Patents Act 1977 **Opinion Number** **23/22**

OPINION UNDER SECTION 74A

Patent	EP 3090023 B1
Proprietor(s)	Tarkett GDL
Exclusive Licensee	
Requester	Schlich Ltd
Observer(s)	Barker Brettell LLP
Date Opinion issued	08 December 2022

The Request

1. The comptroller has been requested to issue an opinion on the validity of EP 3090023 B1 (the patent). The patent was originally published as WO 2015/101569 with a filing date of 23 December 2014 and an earliest claim to priority from 3 January 2014. The patent was granted on 4 May 2022 and remains in force.

2. Observations were received from Barker Brettell LLP, and observations in reply were received subsequently from the requester.

3. The request questions the validity of the patent on the following basis:

    i) Lack of novelty of claims 1 to 7 on the basis of a broad interpretation of claim 1 in the light of at least D1, D2 and D4 (paragraphs 4.1 to 4.6 of request).
    ii) Obviousness of claims 1 to 9 based on a narrower interpretation of claim 1 in the light of documents D1 to D5 and common general knowledge (paragraphs 5.1 to 5.7).
    iii) Lack of industrial applicability of claim 1 (paragraph 6).
    iv) Lack of sufficiency (paragraph 7).

Prior art

4. The main prior art documents relied upon are D1 to D5 as follows:

    D1 - Dr Stimpson letter plus annexes of presentation slides - various dates

D2 - US 8372912 B2 (EASTMAN CHEMICAL CO.) - 12 February 2013

D3 - WO 2013/004265 A1 (TARKETT GDL) - 10 January 2013

D4 - US 2013/0317152 A1 (EVONIK OXENO GMBH) - 28 November 2013

D5 - WO 2013/079950 A1 (JAMES HALSTEAD PLC) - 6 June 2013

5. D1 referred to in the request includes slides allegedly relating to two oral presentations given before the priority date of the invention. The observer challenges the acceptability of this prior art. I will consider whether this document should be allowed before considering the substantive issues.

6. D1 comprises a number of different documents. Firstly, there is a signed statement from Dr Stimpson, formerly of Eastman Chemical UK Ltd, stating that he presented papers at the following two conferences:

"Formulating non-phthalate plasticizers for Speciality Plastisol Applications" at the PVC Formulation Conference on 17th February 2011 in Dusseldorf.

"The use of non-phthalates in formulating PVC Wallcovering Applications" at the IGI Technical Conference on 14th October 2013 in Osnabruck.

7. Secondly, Annex 1 of D1 shows the conference program for the PVC Formulation conference, including the slot for presentation of the paper referred to.

8. Finally, Annexes 2 and 3 are copies of the slides of the two presentations. Annex 2 comprises 45 slides, whilst Annex 3 is 65 slides.

9. The observer argues that the evidence is insufficient to prove that the slides constitute a prior disclosure. For example, the observer argues that it is not clear that these were the actual slides presented, and that they may have been modified subsequently for use at different presentations or to amend details of the slides. The observer also points out that some of the slides may have been omitted during the course of the presentation.

10. Whilst further evidence may have been preferable, for example metadata or file system data showing dates the files were modified, I am content to accept that D1 represents prior art, at least for the purposes of this opinion. In reaching this decision I take note of the following:

    i) the signed statement from Dr Stimpson;

    ii) the conference programme indicating the time slot for the presentation;

    iii) the slides are appropriately titled for the conferences they were presented at, and they are not just a generic set of slides.

    iv) the slides appear tailored for the particular presentation with some

slides reused and others amended/updated

11. To the extent necessary, I will consider whether or not the disclosure of these slides is enabling when I consider the substantive issues.

12. D2 is a US patent published as US 8372912 on 12 February 2013. It relates to PVC products derived from plastisols.

13. D3 is a PCT patent application published as WO 2013/004265. It discloses a PVC surface covering comprising a citrate-based plasticiser.

14. D4 is a US patent application published as US 2013/0317152 which discloses compositions comprising a polyvinyl polymer and diisononyl terephthalate (DINT) as a plasticiser softener.

15. D5 is a further PCT patent application published as WO 2013/079950. It describes a floor covering comprising PVC polymer layers.

16. Additional prior art is referred to by the requester as follows:

    D6 – World History Encyclopedia – Roman Mosaics article

    D7 – Paving Slabs Suitable for Driveways – London Stone

    D8 – Cladding at Birmingham New Street – Features – Building

    D9 – DINCH – SDS

    D10 – ATBC MSDS

    D11 – VESTOLIT P1415 K80 Ultra SDS

17. D6 to D8 are prior art surface coverings. They are only relevant if claim 1 is interpreted very broadly.

18. D9 to D11 are safety data sheets (SDS) for various non-phthalate plasticisers. They are said to show that the patent lacks industrial applicability.

Preliminary matters

19. I deal first with some preliminary matters arising from the request and the observations in reply.

20. Firstly, two of the documents referred to in the request, D3 and D4 were considered during prosecution of the patent by the EPO. It is normal practice for opinions not to reconsider documents already cited during pre-grant examination of the patent. If the patentee has already satisfied the examiner that the patent is novel and inventive in relation to some prior art, it is considered unnecessary for the patentee to have to

deal with that issue again as part of the opinion process.

