The board has no doubt that the skilled person would be aware of this, since it would be understood that any alleged optimisation of the operation of a hybrid vehicle is

necessarily based on the operation of the vehicle in a conventional manner. This would also be clear from the discussion in the patent (see for example the last lines of par. [0005] and the beginning of par. [0006]), which indicates that the main benefits of low FBP liquid fuels are obtained by operating the ICE within a narrower dynamic range (i.e. at higher speeds) rather than over the full range of operating dynamics (see first lines of paragraph [0005]).

1.5.4 On the question of whether 5 points would be sufficient to demonstrate a correlation between the FBP of the fuel and the benefits in terms of CO₂ emissions, the board notes that the appellant has not only presented the five tests in the patent, but has also filed D9 to demonstrate that the correlation is also observed when other factors and differences between the fuels are taken into account. The board thus concurs with the appellant in that the experimental results submitted during the proceedings provide sufficient evidence of the correlation between the FBP of the liquid fuel and the CO₂ emissions of the PHEV.

1.6 In the light of the above considerations, the board concludes that the evidence in the file demonstrates that the uses according to the invention achieve improvements in CO₂ emissions as defined in claim 1 at issue. The invention as granted therefore satisfies the requirement of sufficiency of disclosure, so that the ground of opposition under Article 100(b) EPC does not prejudice the maintenance of the patent as granted.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division for further prosecution.

The Registrar:

The Chairman:



N. Schneider

J.-M. Schwaller

Decision electronically authenticated