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Datasheet for the decision of 16 September 2015

Case Number: T 0101/12 - 3.3.03

Application Number: 01102604.4

Publication Number: 1123946

IPC: C08L23/00, C08L23/04, C08L23/16, C08J3/24

Language of the proceedings: EN

Title of invention:
Low fogging thermoplastic elastomer composition and manufacturing method and use of same composition

Patent Proprietor:
Mitsui Chemicals, Inc.

Opponent:
DSM IP Assets B.V.

Relevant legal provisions:
EPC Art. 123(2), 123(3), 56
EPC R. 80

Keyword:
Amendments - allowable (yes)
Inventive step - (no)

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Case Number: T 0101/12 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 16 September 2015

Appellant: (Opponent)	DSM IP Assets B.V. Het Overloon 1 6411 TE Heerlen (NL)
Representative:	Peterreins Schley Patent- und Rechtsanwälte Soeltlstraße 2a 81545 München (DE)
Respondent: (Patent Proprietor)	Mitsui Chemicals, Inc. 5-2, Higashi-Shimbashi 1-Chome Minato-ku Tokyo (JP)
Representative:	Goddar, Heinz J. Boehmert & Boehmert Anwaltspartnerschaft mbB Patentanwälte Rechtsanwälte Pettenkoferstrasse 20-22 80336 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 17 November 2011 concerning maintenance of the European Patent No. 1123946 in amended form.**

Composition of the Board:

Chairman	M. C. Gordon
Members:	D. Marquis
	D. Prietzel-Funk

Summary of Facts and Submissions

I. The appeal by the opponent lies against the interlocutory decision of the opposition division maintaining the European patent No. 1 123 946 B1 on the basis of the main request, filed during oral proceedings.

II. The granted patent was based on 11 claims, of which claim 1 read:

"1. An olefinic thermoplastic elastomer composition comprising 10 to 90 parts by weight of a crystalline polyolefin (a), 90 to 10 parts by weight of an olefin-based copolymer rubber (b) (the total amount of the components (a) and (b) being 100 parts by weight) and 3 to 100 parts by weight of a paraffinic mineral oil softening agent (c) having an evaporation loss of 0.4% by weight or less at a condition of 200°C, atmospheric pressure and 1 hour and having a kinetic viscosity (40°C) of 50 to 250 cSt, which composition is perfectly or partially crosslinked with a crosslinking agent."

Claim 9 related to the method of manufacturing an olefinic thermoplastic elastomer composition and claim 10 to the product obtainable by that method. Claim 12 related to an olefinic thermoplastic elastomer composition. Claims 2 to 8 and 11 were dependent claims of claim 1. Claims 13 to 17 were dependent claims of claim 12.

III. An opposition against the patent was filed, in which it was requested that the patent be revoked on the grounds of Articles 100(a) EPC (lack of novelty and lack of inventive step), 100(b) EPC and 100(c) EPC.

D3 (Gedeon, B. J *et* al, Use of "Clean" Paraffinic Processing Oils to Improve TPE Properties, presented at TPEs 2000: A new century of progress and opportunities, 27-28 September, 1999) was *inter alia* cited in the opposition proceedings.

IV. In its decision, the opposition division held that the subject-matter of the claims of the main request submitted during the oral proceedings
- fulfilled the requirements of Article 123(2) and (3) EPC;
- was sufficiently disclosed (Article 83 EPC);
- was novel and was inventive in view of the closest prior art D3.

V. The opponent (appellant) lodged an appeal against the above decision on 13 January 2012. The statement of grounds of the appeal was filed on 16 March 2012 in which it was requested that the patent be revoked on the grounds of Articles 100(a), 100(b) and 100(c) EPC. A further written submission was made with letter of 30 December 2013.

VI. Together with its reply to the statement of grounds of appeal of 18 July 2012, the patent proprietor (respondent) filed a new set of claims as the main request and requested the maintenance of the patent on the basis of that request.

VII. The board issued a summons to oral proceedings on 15 June 2015 and in a communication of 30 July 2015 set out its preliminary opinion.

VIII. In reaction to the board's communication the respondent filed a new main request and auxiliary requests 1 to 7

with the letter dated 31 August 2015.