21. In this instance the requester has responded to arguments that these documents should not be considered by claiming that, because they have argued for a different construction of the claims to that adopted by the EPO examiner, they should be reconsidered. In view of this argument I will deal with whether or not to consider these documents once I have construed the claims.

22. Secondly, the requester has raised a new question in the observations in reply relating to whether or not there is added matter in the patent compared to the application as filed. The requester claims this new question is in response to arguments raised by the observer in the observations. Whatever the genesis of this new question, the patentee has had no opportunity to rebut the arguments raised and I decline to issue an opinion on it. If the requester wishes to have an opinion on this issue they should file a new opinion request.

The Patent

23. The patent is titled “Decorative Surface Coverings from Improved Phthalate-Free Polyvinyl Chloride (PVC) Plastisol Compositions”.

24. It relates to decorative PVC based floor and wall coverings which, as well as being phthalate free, also have low emissions of volatile organic compounds (VOCs).

25. Phthalates have found widespread use as plasticisers to increase the flexibility, transparency, durability and longevity of plastics. However, they are now known to be toxic and their use is being phased out.

26. It should be noted that terephthalates are considered distinct to phthalates (ortho-phthalates) and terephthalate compounds are categorised as non-phthalates and are used in phthalate free compositions. The toxicity of terephthalates is much lower than phthalates.

27. Plastisols are suspensions of polyvinyl chloride (PVC) polymer particles in a liquid plasticiser. When the plastisol is heated to around 180°C the polymer particles absorb the plasticiser causing them to swell and fuse to form a gel. Subsequent cooling turns the gel into a flexible solid. This process is known as gelling or curing.

28. The patent sets out compositions and proportions of non-phthalate plasticisers for making plastisols which can suitably be used for making decorative wall and floor coverings, e.g. vinyl wallpaper and vinyl flooring.

Claims

29. There are two independent claims. Claim 1 relates to a decorative surface covering manufactured from the inventive plasticisers. Claim 7 relates to a method of making such a decorative surface covering. These claims read as follows:

> *1. Decorative surface covering, in particular floor or wall covering, obtained*

from processing a phthalate-free PVC-based plastisol composition for the production of decorative surface coverings, said surface covering having a TVOC (total volatile organic compound) emission lower than 100 µg.m^{-3}, preferably a VOC (volatile organic compound) emission, lower than 10 µg.m^{-3}, measured after 28 days according to a test method based on ISO 16000-6, ISO 16000-9 or ISO 16000-10, wherein the VOC emission is equal to the sum of the TVOC (total volatile organic compound) emission, the SVOC (semi-volatile organic compound) emission and the formaldehyde emission,

wherein said composition comprises from 10 to 200 parts, preferably from 20 to 150 parts per 100 parts of polyvinyl chloride of a plasticizer blend comprising the following parts per weight ingredients:

- from 5 to 190 parts, preferably from 10 to 160 parts, more preferably from 15 to 130 parts, most preferably from 15 to 75 parts of one or more phthalate-free primary plasticizers characterized by a solution temperature at the clear point, comprised between 130 and 200°C, preferably 130 and 160°C, and a vapor pressure at 250C of less than 5. 10-3 mm Hg, the one or more phthalate-free primary plasticizers being selected from the group consisting of the alkyl esters of cyclohexane dicarboxylic acids and the alkyl esters of aromatic di-, tri-, or tetra-carboxylic acids, with the exception of orthophthalic acid;

- from 1 to 100 parts, preferably from 3 to 80 parts, more preferably from 5 to 60 parts, most preferably from 5 to 50 parts of one or more phthalate-free secondary plasticizers characterized by a solution temperature at the clear point, of less than 130°C, preferably comprised between 70 and 129°C, and a vapor pressure at 25°C of less than 10^{-1} mm Hg;

the solution temperatures of the one or more primary and the secondary plasticizers being measured according to DIN 53408 on suspension PVC with a K-value of 71;

the vapor pressure of the one or more primary and the secondary plasticizers being measured according to ASTM E1194-07;

wherein

the ratio of the content of said one or more phthalate-free primary plasticizers to the content of said one or more phthalate-free secondary plasticizers is comprised between 0.1 and 10, preferably between 0.5 and 7.5, whereby the gelation temperature exhibited by said plastisol in the presence of said one or more primary plasticizers alone is reduced by at least 5°C.

