

Internal distribution code:

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

**Datasheet for the decision
of 14 December 2016**

Case Number: T 2135/13 - 3.3.05

Application Number: 04753774.1

Publication Number: 1628771

IPC: B01L7/00, C12Q1/68

Language of the proceedings: EN

Title of invention:

THERMAL CYCLING APPARATUS FOR PROVIDING THERMAL UNIFORMITY

Patent Proprietor:

Life Technologies Corporation

Opponents:

Roche Diagnostics International AG
Hirsz, Christopher Stanislaw
Eppendorf AG

Headword:

Thermal cycling apparatus/LIFE TECHNOLOGIES

Relevant legal provisions:

RPBA Art. 12(4), 13(1), 13(3)
EPC Art. 54(1), 54(2), 56, 84, 83, 123(2), 123(3)

Keyword:

Amendments - allowable (yes)

Claims - conciseness (yes) - clarity (yes)

Sufficiency of disclosure - (yes)

Novelty - (yes)

Inventive step - improvement not credible - non-obvious
alternative

Substantial procedural violation - (no)

Decisions cited:

T 0087/08, T 0667/08, T 0028/11, T 0598/12, T 0809/12,

T 2001/12, T 0801/13

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 2135/13 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 14 December 2016

Appellant: Life Technologies Corporation
(Patent Proprietor) 5823 Newton Drive
Carlsbad, CA 92008 (US)

Representative: Hoffmann Eitle
Patent- und Rechtsanwälte PartmbB
Arabellastraße 30
81925 München (DE)

Respondent I: Roche Diagnostics International AG
(Opponent 1) Forrenstrasse 2
6343 Rotkreuz (CH)

Representative: Bösl, Raphael Konrad
Isenbruck Bösl Hörschler LLP
Patentanwälte
Prinzregentenstraße 68
81675 München (DE)

Respondent II: Hirsz, Christopher Stanislaw
(Opponent 2) Mathys & Squire LLP
120 Holborn
London
EC1N 2SQ (GB)

Representative: Hirsz, Christopher Stanislaw
Mathys & Squire LLP
The Shard
32 London Bridge Street
London SE1 9SG (GB)

Respondent III: Eppendorf AG
(Opponent 3) Barkhausenweg 1
22339 HAMBURG (DE)

Representative: Ricker, Mathias
Wallinger Ricker Schlotter Tostmann
Patent- und Rechtsanwälte Partnerschaft mbB
Zweibrückenstrasse 5-7
80331 München (DE)

Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 2 August 2013
revoking European patent No. 1628771 pursuant to
Article 101(3) (b) EPC.**

Composition of the Board:

Chairman E. Bendl
Members: A. Haderlein
O. Loizou

Summary of Facts and Submissions

- I. The present appeal lies from the decision of the opposition division to revoke European patent EP 1 628 771. The patent in suit concerns a thermal cycling apparatus for providing thermal uniformity.
- II. The documents cited in the proceedings before the opposition division included the following:

E1: US 2002/0030044 A1

E2: US 6 337 435 B1

E37: DE 197 23 590 A1

E38: DE 200 10 663 U1

E47: Ebert et al., Influence of a Thermal Diffusivity Plate on the Mount Temperature Uniformity - an Experimental Study (submitted by opponent 1 (respondent I) as D14b)

E48: Ebert et al., Study on Thermal Interface Materials between Peltier and Heat Sink: Thin TDP, Thick TDP or another TIM?

In addition, various items of evidence relating to the alleged public prior use of "Mastercycler Gradient", labelled E33a to E33f, were submitted with the notice of opposition of opponent 3 (respondent III), including

E33e: Technical drawing "Wärmeleitpad"

E33f: "Infratron Kool Pad, Graphite Pad CM20"

as documents D2e and D2f,

as well as various items of evidence relating to the alleged public prior use of "Cobas Amplicor", labelled E49a to E49t6, including

E49d: Technical drawing "Keramikplatte, Warmseite"
E49e: Technical drawing "Keramikplatte, Kaltseite"
E49j: Declaration by Mr Grüter.