IX. On 16 September 2015, oral proceedings were held before the board. Following the discussion of the main request on file the respondent withdrew all requests on file and filed a new main request. Claim 1 of the new main request read:

"1. An olefinic thermoplastic elastomer composition comprising 10 to 90 parts by weight of a crystalline polyolefin (a), 90 to 10 parts by weight of an olefin-based copolymer rubber (b) (the total amount of the components (a) and (b) being 100 parts by weight) and 3 to 100 parts by weight of a paraffinic mineral oil softening agent (c) having an evaporation loss of 0.4% by weight or less at a condition of 200°C, atmospheric pressure and 1 hour and having a kinetic viscosity (40°C) of 50 to 250 cSt, wherein the mineral oil softening agent (c) has a viscosity index of 90 to 110, a flash point of 200 to 290°C and a pour point of -20 to -10°C, which composition is perfectly or partially crosslinked with an organic peroxide or a phenolic curing resin as a crosslinking agent."

X. The arguments of the appellant, insofar as relevant for the present decision can be summarised as follows:

Inventive step

D3 was the closest prior art document. As the patent in suit did not provide evidence of a technical effect attributable to the evaporation loss over the whole breadth of the claims, the technical problem could only be the provision of alternative compositions. The person skilled in the art could have considered any oil available to him to solve that problem, including an

oil having an evaporation loss of 0.4% by weight or less. The use of mineral oils of low volatility was also taught in D3 on page 161 where the use of hydroprocessed oils with low volatility were said to reduce fogging in thermoplastic compositions. Claim 1 of the main request therefore lacked an inventive step.

XI. The arguments of the respondent, insofar as relevant for the present decision, can be summarised as follows:

Inventive step

D3 was the closest prior art document. The composition of example 15 of D3 differed from the subject-matter of the patent in suit in the value of the pour point and absence of a disclosure of the evaporation loss of the oil. No advantage could be identified to result to the pour point from the data of the patent in suit however Table 1 showed that the choice of a mineral oil having an evaporation loss of 0.4% by weight or less led to reduced fogging of the claimed compositions. The technical problem was thus to provide thermoplastic elastomer compositions with reduced fogging. The solution was to use a mineral oil having an evaporation loss of 0.4% by weight or less. In addition, the choice of a phenolic resin as a crosslinking agent resulted in improved compositions. D3 taught the hydrogenation of the aromatics of the oil in order to reduce its volatility and ultimately to reduce fogging. D3 was silent on the the removal of low molecular weight ingredients of the oil as measured by the lower evaporation loss as disclosed in the patent in suit. The weight loss in air described in D3 was not comparable to the fogging test as disclosed in the patent in suit and there was no indication in that document that fogging could be improved as a result of

choosing an oil with lower evaporation loss. D3 did therefore not provide evidence that the fogging of thermoplastic elastomer compositions could be effectively reduced by limiting the evaporation loss as defined in the operative claims. The subject-matter of claim 1 was inventive in view of the closest prior art D3.

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

XIII. The respondent requested that the patent be maintained in amended form according to claims 1 to 10 of the amended main request submitted during oral proceedings.

XIV. At the end of the oral proceedings, the chairman announced the decision.

Reasons for the Decision

Main request - As filed during oral proceedings

1. Modifications

1.1 The admissibility of the main request filed during the oral proceedings was neither contested by the appellant in view of its late filing nor in view of Article 123(2),(3) EPC and Rule 80 EPC. The claims of the main request were found to be admissible and to fulfil the requirements of Article 123(2),(3) EPC and Rule 80 EPC. As the board reached the conclusion that claim 1 of the main request did not meet the requirements of Article 56 EPC (see below), a detailed explanation of the reasoning as to why the modifications of the claims of the main request were held to be allowable is not

necessary.

2. Article 83 EPC, Article 54 EPC

In view of the following conclusions in respect of Article 56 EPC it is not necessary to reach a conclusion in respect of sufficiency of disclosure or novelty of the claimed subject-matter all the more since in the oral proceedings the parties agreed to defer a discussion of further problems of the claim until such time as they became relevant for the decision (which ultimately was not the case).

3. Inventive step

3.1 The patent in suit is concerned with the provision of olefinic thermoplastic elastomer compositions that have excellent antifogging property (low hazing property) (paragraph 1). The compositions are intended for use in automobile interior parts. The problem addressed is to reduce the problem of fogging arising with known compositions (paragraphs 2 to 6 and 54 to 56 of the patent).