30. Claim 7:

7. Method for the preparation of a decorative surface covering as claimed in

any one of claims 1 to 6, with a-free PVC- based plastisol composition comprising from 10 to 200 parts, preferably from 20 to 150 parts per 100 parts of polyvinyl chloride of a plasticizer blend comprising the following parts per weight ingredients:

- from 5 to 190 parts, preferably from 10 to 160 parts, more preferably from 15 to 130 parts, most preferably from 15 to 75 parts of one or more phthalate-free primary plasticizers characterized by a solution temperature at the clear point, comprised between 130 and 200°C, preferably 130 and 160°C, and a vapor pressure at 25°C of less than $5x10^{-3}$ mm Hg, the one or more phthalate-free primary plasticizers being selected from the group consisting of the alkyl esters of cyclohexane dicarboxylic acids and the alkyl esters of aromatic di-, tri-, or tetra- carboxylic acids, with the exception of orthophthalic acid;

- from 1 to 100 parts, preferably from 3 to 80 parts, more preferably from 5 to 60 parts, most preferably from 5 to 50 parts of one or more phthalate-free secondary plasticizers characterized by a solution temperature at the clear point, of less than 130°C, preferably comprised between 70 and 129°C, and a vapor pressure at 25°C of less than 10^{-1} mm Hg;

the solution temperatures of the one or more primary and the secondary plasticizers being measured according to DIN 53408 on suspension PVC with a K-value of 71

the vapor pressure of the one or more primary and the secondary plasticizers being measured according to ASTM El 194-07,

wherein

the ratio of the content of said one or more phthalate-free primary plasticizers to the content of said one or more phthalate-free secondary plasticizers is comprised between 0.1 and 10, preferably between 0.5 and 7.5, whereby the gelation temperature exhibited by said plastisol in the presence of said one or more primary plasticizers alone is reduced by at least 5°C;

the method comprising the steps of:

a) supplying a backing layer;
b) contacting the backing layer with the plastisol composition;
c) gelling said composition at a temperature comprised between 130°C and 200°C.

Claim construction

31. As a first step in determining the validity of the patent I must correctly construe the claims. This means interpreting them in the light of the description and drawings as instructed by Section 125(1). In doing so I must interpret the claims in context through the eyes of the person skilled in the art. Ultimately the question is what the person skilled in the art would have understood the patentee to be using the

language of the claims to mean. This approach has been confirmed in the decisions of the High Court in *Mylan v Yeda*[1] and the Court of Appeal in *Actavis v ICOS*[2].

32. I start by noting that the independent claims include a number of preferable features. For the purposes of construction these preferable features can be ignored. For example, the claims refer to a proportion of plasticiser blend as *being from 10 to 200 parts, preferably from 20 to 150 parts per 100 parts of polyvinyl chloride*. The reference to *preferably from 20 to 150 parts* in this clause can be ignored for the purpose of construing the claim.

33. Looking firstly at claim 1, the requester has suggested that the term *decorative surface covering* should be construed as two separate terms, with decorative reflecting an aesthetic creation. On this point I agree with the observer that decorative is merely a characterisation of the surface covering which would be familiar to someone skilled in the art. Decorative distinguishes the type of surface covering from other surface coverings which may characterised as waterproof, protective, etc. I consider that the requester has adopted an overly legalistic interpretation of this feature of the claim rather than interpreting the claim through the eyes of the skilled addressee.

34. One of the main points of dispute relates to the product-by-process nature of claim 1 and how such a claim should be interpreted.

35. The requester's arguments on this issue are not straightforward to understand. They seem to be simultaneously arguing that there are process steps, which should be ignored for the purpose of construction, and that there are no process steps. On the face of it the claim is a product-by-process claim by virtue of the phrase *"obtained from processing*".

36. The principal problem with product-by-process claims is being able to determine whether a product falls within the scope of the claim as it may not be possible to determine how the product was formed, and there may be multiple ways of forming the same product.

37. The leading case law of the UK courts regarding the construction of product-by-process claims is *Kirin-Amgen*[3]. In their judgement the House of Lords held that the UK should apply the same law as the EPO and other EU states, and that product-by-process claims should be construed as a claim to the product as such (see Technical Board of Appeal decision T0150/82[4]). Furthermore, product-by-process claims are allowed, but only where the product itself is new, and where the difference between the new product and existing products cannot be described in chemical or physical terms. This was set out at paragraph 98 of *Kirin Amgen* as follows:

> *It is only if the product is different but the difference cannot in practice be satisfactorily defined by reference to its composition, etc that a definition by process of manufacture is allowed.*

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[1] *Generics UK Ltd (t/a Mylan) v Yeda Research and Dev. Co. Ltd & Anor* [2017] EWHC 2629 (Pat)
[2] *Actavis Group & Ors v ICOS Corp & Eli Lilly & Co.* [2017] EWCA Civ 1671
[3] *Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2005] RPC 9
[4] T 0150/82 *International Flavors & Fragrances Inc* [1984] O.J. EPO 309,

38. Accordingly, claim 1 should be construed as directed to the product itself regardless of the way it is manufactured. Nevertheless, and pre-supposing it is a new product, it is defined by that process of manufacture. In order to decide if the product itself (of a product-by-process claim) is new or not, an analysis of the physical and chemical characteristics of the product would typically have to be carried out for comparison with a similar analysis for a prior art product. I have not been provided with the evidence to make that comparison. It may nevertheless be possible to compare the products by deriving appropriate information from information on their manufacture.