III. The opposition division found that the grounds for opposition set forth in Article 100(c) and (b) EPC did not prejudice the maintenance of the patent. However, the subject-matter of claim 1 as granted lacked novelty over E2. Auxiliary request 1 was said not to comply with Article 123(2) EPC. Although the opposition division found that the subject-matter of claim 1 of the then pending auxiliary request 2 was not obvious in view of E2 as the closest prior art (see section 7.1 of the impugned decision), it arrived at the conclusion that, in view of E47, the feature distinguishing the claimed subject-matter over E2 did not justify an inventive step (page 10 of the impugned decision, penultimate paragraph). The other auxiliary requests were likewise said not to comply with the requirements of the EPC. In particular, the wording of auxiliary request 12 corresponding to auxiliary request 10 submitted with letter dated 18 January 2013 (cf. point 21.2 of the minutes of the oral proceedings before the opposition division) was held to be unclear because of the expression "significantly greater" (see section 8 of the impugned decision).

IV. With the statement of grounds of appeal, the appellant (proprietor) filed thirteen auxiliary requests.

V. With its reply, respondent I filed the following evidence:

E53: Ebert et al., "Report - Accuracy DAQ Temperature Measurement Set with 18-Sensor Head"
E54: MCS Laboratory, "Calibration Certificate of DAQ

Temperature Measurement Set Serial No. 2001"
E55: Ebert et al., "LC480 TNU Performance Study with
Copper and Aluminium TDP".

VI. With its reply, respondent III filed the following
evidence:

E45: Definition of the term "plate" in Oxford
Dictionaries

E2': Grafoil[®], Flexible Graphite, Typical Grafoil[®]
sheet properties

VII. The board issued a communication setting out its
preliminary opinion.

VIII. With letter dated 14 November 2016, the appellant *inter
alia* filed auxiliary request 2A.

IX. At the oral proceedings before the board, the appellant
declared its auxiliary request 2A to be its main
request and withdrew the higher-ranking requests.

X. Claim 1 of the main request (corresponding to auxiliary
request 2A dated 14 November 2016) reads as follows
(amendments with respect to claim 1 as granted
underlined):

*"1. An apparatus for thermally cycling biological
sample comprising:
a thermal block assembly (20) for receiving said
biological sample;
a thermoelectric module (30) coupled to said thermal
block assembly; and
a heat sink (10), wherein said heat sink is coupled to
said thermoelectric module, wherein said heat sink
comprises a base plate, fins, and a thermal diffusivity*

plate (12), and wherein said thermal diffusivity plate comprises a different material than said base plate and fins such that the thermal diffusivity plate has at least twenty-five percent greater thermal diffusivity than said base plate and fins, wherein said thermal diffusivity plate provides substantial temperature uniformity to said thermal block assembly during thermal cycling."

XI. Claims 2 to 9 of the main request are dependent on claim 1 and refer to preferred embodiments thereof.

XII. The appellant's arguments may be summarised as follows:

Admissibility of the main request

The main request was based on auxiliary request 10 dated 18 January 2013 and corresponding to auxiliary request 12 on which the impugned decision was based, with the clarification as included in the revised auxiliary request 2 submitted at the oral proceedings before the opposition division. The further amendment made during the appeal proceedings was a legitimate reaction to the board's preliminary opinion that the claim lacked conciseness. The main request was therefore admissible.

Amendments

The amendments complied with the requirements of Article 123(2) and (3) EPC. Their basis could be found in paragraph [0022] of the application documents as originally filed.

Clarity and conciseness

The requirements of clarity and conciseness were complied with, in particular because claim 1 now included the expression "at least twenty-five percent greater thermal diffusivity".

Sufficiency of disclosure

The requirement of sufficiency of disclosure was complied with as set out in the impugned decision.

Novelty

None of the cited documents disclosed an apparatus according to claim 1 of the main request. In particular, whilst it was requested that the evidence relating to the alleged public prior use of the "Cobas Amplicor Analyser" should not be admitted and that the case should be remitted to the department of first instance if it were to be admitted, this prior use was in any case not prejudicial to the novelty of the apparatus according to claim 1.