3.2 D3 is a publication of a presentation made at the TPEs 2000 conference in Philadelphia on 27-28 September 1999, and hence before 9 February 2000, the earliest priority date of the patent in suit. D3 discloses the use of clean paraffinic processing oils to improve thermoplastic elastomer (TPE) properties, in particular their colour stability, oven ageing, fogging, and compatibility (abstract). In particular, example 15 in table 8 of D3 discloses a composition comprising a crystalline polyolefin (Polypropylene 12 Melt), an ethylene propylene diene rubber (EPDM Vistalon 3708) and a paraffinic mineral oil (Chevron oil Paralux

6001R) in amounts, recalculated on the same basis as specified in the operative claims, of 28.6% of polyolefin, 71.4% of an ethylene propylene diene rubber and 71.4% of oil. A thermoplastic vulcanisate is obtained therefrom by addition of an organic peroxide (Varox DBPH 50) and kneading in a Banbury mixer before being compression moulded into plaques. Typical properties of Chevron oil Paralux 6001R are disclosed in table 5 on page 161. Whereas the kinetic viscosity at 40°C (117.6 cSt), the viscosity index calculated from the kinetic viscosities at 40°C and 100°C (97.4) and flash point (525°F or 274°C) of that oil are according to claim 1 of the patent in suit, the evaporation loss is not mentioned and the pour point (-21°C) is outside the claimed range of -20°C to -10°C.

3.3 The oils according to D3, which are produced using all-hydroprocessing, are said to have low aromatic content and better colour and UV stability than conventional paraffinic or naphthenic oils. D3 also discloses that these oils have lower volatility resulting in fewer emissions and excellent compatibility with rubber polymers (page 161, second paragraph), as shown by the weight loss in air (page 164, last paragraph and Figure E). D3 discloses that the weight loss of most of the hydroprocessed-produced oils is very low, which is important in applications where fogging or flexibility retention are important (page 167, paragraph 1).

3.4 D3 therefore addresses the fogging phenomenon arising from olefinic thermoplastic elastomer compositions containing a mineral oil. D3 was considered to represent the closest prior art by the parties. The board sees no reason to deviate from that view because D3 does indeed relate to the technical problem

addressed in the patent in suit.

3.5 The examples and comparative examples of the patent in suit show crosslinked olefinic thermoplastic compositions comprising a polypropylene or a mixture of polypropylene and a polyethylene as crystalline polyolefins, ethylene-propylene-5-ethylidene-2-norbornene copolymer rubber as olefin-based copolymer rubber and mineral oil softening agents obtained by distillation of a commercially available paraffinic oil (PW-90) and resulting in an oil having a kinetic viscosity of from 87.6 cSt to 102.3 cSt, a viscosity index of 103, a flash point of from 256°C to 274°C and a pour point of -15°C. The mineral oil softening agents present in the compositions of examples 1 to 4 have an evaporation loss, as measured by the method disclosed in paragraph 60, of from 0.22% to 0.35% by weight and are therefore according to the subject-matter of claim 1 as the evaporation loss of the mineral oils is 0.4% by weight or less. The compositions of comparative examples 1 to 3 differ therefrom in that they contain mineral oil softening agents having an evaporation loss of 0.77%, 0.45% and 0.77% by weight respectively and thus outside the claimed range.

3.6 The haze (%) after 3 hours at 100°C, gloss and tensile properties measured on square pellets of the compositions produced in the examples and comparative examples are reported in Table 1 of the patent in suit. In that table, the values of the haze (%) of the compositions according to examples 1 to 4 is lower (1.4% to 2.1%) than for the compositions of the comparative examples 1 to 3 (4.5% to 8.2%), establishing that the compositions according to claim 1 of the patent in suit display lower haze or improved antifogging properties compared to compositions in

which the mineral oil has an evaporation loss outside the claimed range.

3.7 The values of gloss and tensile properties reported in table 1 of the patent in suit are very similar for all the compositions of the examples and comparative examples. It is plausible that the claimed compositions possess excellent gloss, flexibility and rubbery elasticity as disclosed in paragraph 53 of the patent in suit, it can however not be concluded that the claimed compositions were improved over those of the closest prior art in that respect.