39. Looking more closely at the process steps required by the claim, I consider that they are implicit. Claim 1 specifies:

> *Decorative surface covering, in particular floor or wall covering, obtained from processing a phthalate-free PVC-based plastisol composition …*

40. As the requester points out, there are no explicit processing steps in the claim, merely the requirement that the surface covering is *obtained by processing*. The skilled person would however realise that the processing being referred to is the gelling of the plastisol composition, as, for example, required by claim 7. Provided that the decorative surface covering is a new product, then I consider that is an appropriate way to define the product, rather than having to specify the complex chemical composition and physical properties of the gelled plastisol. On this basis the gelling step may be ignored but only to the extent it is possible to form the same decorative wall covering by another process. Contrary to the agent's arguments, anticipation is not assessed by simply ignoring everything following the process step. So, in the case of this application, it is not correct to suggest that the claim is directed simply to a decorative surface covering.

41. The requester refers to the judgement in *British Celanese Ltd's Application*[5] and the statement in that application that *"to claim the conversion of a starting material into an end product without specifying the means for its conversion would be to define no process at all."* The requester points out that claim 1 does not specify the means for conversion of the plastisol (the starting material) into the surface covering (the end product). However, I do not consider that this judgement is of any assistance in this opinion. In particular, the judgement was an appeal against the Comptroller's refusal of the application, i.e. it does not relate to a granted patent. The requester does not suggest the patent is invalid because of the lack of a defined process in claim 1. The claims as granted fall to be construed through the eyes of the skilled person.

42. The requester also suggests that *"obtained from processing"* should be interpreted as "*comprising*". On that basis they argue that the decorative surface covering is the plastisol, i.e. an ungelled liquid composition. I consider this another example of overly legalistic interpretation of the claim. The skilled person would construe the claim as being directed to a wall surface covering formed from the liquid plastisol composition by curing/gelling, these processes being part of the skilled person's common general knowledge.

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[5] *British Celanese Ltd's Application* [1934] 51 RPC 192

43. At least for the purpose of determining the validity of the patent, I construe claim 1 as being directed to the product itself. Whilst the process step may be ignored, the product is nevertheless produced by the process. It is that product which is compared with prior art products, regardless of the process by which those prior art products have been made.

44. In this case the prior art referred to by the requester all relies on gelling of a plastisol composition to form a PVC polymer layer. As such the processing step of the prior art is substantially the same as that of the patent. This being the case, as a first step in determining novelty and inventiveness of the product for the purpose of this opinion, I consider that I can compare the plastisol composition defined by claim 1 prior to gelling with the plastisol compositions of the prior art. There is no evidence to suggest that the decorative surface covering of claim 1 can be manufactured by gelling a different plastisol composition or by some different process entirely.

45. In order to fully determine whether the product is new or inventive, the product must also have the required *functional* characteristics of claim 1, i.e. its TVOC and VOC properties must fall below the maximums specified in claim 1.

46. With regard to comparing the plastisol composition of claim 1, I note that certain features of the plastisol have also been defined on a *functional* basis. Whilst certain of these *functional* characteristics are straightforward to determine, such as the vapour pressure and solution temperature of the plasticisers, there are further features which cannot be readily determined. In particular, the plastisol composition is defined in part by a requirement that *the gelation temperature exhibited by said plastisol in the presence of said one or more primary plasticizers alone is reduced by at least 5°C.* I refer to this as the *gelation temperature behaviour.* Expressing this requirement in a different manner, I interpret it as requiring sufficient secondary plasticiser to be added that the gelation temperature is increased by at least 5°C compared with the primary plasticiser alone. It is not possible to tell how much secondary plasticiser is required without carrying out experiments. I.e. the data is not derivable from text books nor would it form part of the skilled person's common general knowledge. The requester has not provided any data of this *gelation temperature behaviour*. The only data I have is for the particular examples of the patent, on the basis that they are presumed to meet this requirement.

47. Ultimately this means that it is very difficult to determine, without appropriate physical and chemical comparison of the patented product with prior art products, or of the equivalent plastisols, whether the product is new or not. Without that physical and chemical data I do not have the evidence to determine if the prior art plastisols are the same as the plastisols of the patent, unless they happen to be manufactured using the same chemicals in the same proportions as the particular examples described in the patent.

48. To the extent that I am able, I need to decide if the prior art plastisols are the same as the specific plastisols defined in the patent. Similarly, for inventiveness I need to determine if there are minor variations between the plastisols, such that it would be obvious to modify the prior art plastisol to match the specific plastisols of the patent.

49. In view of the product-by-process formulation of the claim, I consider that the EPO examiner determined that the product of claim 1 was new, and it was for this reason

that the product-by-process definition was considered allowable. Accordingly, I do not consider it appropriate to consider documents D3 and D4. These documents were considered by the EPO examiner and I see no basis for reconsidering them.

50. Claim 7 defines a process for making the wall covering of claim 1 starting with the same plastisol composition and processing it by applying the plastisol composition to a backing layer and then gelling the plastisol.

51. The construction of claim 7 is somewhat more straightforward as it is directed to the process *per se*.

52. Firstly, I would note that the backing layer at the end of the claim would be interpreted as a permanent backing layer for the finished product, e.g. a paper layer for a vinyl wallpaper.

53. Secondly, as with claim 1, a number of the features of the plastisol are defined on a *functional* basis, in particular the *gelation temperature behaviour*.