Inventive step

E1 represented the closest prior art. From the figures of the patent in suit it was clear that claim 1 at least provided for an alternative apparatus. Using a copper plate instead of the silicone rubber plate of E1 was not obvious. E1 already disclosed parts made of copper and used a thermal interface between the copper parts and the Peltier element. In particular, the parts listed in paragraph [0087] of E1 did not include the thermal interfaces made of silicone rubber. The skilled person would not have dispensed with the silicone

rubber plate of E1. Also, there was no evidence that a diffusivity value of 25% and more compared to aluminium could be achieved by boron nitride (BN) filled silicone rubber.

Procedural violation

When assessing the evidence provided with respect to the public prior use of "Mastercycler Gradient", the opposition division had committed a substantial procedural violation by not admitting a discussion of the criteria for the burden of proof concerning the alleged public prior use.

- XIII. The respondents' arguments may be summarised as follows:

Admissibility of the main request

The main request should not be admitted into the proceedings. This request did not correspond to the revised auxiliary request 2 submitted at the oral proceedings before the opposition division. It could also not be said to be based on auxiliary request 10 dated 18 January 2013 and corresponding to auxiliary request 12 on which the impugned decision was based. The main request thus constituted a "fresh case" which had not been dealt with in the impugned decision. Also, the "such that ..." feature constituted a feature defined by the result to be achieved. It was not allowable without indication of the essential features necessary for achieving that result, as set out in particular in T 809/12.

Amendments

The deletion of granted claims 11 and 12 led to a different interpretation of the vague expression "substantial temperature uniformity" in claim 1 and therefore resulted in non-compliance with Article 123(2) and (3) EPC. Also, the feature "such that the diffusivity plate ..." could not be based on paragraph [0022] of the application as filed, which referred to "rest of the heat sink" and not to "base plate" and "fins".

Clarity and conciseness

The use of the expression "comprises a different material" in combination with the feature "such that the thermal diffusivity ..." was not clear.

Sufficiency of disclosure

The requirement of sufficiency of disclosure was not met because of the "substantial temperature uniformity" feature. Moreover, the subject-matter of claim 1 did not lead to an apparatus having improved temperature distribution. For that reason too the requirement of sufficiency of disclosure was not met.

Novelty

E1 was novelty-destroying for the subject-matter of claim 1 because at a high BN content, BN-filled rubber could achieve a thermal diffusivity which was 25% higher than that of aluminium, i.e. the material of the heat sink of E1. E2 was also novelty-destroying for the subject-matter of claim 1. In particular, it disclosed the heat sink to be made of "conventional

construction". As it was common to manufacture heat sinks from aluminium, E2 disclosed a heat sink made of aluminium and thus the diffusivity relationship called for in claim 1 was complied with. The public prior use of the "Cobas Amplicor Analyser", which included copper platelets and a heat sink made of aluminium, was also novelty-destroying.

Inventive step

Any one of E1, E2 or the public prior uses "Mastercycler Gradient" and "Cobas Amplicor" could be considered the closest prior art. Lack of inventive step should be acknowledged not least because the distinguishing feature did not result in any effect. The subject-matter of claim 1 was also obvious when starting from E2 as the closest prior art. Starting from E1, the subject-matter of claim 1 was also obvious in view of E2, E37, E38 or the public prior use "Cobas Amplicor". The claimed subject-matter did not result in an improved temperature uniformity. In view of Figures 6 to 9 of the patent in suit, it could even be seen to result in a deterioration in temperature uniformity.

XIV. Requests

The appellant (patent proprietor) requested that the decision under appeal be set aside and that the patent be maintained on the basis of the set of claims of the main request (previous auxiliary request 2A) filed with letter dated 14 November 2016. In the alternative, it requested that the patent be maintained in amended form on the basis of one of the lower-ranking auxiliary requests.

Respondents 1 and 3 requested that the appeal be dismissed.