3.8 As to the phenolic curing resins crosslinking agents, there is no evidence for any advantage associated with the use thereof. Even if a technical advantage could be attributed to their use in the claimed compositions, as argued by the respondent, that advantage would not be relevant to the use of organic peroxide crosslinking agents also encompassed by claim 1 of the main request and disclosed in example 15 of the closest prior art D3.

3.9 From the data available in the patent in suit, the technical problem that can be formulated in respect of the closest prior art D3 is therefore the provision of olefinic thermoplastic elastomer compositions having improved antifogging properties.

3.10 That problem is solved in the patent in suit by incorporating a paraffinic mineral oil having an evaporation loss of 0.4% by weight or less in the claimed thermoplastic elastomer compositions, as shown in the examples and comparative examples of table 1. The patent in suit plausibly shows that fogging in a crosslinked thermoplastic elastomer composition

decreases with decreasing evaporation loss of the oil. However, the examples provided do not show any criticality associated with the claimed threshold of 0.4% by weight. On the contrary the available evidence merely shows a continuous reduction in fogging as the evaporation loss becomes smaller. Thus, in examples 1, 2, 3 and comparative example 1, polymeric compositions containing paraffinic mineral oils only differing in their evaporation loss show that haze or fogging of these compositions decreases as evaporation loss of the oil decreases, even outside the claimed range (example 1: Haze of 1.4% for an evaporation loss of 0.22% by weight; example 2: Haze of 1.4% for an evaporation loss of 0.26% by weight; example 3: Haze of 1.9% for an evaporation loss of 0.35% by weight, comparative example 2 haze of 4.5% for an evaporation loss of 0.45% by weight and comparative example 1: Haze of 5.6 % for an evaporation loss of 0.77%). Starting from the closest prior art D3, the question to be answered is therefore whether it was obvious to reduce the evaporation loss of the paraffinic mineral oil contained in crosslinked thermoplastic elastomer compositions in order to solve the problem of reducing fogging of those compositions.

3.11 The evaporation loss of 0.4% or less characterising the compositions of claim 1 is defined in the patent in suit as the change in weight of the oil before and after immersion of a given amount of oil in a beaker for 1 hour in an oil bath heated to 200°C (paragraph 60). The evaporation loss is the loss of low molecular weight components which are the most volatile components from the oil upon heating and quantifies therefore the volatility of the oil. D3 teaches that it is especially important in polymer compounding for automotive applications to choose oils of low

volatility (passage bridging pages 158 and 159). The oils produced using the all-hydroprocessing technology referred to in D3 have lower volatility resulting in fewer emissions and excellent compatibility with rubber polymers (page 161, second paragraph). D3 establishes that emissions are indeed reduced in crosslinked rubber compositions containing oils of low volatility, as measured by the weight loss in air and emphasises the importance of low weight loss of the oils for applications where fogging is important (page 167, first paragraph and Figure E). D3 alone therefore teaches that emissions or fogging in crosslinked thermoplastic elastomer compositions can be reduced when an oil of reduced volatility or evaporation loss is used. The threshold of 0.4% by weight evaporation loss is not mentioned in D3. However, since D3 teaches the reduction of oil volatiles responsible for the fogging phenomenon of the thermoplastic elastomer compositions and since the threshold specified in operative claim 1 has not been shown to be critical in terms of any property of the resulting compositions, it is within the routine activity of the skilled person to identify the level of evaporation which yields satisfactory fogging performance, for example to a level of 0.4% or less. Thus, the threshold specified in claim 1 is merely the result of a routine optimisation which cannot render the claimed composition inventive.

3.12 As to the pour point of the paraffinic mineral oil, it was not disputed by the respondent that no technical advantage could be attributed to the choice of an oil having a pour point within the claimed range of -20°C to -10°C over the paraffinic mineral oil Chevron Oil Paralux 6001R having a pour point of -21°C disclosed in example 15 of the closest prior art D3. The choice of a

paraffinic mineral oil having a pour point within the range of claim 1 of the main request is purely arbitrary and does not contribute to an inventive merit of the claimed subject-matter in view of D3.

3.13 The solution to the technical problem provided by the patent in suit was therefore obvious in view of D3 alone. The subject-matter of claim 1 therefore does not meet the requirements of Article 56 EPC.

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:

B. ter Heijden M. C. Gordon

Decision electronically authenticated