54. As above, the requester has not provided any data regarding the *gelation temperature behaviour*. Accordingly, and as with claim 1, I can only determine if claim 7 is anticipated if the prior art discloses forming a plastisol from the same compounds and in the same proportions as the particular examples of the patent. Similarly for inventiveness, given the evidence and argument provided, I can only determine if there is a lack of inventive step if there are small variations between the proportions or between the chemicals of the compounds in the prior art and the patent, such that it would be obvious to adjust the prior art examples to match those of the patent.

Novelty

55. I have indicated above that, for both claim 1 and claim 7, I can only reach a conclusion of anticipation or lack of inventive step if there are specific examples disclosed in the prior art which are the same or at least nearly the same as the specific examples disclosed in the patent.

56. The specific examples described in the patent, which are set out in tables 1 to 3 of the specification, are reproduced below.

Table 1	Component	Phthalate based	Phthalate-free
PVC	Paste PVC micro-suspension	100.00	100.00
Primary plasticizer	Diisononyl phthalate	75.00	
	Diisononyl cyclohexanoate		65.00
Secondarry plasticizer	Acetyl tributyl citrate		20.00
Diluant	Fatty acid methyl ester	11.40	
Filler	Calcium carbonate	152.00	152.00
Other component	Rheology additive	2.90	2.90

Table 2	Component	Phthalate based	Phthalate-free
PVC	Paste PVC micro-suspension	100.00	100.00
Primary plasticizer	Diisononyl phthalate	53.00	
	Diisononyl cyclohexanoate		55.00
Secondary plasticizer	Isononyl benzoate	11.00	10.00
	Diethylene glycol dibenzoate		7.00
Diluant	Fatty acid methyl ester	9.00	
Filler	Calcium carbonate	160.00	160.00
Table 2	Component	Phthalate based	Phthalate-free
Other component	Blowing agent	2.90	2.90
	Kicker	1.70	1.70

Table 3	Component	Phthalate based	Phthalate-free
PVC	Paste PVC micro-suspension	70.00	70.00
	Paste PVC resin extender	30.00	30.00
Primary plasticizer	Diisononyl phthalate	16.50	
	Diisononyl cyclohexanoate		18.00
Secondarry plasticizer	Isononyl benzoate	7.00	10.00
Diluant	Fatty acid methyl ester	4.70	
Stabilizer	Liquid Ca/Zn	2.00	2.00
	Epoxidized soya bean oil	2.50	2.50
Other component	Air release additive	0.60	0.60

57. I note that the primary phthalate free plasticiser in each case is diisononyl cyclohexanoate (DINCH).

58. Having carefully studied all the prior art referred to by the requester, in particular D1 and D2, I can find no specific examples of plastisols which use DINCH. DINCH appears to be mentioned somewhat in passing in D1 and D2 merely as an example of a non-phthalate plasticiser. However, there are no specific combinations setting out its use with a secondary plasticiser nor any suggested proportions of DINCH to be used with a secondary plasticiser.

59. In D1, DINCH only appears to be mentioned on pages 33 and 34 of Annex 2 of D1, where the health risk to children from its use in plastic toys is specified. The same data is presented in Annex 3 of D1, plus further data on pages 7 to 9, including its volatility and gelation performance.

60. D2 specifies that the main plasticiser is a di-butyl- or di-isobutyl- terephthalate

plasticiser. DINCH is included in a long list of *additional* plasticisers. Clearly the use of di-butyl- or di-isobutyl- terephthalate as a main plasticiser precludes it from being a comparable product to the inventive product.

61. None of the prior art therefore discloses an example of a plastisol composition matching the examples of the patent.

62. In particular, none of the specific examples from the prior art disclose the specific mixture of primary plasticiser (DINCH) and secondary plasticiser (see tables above) from the patent which is known to show the *gelation temperature behaviour required by the claims.* Without any further evidence of mixtures of primary and secondary plasticiser which show this *gelation temperature behaviour*, I am unable to determine if the prior art plasticiser mixtures fall within the scope of the claims.

63. The evidence provided fails to show that either the product of claim 1 or the process of claim 7 is known. Accordingly the claims are considered to be novel. Additionally, as the product of claim 1 is new the process is also relevant to the construction of the claim.

64. In view of the novelty of independent claims 1 and 7 I do not need to consider the novelty of the dependent claims.

Inventive step

65. As I only know the *gelation temperature behaviour* for the specific mixtures detailed in the patent, I can only find a lack of inventive step if it obvious to modify one of the prior art mixtures to match one of those mixtures. I have already identified that none of the prior art discloses DINCH as a primary plasticiser. The only basis on which I can consider inventiveness is if it obvious to replace one of the primary plasticisers of the prior art with DINCH to arrive at a mixture which is the same as that disclosed in the patent.

66. As I have set out above, D2 discloses that DINCH is an additional plasticiser added to another main plasticiser. It is not therefore considered obvious to use DINCH alone as a primary plasticiser and/or to replace the main plasticiser. There is therefore no data to show that the plastisol of claims 1 or 7 is obvious based on D2.