Reasons for the Decision

1. Admittance of the main request
 - 1.1 The main request was filed after oral proceedings had been arranged. Admitting it was therefore at the discretion of the board (Article 13(1), (3) RPBA). Claim 1 of the main request differs from that of auxiliary request 2 submitted with the statement of grounds of appeal in that the expression "*such that the thermal diffusivity plate has significantly greater thermal diffusivity than said base plate and fins, i.e., at least twenty-five percent greater*" has been replaced by "*such that the thermal diffusivity plate has at least twenty-five percent greater thermal diffusivity than said base plate and fins*". It is uncontested that this amendment was made as a reaction to the board's communication, which had raised an objection for lack of conciseness (see point 19 of the board's communication dated 22 September 2016).
 - 1.2 The respondents did not object to the above amendment as such, but contended that the main request should not be admitted into the proceedings because, apart from the above amendment, it could have been filed in the proceedings before the opposition division (cf. Article 12(4) RPBA). In particular, this request could be based neither on the revised auxiliary request 2 submitted at the oral proceedings before the opposition division, as the limitation concerning the position of the thermal diffusivity plate was omitted, nor on auxiliary request 10 dated 18 January 2013 and corresponding to auxiliary

request 12 on which the impugned decision was based, as it did not contain the diffusivity relationship in percent.

- 1.3 While it is true that the main request is not identical to any request filed in the proceedings before the opposition division, even disregarding the amendment made in reaction to a conciseness objection raised by the board (cf. point 1.1 *supra*), this is not sufficient reason to hold this request inadmissible.

Claim 1 essentially corresponds to claim 1 of auxiliary request 12 underlying the impugned decision (corresponding to auxiliary request 10 of 18 January 2013) and also includes a clarification of the expression "significantly greater", a clarification which was discussed at the oral proceedings before the opposition division with respect to auxiliary request 2 dated 18 January 2013 (see the minutes, item 9).

The board considers this amendment to be a legitimate reaction to the impugned decision, in which the "significantly greater" feature was held to lack clarity (see "Grounds for the decision", item 8, paragraph "AR 12 - 15"), in order to obviate a possible clarity objection by the board, the feature relating to the diffusivity relationship having already been proposed in the proceedings before the opposition division to overcome a clarity objection in the course of the oral proceedings before the opposition division (cf. revised auxiliary request 2).

- 1.4 In this respect, the board also disagrees with the respondents' argument that the main request was to be considered a "fresh case". The board understands this expression as referring to a substantial change in the

subject of the proceedings. This is clearly not the case here, since claim 1 of the main request, as set out above, essentially corresponds to claim 1 of auxiliary request 12 underlying the impugned decision, with an amendment aimed at rendering the claim clear.

- 1.5 The respondents also argued that the main request should not be admitted into the proceedings because the feature "such that the thermal diffusivity plate has at least twenty-five percent greater thermal diffusivity ..." constituted a result to be achieved, but the essential features for achieving this result were not present in the claim as required by the case law of the boards of appeal.

The board does not share this view. The contentious feature relates to the relationship between the diffusivity of the diffusivity plate and the diffusivity of the base plate and fins, i.e. it relates to intrinsic properties of these physical entities. Decision T 809/12 cited by the respondents is not applicable in the present case, because it deals with a case in which the feature defined by a result to be achieved essentially corresponded to the problem underlying the patent in suit (see in particular reasons 2.8). In the present case, however, the problem underlying the patent, i.e. improved temperature distribution, does not correspond to the alleged result to be achieved in the claim, i.e. the diffusivity relationship.

- 1.6 The board therefore saw no reason not to admit the main request into the proceedings. In particular, the filing of the main request did not raise any issues which the board or the respondents could not reasonably have been expected to deal with without adjournment of the oral

proceedings (Article 13(3) RPBA).

1.7 For the above reasons, the board admitted the main request into the proceedings.

2. Amendments

2.1 The respondents consider the provisions of Article 123(2) and (3) EPC not to be complied with because granted claims 11 and 12 have been deleted.

The board fails to see why the deletion of these dependent claims should result in an infringement of either provision. Firstly, even if the expression "substantial temperature uniformity" were held to be vague, this feature is present in claim 1 of the application as filed, independently of the presence or absence of any dependent claims. Secondly, the deletion of the dependent claims does not render this expression broader.

2.2 According to the respondents, the feature "such that the thermal diffusivity plate has significantly greater thermal diffusivity than said base plate and fins, i.e. ..." does not comply with Article 123(2) EPC because paragraph [0022] of the originally filed application documents refers to "rest of the heat sink" but does not refer to "base plate" and "fins".

To the board it is clear from the whole of the description as originally filed that the heat sink is composed of the base plate, the fins and the thermal diffusivity plate. Thus with paragraph [0022] referring to "the rest of the heat sink", it is clear to the skilled person that reference is being made to the base

plate and the fins.

2.3 No further objections were raised under the provisions of Article 123(2) and (3) EPC.

2.4 For the above reasons, the board is satisfied that these provisions are complied with.

3. Clarity and conciseness

According to the respondents, the use of the expression "comprises a different material" in combination with the diffusivity relationship is not clear because it might mean that only part of the diffusivity plate has to have the required property.

The board does not agree. The diffusivity relationship, albeit not present in the claims as granted, clearly refers to the entirety of the diffusivity plate and not only to a part which would be comprised in it (cf. "such that the thermal diffusivity plate has ...").

Also, the board notes that the expression "a significantly greater thermal diffusivity, i.e. a thermal diffusivity of at least twenty-five percent greater," has been replaced by "such that the thermal diffusivity plate has at least twenty-five percent greater thermal diffusivity than ..." in response to an objection of lack of conciseness raised by the board.

The board therefore concludes that the requirements of clarity and conciseness set forth in Article 84 EPC are complied with.

4. Sufficiency of disclosure

4.1 According to the respondents, the requirement of sufficiency of disclosure is not met. In essence, the skilled person is unable to determine the subject-matter to be protected because of the expression "substantial temperature uniformity".

4.2 The board is not persuaded by this argument. This objection relates to the delimitation of the subject-matter to be protected from other subject-matter not falling under the claims. This objection therefore relates to the clarity of the claims and not to sufficiency of disclosure (cf. T 28/11, reasons 2.3.4).

4.3 Also, the argument that an improvement is not shown over essentially the whole range claimed is not related to the requirement of sufficiency of disclosure but rather to the question of inventive step. In particular, the board notes that claim 1 does not state that the claimed apparatus achieves an improvement, i.e. improved thermal uniformity. Yet not achieving an unclaimed effect cannot form the basis for an objection under Article 83 EPC (T 2001/12, reasons 3.4).

4.4 The board therefore concurs with the opposition division's finding that the requirement of sufficiency of disclosure is complied with.

5. Novelty

5.1 In the course of the appeal proceedings, the respondents referred to documents E1 and E2 and the alleged public prior uses "Mastercycler Gradient" (E33a to E33f) and "Cobas Amplicor Analyser" (documents E49a

to E49t6) in relation to lack of novelty.

5.2 The thermal interface elements 62 in E1, which can be considered a "thermal diffusivity plate" in the sense of claim 1 of the main request, are said to be "boron nitride filled silicone rubber" (paragraph [0069]), whereas the heat sink is preferably made of aluminium (middle of paragraph [0056]). The respondents are of the opinion that it is possible to achieve diffusivities which are 25% higher than that of aluminium through increasing the BN content of the silicone rubber. Even if that were the case, the board notes that E1 is silent about the BN content of the silicone rubber. E1 thus does not disclose the BN content, let alone a BN content that would correspond to a diffusivity relationship as called for in claim 1. E1 therefore does not disclose the feature whereby the thermal diffusivity plate has a diffusivity which is at least 25% higher than the base plate and the fins.

5.3 E2 discloses a heat sink that is said to be of "conventional construction" (column 3, lines 44 *et seq.*). According to the respondents, the elements 41 to 44 being made of copper and the heat sink being implicitly disclosed to be made of aluminium, E2 discloses all the features of claim 1 and in particular the diffusivity relationship that is called for.

While it is uncontested that heat sinks were commonly made of aluminium at the date of publication of E2, this does not mean that aluminium was the sole material suitable for that purpose. Moreover, the board notes that the expression "conventional construction" does not unambiguously refer to the material used but could also refer only to the dimensions of the heat sink. Therefore, the board concludes that E2 neither

explicitly nor implicitly disclose the material of which the heat sink is made and hence does not disclose the diffusivity relationship called for in claim 1.