67. Annex 3 of D1 appears to disclose plastisol mixtures comprising a mixture of a general plasticiser and a speciality plasticiser (see, in particular, slide 19 of Annex 3). For present purposes, the general plasticiser Eastman 168 (dioctyl terephthalate - DOTP/DEHT) is considered to be the primary plasticiser of the claims and the speciality plasticiser is considered to be the secondary plasticiser. The phthalate free speciality plasticisers listed are Eastman DBT (di-butyl terephthalate), Benzoflex 131 (iso-decyl benzoate - IDB) and Benzoflex 2088. Benzoflex 2088 is identified in its MSDS as dipropyleneglycol dibenzoate. Eastman and Benzoflex are registered trademarks of Eastman Chemical Co.

68. Benzoflex 131 (iso-decyl benzoate) is very similar to iso-nonyl benzoate which is the secondary plasticiser of the composition of Table 3 of the patent. It would be obvious to replace Benzoflex 131 with iso-nonyl benzoate. It is not clear if it is obvious to

replace Eastman 168 with DINCH. However, even if it were obvious to use a different general plasticiser, the compositions of these two examples would still be somewhat different. The composition of Table 3 is based on 100 parts PVC, 18 parts DINCH and 10 parts isononyl benzoate. The only composition I can find in Annex 3 of D1 is 100 parts PVC, 28 parts Eastman 168 and 13 parts of a "High Solvating Plasticiser", along with a list which includes Benzoflex 131 (slide 15). Thus there is significantly more primary plasticiser in the prior art example (28 parts) than in the patent (18 parts). Even if it were obvious to modify the chemical constituents, I do not consider it obvious to additionally modify the proportions of the example of D1 to the extent required to match the example of Table 3 of the patent. Whilst it may nevertheless be obvious to modify the example of D1 to a lesser extent such that it exhibits the required *gelation temperature behaviour,* I do not have the evidence to determine if that is the case or not. Based on the evidence and argument provided, the particular example of Table 3 appears inventive in relation to D1.

69. I do not consider it obvious to replace the secondary plasticisers of Annex 3 of D1 with a citrate-based plasticiser, as is specified in Table 1, nor a mixture of plasticisers, as is specified in Table 2. These particular examples also appear inventive in relation to D1 on the available evidence.

70. Albeit based on limited evidence, I cannot find any prior art examples which would be obvious to modify so as to replicate the examples disclosed in the patent. The specific plastisol mixtures of the patent are therefore considered to be inventive. Given also the lack of data regarding the *gelation temperature behaviour* of mixtures of primary and secondary plasticisers, I have to conclude that claims 1 and 7 are inventive.

71. In view of the inventiveness of the independent claims I do not need to consider the dependent claims.

Industrial applicability

72. I deal with this issue briefly. I agree with the observer's arguments:

> *The claims relate to a decorative surface covering and a method for the preparation of a decorative surface covering. It is self-evident that these products, which are articles of commerce, and methods for the preparation thereof have industrial applicability.*
>
> *In any case, the requester's assertions of lack of industrial applicability all appear to arise from an incorrect construction of the claims, which we have discussed above. When the claims are properly understood, taking the mindset of the person skilled in the art, it is unquestionably apparent that the claimed subject matter has industrial applicability.*

73. The requester's main argument seems to be that, based on their incorrect interpretation of claim 1, the decorative surface covering cannot function as such, is toxic, will not cure and is not capable of industrial application. This is largely based on their interpretation of "*obtained by processing*" being equivalent to "*comprising"*

such that the surface covering is the ungelled plastisol, i.e. it is restricted to a liquid. However, as dealt with previously, I do not agree with this interpretation. In any event, the toxicity, practicality of application, etc., is not considered relevant to the issue of industrial applicability.

Sufficiency

74. The requester also seeks an opinion on whether or not the specification of the patent discloses the invention clearly enough and completely enough for it to be performed by a person skilled in the art, i.e. whether the disclosure is sufficient.

75. In *Eli Lilly v Human Genome Sciences*[6] Kitchin J gave the following summary of the relevant principles, to be applied when assessing sufficiency:

> *The specification must disclose the invention clearly and completely enough for it to be performed by a person skilled in the art. The key elements of this requirement which bear on the present case are these:*
>
> *(i) the first step is to identify the invention and that is to be done by reading and construing the claims;*
>
> *(ii) in the case of a product claim that means making or otherwise obtaining the product;*
>
> *(iii) in the case of a process claim, it means working the process;*
>
> *(iv) sufficiency of the disclosure must be assessed on the basis of the specification as a whole including the description and the claims;*
>
> *(v) the disclosure is aimed at the skilled person who may use his common general knowledge to supplement the information contained in the specification;*
>
> *(vi) the specification must be sufficient to allow the invention to be performed over the whole scope of the claim;*
>
> *(vii) the specification must be sufficient to allow the invention to be so performed without undue burden."*

76. In *Mentor Corporation v Hollister Inc*[7], the Court of Appeal said they could find "no vestige of error" in a statement of Aldous J. in the same case in the following terms:

> *"The section requires the skilled man to be able to perform the invention, but does not lay down the limits as to the time and energy that the skilled man must spend seeking to perform the invention before it is insufficient. Clearly there must be a limit. The subsection, by using the words, clearly enough and completely enough, contemplates that patent specifications need not set*

[6] *Eli Lilly v Human Genome Sciences* [2008] RPC 29 at [239]
[7] *Mentor Corporation v Hollister Inc* [1993] RPC 7 at 13

out every detail necessary for performance, but can leave the skilled man to use his skill to perform the invention. In so doing he must seek success. He should not be required to carry out any prolonged research, enquiry or experiment. He may need to carry out the ordinary methods of trial and error, which involve no inventive step and generally are necessary in applying the particular discovery to produce a practical result. In each case it is a question of fact, depending on the nature of the invention, as to whether the steps needed to perform the invention are ordinary steps of trial and error which a skilled man would realise would be necessary and normal in order to produce a practical result."

77. The requester argues that the patent lacks sufficiency based on at least one of classical insufficiency or insufficiency due to undue claim breadth (otherwise known as Biogen insufficiency).

Classical insufficiency

78. Classical insufficiency was summarised by Floyd J in *Zipher Ltd v Markem Systems Ltd*[8] as follows:

> *"Classical insufficiency arises where the express teaching of the patent does not enable the skilled addressee to perform the invention. This type of insufficiency requires an assessment …of the steps to which it would be necessary for the skilled reader or team to take in following the teaching of the specification and in order to arrive within the claim. Plainly the steps should not include inventive ones. But a patent can also be found insufficient if the steps can be characterised as prolonged research, enquiry or experiment."*

79. Firstly, the requester argues that the specification is classically insufficient because it is possible to make products according to the process of claim 7 which do not fall within the scope of claim 1. In particular, they point to the examples of slide 36 of Annex 3 of D1 which show TVOC data for a floor covering formed from a plastisol composition which are greater than the *100 µg.m^{-3}* maximum of claim 1.

80. The requester identifies that the patent refers in paragraph [0052] to a list of four preferred primary plasticisers which includes dioctyl terephthalate (DOTP/DEHT). Similarly, paragraph [0059] specifies a list of four preferred secondary plasticisers which includes dibutyl terephthalate (DBT). The examples of slide 36 of Annex 3 of D1 includes show compositions formed from a plastisol comprising E168 (which is DOTP/DEHT) and DBT in a formulation disclosed on slide 32. These examples are therefore formed from particularly preferred plasticisers of the patent. Slide 36 also includes the TVOC emissions data for these products. Notably the TVOC emissions data for these samples is much higher than the 100 µg.m^{-3} maximum required to fall within the scope of claim 1.

81. The requester therefore claims that these products are made according to the method of claim 7 but have more than the maximum level of TVOC required by claim

[8] *Zipher Ltd v Markem Systems Ltd* [2009] FSR 1

1. The requester suggests that this means all the steps of the process have not been set out sufficiently, i.e. something else must be required to bring the products within the scope of the claim.

82. I do not agree with this argument. In particular, whilst the primary and secondary plasticisers are presumed to have the required vapour pressure and solution temperature, there is no data available regarding the *gelation temperature behaviour.* The *gelation temperature behaviour* is dependent on the relative proportions of the first and secondary plasticiser in the composition. Without this data it is not possible to determine if the compositions specified in D1 are made according to the process of claim 7 and whether they fall within the scope of claims. Accordingly, and as I have already considered in relation to novelty and inventiveness, there is no basis for concluding that the products or processes of D1 fall within the scope of claims 1 or 7 respectively.

83. In any event, the patent sets out three specific examples of compositions of plastisol falling within the scope of the claims. For example, paragraphs [0097] and [0098] provide detailed instructions for the specific plastisol of Table 1 as follows:

> *[0097] In table 1, the PVC resin micro-suspension is Vestolit® P1415 K80 from Vestolit; … diisononyl cyclohexane is Hexamoll® DINCH from BASF; acetyl tributyl citrate is Citrofol® B II from Jungbunzlauer; … calcium carbonate is Mikhart® 10 from Provencale and the rheology additive is composed of 0.40 parts of Aerosil® 200 from Evonik and 2.50 parts of Byk® 8070 from Byk Chemie*
>
> *[0098] The polyvinyl chloride layers obtained after gelling/fusing at a temperature of 170°C for a period of 30 seconds, at a thickness of about 200 micrometer are characterized by:*
>
> *…*
> *- phthathalate-free formulation: TVOC, SVOC and formaldehyde emission after 28 days equal to or less than 10 µg.m^{-3}*

84. I have no doubt that the skilled person can carry out the process of claim 7 and formulate the wall covering of claim 1 based on these instructions and their skill and common knowledge, i.e. the skilled addressee can perform the invention. On that basis the patent is classically sufficient.

Insufficiency by excessive claim breadth

85. I must now consider insufficiency by virtue of undue claim breadth. In *Biogen Inc v Medeva plc,* the House of Lords held that for a patent to be sufficient, the disclosure must enable the whole width of the claimed invention to be performed.

86. The requester argues that the patent only discloses three plastisol compositions using only a single primary plasticiser and three different secondary plasticisers. The requester points out there are 6000 potential combinations referred to in the patent based on 120 potential primary plasticisers and over 50 examples of secondary plasticisers.