The decisions cited by the respondents (T 667/08, T 801/13 and T 598/12) also do not support their contention that E2 discloses a heat sink made of aluminium. While according to these decisions an explicit disclosure is not necessary in order to satisfy the requirement of Article 123(2) EPC, they do not question the generally accepted principle of direct and unambiguous disclosure of the contentious feature (see in particular T 667/08, reasons 4.1.4). In applying these principles to the present case, the question to be answered is whether the skilled person would construe the expression "conventional construction" as meaning only "made of aluminium" and nothing else (cf. T 801/13, reasons 6, last paragraph). As set out above, this question must be answered in the negative, since the skilled person would not rule out the possibility that the expression also referred to a heat sink of conventional dimensions but made of another highly heat-conductive material.

- 5.4 With respect to the alleged public prior use of "Mastercycler Gradient", the respondents consider in particular the graphite pad disclosed in E33f to be a thermal diffusivity plate in the sense of claim 1.

E33f relates to a graphite pad with a thickness of 0.2 mm which appears to be highly flexible (see photograph of E33f). This pad is also called "heat conducting foil" or "heat conducting film" ("Wärmeleitfolie") in E33e. The board is of the opinion that such a "film" or "foil" does not qualify as a plate in the sense of claim 1. In this context the

board observes that E45 discloses numerous definitions of the term "plate". Although as a general definition it discloses "a thin, flat sheet or strip of metal or other material", at least the first two examples given under point 2 of E45 relate to a flat piece of material having a rigidity that is higher than that of a "film" or a "foil" (cf. "steel plate put into his leg", "brass plate with her initials", licence plate). E45 therefore fails to support the respondents' contention that E33e unambiguously discloses a "thermal diffusivity plate" in the sense of claim 1. Also, the reference to the modulus of elasticity of the foil or film used in the alleged public prior use (see document E2') does not support the respondents' contention that this foil or film would be considered a plate by the skilled person, rigidity being a function not only of elasticity but also of the geometrical dimensions. This means that even at a modulus of elasticity as disclosed in E2', a foil or film having a very small cross-sectional area such as is disclosed in E33e and E33f shows very little rigidity.

Moreover, this alleged public prior use uncontestedly does not disclose the diffusivity relationship called for in claim 1.

5.5 As the present decision is in favour of the appellant, the board does not see the need to give further reasons as to the appellant's request not to admit the evidence relating to the alleged public prior use of the "Cobas Amplicor Analyser" (E49a to E49s and E49t1 to E49t6) or to remit the case to the department of first instance in the event of it being admitted.

The board notes that, according to the evidence provided (see in particular declaration E49a, drawings

E49d and E49e, declaration E49j), the copper platelets located above the heat sink are provided on the lower ceramic surface of the Peltier element in the course of the manufacturing process for the Peltier element. The copper platelets are thus part of the thermoelectric module, i.e. separate from the heat sink, and are not part of the heat sink as required in claim 1. The passage in paragraph [0019] of the patent in suit also does not support the respondent's contention that, in the light of the patent specification, the heat sink "comprising" the diffusivity plate would encompass diffusivity plates "being separate from" the heat sink. Clearly, the above passage of the patent in suit distinguishes between "separate from" and "comprise", i.e. it refers to mutually exclusive alternatives. Thus, even if the copper platelets used in this alleged public prior use were held to constitute a thermal diffusivity plate, the skilled person would not consider the heat sink thereof to "comprise a thermal diffusivity plate" as required by claim 1.

5.6 The subject-matter of the sole independent claim 1 is therefore new (Article 54(1), (2) EPC).

6. Inventive step

6.1 Invention

The invention concerns an apparatus for thermally cycling biological samples.

6.2 Closest prior art

6.2.1 The parties present at the oral proceedings agreed that E1 represented the closest prior art. The respondents also submitted in writing that E2 and the alleged

public prior uses "Mastercycler Gradient" and "Cobas Amplicor Analyser", too, were suitable starting points for discussing inventive step.

- 6.2.2 While E2 and E1 are directed to the same purpose as the patent in suit, i.e. providing temperature uniformity, E2 has fewer features in common with the subject-matter of claim 1 than E1. In particular, not only is there no unambiguous disclosure of the "different material" feature, but E2 also does not disclose the heat sink as comprising a diffusivity plate in the sense of claim 1. Moreover, the respondents' argument that the subject-matter of claim 1 does not comply with the requirement of Article 56 EPC is based essentially on the contention that the "plate" feature is not technical. As the "plate" feature clearly has technical character, this line of argument is not persuasive.
- 6.2.3 As to the alleged public prior use of "Mastercycler Gradient", the board is not convinced that the skilled person would consider the graphite pad disclosed there to be a thermal diffusivity plate in the sense of claim 1 (cf. 5.4 *supra*). This alleged public prior use is therefore a less promising starting point than E1.
- 6.2.4 As to the alleged public prior use of "Cobas Amplicor Analyser", the board considers this to be a less suitable starting point for assessing inventive step, because its heat sink does not comprise a thermal diffusivity plate (see 5.5 *supra*) and, therefore, is structurally more remote from the claimed subject-matter than the apparatus disclosed in E1.
- 6.2.5 The board therefore starts from E1 as the closest prior art.

6.3 Problem to be solved

According to the patent in suit (cf. in particular paragraphs [0003] and [0040]) and as submitted by the appellant, the problem to be solved is to increase temperature uniformity.

6.4 Success of the solution and reformulation of the problem

6.4.1 The board notes that in E1 the problem of increasing temperature uniformity is already solved (cf. in particular paragraph [0009], last sentence; paragraph [0076]). Moreover, the data provided in the patent does not include examples comparing an apparatus comprising a BN-filled silicone rubber such as the one in E1 with one comprising a material having at least 25% higher diffusivity than aluminium, such as copper. Rather, the data contained in the patent relates to comparisons between configurations that comprise a thermal diffusivity plate and configurations that do not (paragraph [0040], Example 1) or to investigations into other parts of the thermal cycling apparatus (Examples 2 to 4).

6.4.2 According to the appellant, the temperature non-uniformity achieved by the apparatus according to claim 1 was better (lower) than that disclosed in E1.

The board notes that E1 discloses a temperature non-uniformity (TNU) of $\pm 0.5^{\circ}\text{C}$, corresponding to a TNU value of 1 as defined in the patent in suit (see E1, paragraph [0054], last sentence), and that the TNU value in the apparatus according to claim 1 is below 1 after about 30 seconds (see Figures 6 to 9). The board however also observes, as submitted by the respondents,

that the same data of the patent in suit also shows values above $TNU=1$. Moreover, the board also concurs with the respondents in that the data of E1 and the data of the patent in suit cannot be compared directly because they were obtained in a substantially different manner. In particular, the method for measuring the temperatures in the patent, while not explicitly indicated in the examples, appears to involve measuring the sample (see paragraph [0036]), whereas in E1 it is the temperatures of the thermal block that are measured (paragraph [0053]).

6.4.3 The board therefore concludes that the problem of increasing temperature uniformity over the apparatus known from E1 is not solved. It reaches this conclusion even in the absence of the abundant experimental evidence (including E47, E48 and E53 to E55) provided by the respondents in the written proceedings before the opposition division and before the board and aimed at showing a lack of improvement over E2, which the opposition division considered to constitute the closest prior art.

6.4.4 The problem thus needs to be reformulated and consists in the provision of an alternative apparatus for maintaining temperature uniformity.

The respondents contend that Figures 6 to 9 of the patent in suit show that the claimed subject-matter results in deteriorated thermal uniformity.

The board notes in this respect that the data shown in these figures does not relate to a comparison between an apparatus according to claim 1 and an apparatus according to E1. Moreover, it shows that the claimed apparatus (dotted line in the figures) possesses

considerable temperature uniformity at least after 20 seconds (a TNU value of below 2).

The board therefore concludes that the problem of providing an alternative apparatus for maintaining temperature uniformity is indeed solved.

6.5 Obviousness

- 6.5.1 According to a first line of argument of the respondents, the subject-matter of claim 1 lacks inventive step because of the mere fact that no improvement is shown.

This argument must fail since, for an alleged lack of inventive step, it is not sufficient to show that no improvement is achieved by the claimed subject-matter; it must also actually be obvious to arrive at the claimed subject-matter (cf. T 87/08, reasons 6.2 and 6.3).