87. The claims certainly appear broad on the basis of only three specific embodiments and there is no doubt a question to be answered regarding whether or not these three examples justify the breadth of the claims.

88. In *Biogen Inc v Medeva Hoffmann LJ stated (my underlining):*

> *Thus if the patentee has hit upon a new product which has a beneficial effect but cannot demonstrate that there is a common principle by which that effect will be shared by other products in that class, he will be entitled to a patent for that product but not for the class, even though some may subsequently turn out to have the same beneficial effect… On the other hand, if he has disclosed a beneficial property which is common to the class, he will be entitled to a patent for all products of that class (assuming them to be new) even though he has not himself made more than one or two of them.*

89. Similarly, some principles which need to be considered when assessing insufficiency due to excessive claim breadth were set-out by Lord Briggs in *Regeneron Pharmaceuticals Inc v Kymab Ltd*[9]*.* These were clarified by Birss J in *Illumina Cambridge Ltd v Latvia MGI Tech SIA*[10]*.* I quote only principle (vi) which I consider most relevant to the issue (my underlining):

> *vi) This does not mean that the patentee has to demonstrate in the disclosure that every embodiment within the scope of the claim has been tried, tested and proved to have been enabled […]. Patentees may rely, if they can, upon a principle of general application if it would appear reasonably likely to enable the whole range […] within the scope of the claim to be performed. But they take the risk, if challenged, that the supposed general principle will be proved at trial not in fact to enable a significant, relevant, part of the claimed range to be performed, as at the priority date.*

90. Beyond simply asserting that there is a large discrepancy between the number of possible combinations and the number of specific examples, the requester has not provided any argument about there being a *principle of general application*. Without such argument I cannot consider the issue further. It appears from the disclosure of the patent that the vapour pressure, solution temperature, and *gelation temperature requirement* are the *principles of general application.* For example, paragraphs [0105] and [0106] of the patent specify the importance of the vapour pressure and solution temperature to the invention:

> *[0105] As has been surprisingly found in the present invention, the right selection of suitable primary and secondary plasticizers in order to formulate a plastisol having a gelation /fusion profile identical to the gelation /fusion profile of the phthalate based reference and in order to produce polyvinyl chloride layers showing comparable VOC emission is dictated by a number of particular physico-chemical characteristics.*
>
> *[0106] As appears from Table 4, the physico-chemical characteristics of interest are the solution temperature at clear point, the vapor pressure at 25*

[9] *Regeneron Pharmaceuticals Inc v Kymab Ltd* [2020] UKSC
[10] *Illumina Cambridge Ltd v Latvia MGI Tech SIA & Ors [2021] EWHC 57 (Pat)*

C in the first instance and the viscosity at 20° C and the molecular weight in the second instance

91. The one point the requester does raise is again in relation to the examples of Annex 3 of D1 as follows:

> *"The data in Annex 3 of D1 demonstrates that the scope of claim 1 is too broad as not all of the combinations of primary and secondary plasticiser satisfy the requirements of clause V [maximum TVOC level] of claim 1."*

92. This point appears relevant to the final sentence of principle (vi) quoted above. I.e. the requester is suggesting that, these are examples using plasticisers specifically preferred by the patent, which show that, whatever the *principle of general application*, it does not enable a part of the claimed range to be performed. However, as discussed above, the examples from Annex 3 have not been shown to have the required *gelation temperature behaviour*. As such they cannot be considered relevant to the invention and they are not evidence of insufficiency.

93. In the absence of any evidence to the contrary, I am satisfied that the claims are not insufficient for undue claim breadth.

Summary

94. I cannot find examples of plastisols in the prior art provided by the requestor which match the specific plastisols of Tables 1 to 3 of the patent. Similarly, I do not consider it obvious, based on the argument and evidence provided, to modify the prior art examples so that they would match the specific plastisols of the patent. I therefore consider that those specific plastisols are new and inventive. Furthermore, without any data being provided of mixtures of plastisols which match the required *gelation temperature behaviour,* I cannot assess whether the examples of the prior art would otherwise fall within the scope of the claims, or whether it would be obvious to modify those examples so that they did fall within the scope of the claims. In the circumstances I can only conclude that the patent is novel and inventive.

95. In relation to classical sufficiency, I consider that the skilled person can put the invention into practice without undue effort based upon the disclosures of the patent. It is therefore classically sufficient.

96. With regards to insufficiency due to undue claim breadth, the requester has failed to provide sufficient argument or evidence to persuade me that the scope of the claims is unduly broad, in spite of the fact that there are only three concrete examples.

Opinion

97. Based on the argument and evidence provided it is my opinion that EP 3090023 B1 is valid.

98. In particular, the requester has not persuaded me that the claims lack novelty or

inventive step or that the patent lacks sufficiency. The patent is also capable of industrial application.

Matthew Jefferson
Examiner

NOTE

This opinion is not based on the outcome of fully litigated proceedings. Rather, it is based on whatever material the persons requesting the opinion and filing observations have chosen to put before the Office.