- 6.5.2 According to a second line of argument of the respondents, it is possible to increase the BN content of the silicone rubber disclosed in E1 such that the diffusivity of the BN-filled silicone rubber exceeds the diffusivity of the aluminium plate by 25% and more.

The board notes that the respondents have not provided any evidence in support of this allegation. Even if it were established that it is indeed possible to increase the diffusivity of BN-filled silicone rubber to such an extent that it is at least 25% higher than that of aluminium (the material of the base plate and the fins disclosed in E1), this would not prove that, before the filing date of the patent in suit, this information was publicly available, let alone that it was obvious to

increase the BN content of the silicone rubber of E1 accordingly.

- 6.5.3 According to a third line of argument, the solution was also obvious in view of the fact that copper (which has a diffusivity about 40% higher than that of aluminium, see Table 1 on page 4 of the patent in suit) is known to be an excellent heat conductor and is already used for other components in E1, but is also disclosed in E2, in the alleged public prior use "Cobas Amplicor Analyser" and in E37 and E38. In view of these teachings and considering that a copper plate is easier to manufacture than a BN-filled silicone rubber plate, it was obvious to the skilled person to replace the BN-filled silicone rubber of E1 with a copper plate, thus arriving at a diffusivity relationship as required by claim.

The board agrees with the respondents only to the extent that copper is uncontestedly known to be an excellent heat conductor. The BN-filled silicone rubber of E1 however is said to be compressible and to have elastomeric characteristics (see paragraph [0071]). These properties are used in E1 in order to improve the reliability of the device that it discloses (*loc. cit.*). Considering this teaching, the skilled person would not have replaced the BN-filled silicone rubber with a copper plate which, albeit compressible to some extent, is far less compressible than the silicone rubber disclosed in E1. Moreover, while it is true that some components of E1 are said to be preferably made of copper (see for instance paragraph [0054]), E1 does not teach to provide the bottom thermal interface plates 62, corresponding to the thermal diffusivity plate according to claim 1, in the form of a copper plate. Rather, the skilled person would refrain from using

copper as the thermal interface because E1 teaches that when a component such as the thermal block plate 22 is made of copper in order to thermally couple it with the Peltier elements, top thermal interface plates made of silicone rubber are used (cf. paragraph [0070]).

- 6.5.4 According to a fourth line of argument of the respondents submitted in the written proceedings, the skilled person would have replaced the silicone rubber plates of E1 with Grafoil[®] foil or film disclosed in E2.

The board is not persuaded by this argument because, as stated above, the Grafoil[®] foil or film is not a plate in the sense of claim 1 and therefore, even if the skilled person were to replace the silicone rubber plates of E1 with a Grafoil[®] foil, he would not arrive at the subject-matter of claim 1.

- 6.5.5 The other documents cited by the respondents in the written proceedings in the context of the discussion of inventive step, when starting from E2 as the closest prior art, also do not provide evidence that it is obvious to replace the silicon rubber plate known from E1 with a plate made of copper or another material that would fulfil the diffusivity relationship called for in claim 1.

- 6.6 The board thus concludes that the subject-matter of claim 1 was not obvious in view of the cited prior art and that therefore the requirement of Article 56 EPC is complied with.

7. Alleged procedural violation

7.1 According to the appellant, the opposition division committed a substantial procedural violation by allegedly only permitting a discussion of the admissibility of the alleged public prior use of "Mastercycler Gradient", but not allowing the appellant to present its arguments as to whether the necessary burden of proof had been met by the respondents.

7.2 The board does not see how the opposition division committed a substantial procedural violation when assessing the probative value of the evidence provided in view of the alleged public prior use, in particular because the opposition division arrived at the conclusion that the alleged public prior use was not prejudicial to the patentability of the subject-matter of the claims of the requests underlying the impugned decision (see in particular the impugned decision, reasons 6.2).

7.3 The board thus concludes that the opposition division did not commit a procedural violation, let alone a substantive one, when assessing the evidence provided with respect to the above alleged public prior use.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to maintain the patent in amended form on the basis of the claims of the main request (previous auxiliary request 2A) filed with letter dated 14 November 2016 and a description to be adapted thereto.

The Registrar:

The Chairman:



C. Vodz

E. Bendl

Decision electronically authenticated