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**Datasheet for the decision  
of 20 December 2011**

**Case Number:** T 0593/09 - 3.3.09

**Application Number:** 97915703.9

**Publication Number:** 901899

**IPC:** B32B 15/08

**Language of the proceedings:** EN

**Title of invention:**

Polyethylene terephthalate resin-coated metal plate of high processability

**Patentee:**

TOYO KOHAN Co., Ltd

**Opponent:**

Tata Steel IJmuiden BV

**Headword:**

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**Relevant legal provisions:**

EPC Art. 100(b)

**Relevant legal provisions (EPC 1973):**

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**Keyword:**

"Sufficiency of disclosure - no (main and auxiliary requests)"

**Decisions cited:**

T 0256/87, T 1062/98, T 0387/01, T 0252/02, T 0396/02,  
T 1033/02, T 0608/07, T 0815/07, T 0018/08

**Catchword:**

Where a claim contains an ill-defined ("unclear", "ambiguous") parameter and where, as a consequence, the skilled person would not know whether he was working within or outside of the scope of the claim, this, by itself, is not a reason to deny sufficiency of disclosure as required by Article 83 EPC. Nor is such a lack of clear definition necessarily a matter for objection under Article 84 EPC only. What is decisive for establishing insufficiency within the meaning of Article 83 EPC is whether the parameter, in the specific case, is so ill-defined that the skilled person is not able, on the basis of the disclosure as a whole and using his common general knowledge, to identify (without undue burden) the technical measures (eg selection of suitable compounds) necessary to solve the problem underlying the patent at issue (point 4.1.4 of the Reasons)



Case Number: T 0593/09 - 3.3.09

**DECISION**  
of the Technical Board of Appeal 3.3.09  
of 20 December 2011

**Appellant:** TOYO KOHAN Co., Ltd  
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**Representative:** Bodin, André  
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**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 18 December 2008  
revoking European patent No. 901899 pursuant to  
Article 101(2) EPC.

**Composition of the Board:**

**Chairman:** W. Sieber  
**Members:** M. O. Müller  
R. Menapace

## Summary of Facts and Submissions

- I. This decision concerns an appeal by the proprietor against the decision of the opposition division to revoke the patent EP 0 901 899.

The granted patent contained four claims, claim 1 of which reads as follows:

"1. Polyethylene terephthalate resin covered metal sheet, wherein a biaxially oriented film consisting of polyethylene terephthalate having a low temperature crystallization temperature ranging from 130 to 165°C is covered at least on one side of a metal sheet by heat bonding."

- II. The opponent had requested revocation of the patent in its entirety on the grounds that the claimed subject-matter was neither novel nor inventive and that the patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Articles 100(a) and (b) EPC).

The documents submitted during the opposition proceedings included:

A3: L. C. Thomas, "Use of multiple heating rate DSC and modulated temperature DSC to detect and analyze temperature-time-dependent transitions in materials", AMERICAN LABORATORY, January 2001, pages 26, 28, 30 and 31; and

D7: EP 0 767 049 A2.

Moreover, reference was made to

D8: ISO 11357-3, "Plastics - Differential scanning calorimetry (DSC) - Part 3: Determination of temperature and enthalpy of melting and crystallization", first edition, 1999.

III. The opposition division's decision, which was announced orally on 2 December 2008 and issued in writing on 18 December 2008, was based on the patent as granted.

The opposition division's view can be summarized as follows:

As corroborated by A3, the low temperature crystallization (LTC) temperature depends to a substantial degree on the heating rate applied during differential scanning calorimetry (DSC). The ISO standard D8 does not give unambiguous advice on the heating rate but merely suggests a heating rate. Furthermore, no information regarding the heating rate can be found in the opposed patent or in the prior art cited therein. Also, the proprietor could not convincingly show that this information was part of the common general knowledge. Finally, it is not possible to determine the required heating rate by applying DSC measurements to commercial polymers with given LTC values because, as confirmed by the proprietor, the LTC temperature also depends on the polymerisation catalyst, the molecular weight, the heat treatment and the amount of stretching of the film.

As a consequence the skilled person, when having to decide whether a specific polyethylene terephthalate fell within the claimed range or not, did not have enough information to do so. The opposed patent therefore was insufficiently disclosed.

IV. On 2 March 2009, the appellant (proprietor) filed a notice of appeal against the above decision and paid the prescribed fee on the same day. A statement setting out the grounds of appeal was filed on 28 April 2009 together with a copy of D8.

V. On 1 July 2009, the respondent (opponent) filed a reply to the appeal together with

D9: A. Tanaka et al, "Adhesion of Biaxially Oriented Polyethylene Terephthalate Film to Tin Free Steel", Transactions ISIJ, volume 27, 1987, pages 638-644; and

D10: ISO 10350-1, 2007, pages 3-9.

VI. In its communication of 14 March 2011, the board informed the parties of its preliminary opinion on sufficiency of disclosure. The board in particular observed that the skilled person would not know what heating rate to apply when determining the LTC temperature in the opposed patent and, depending on the heating rate, different LTC temperatures would be obtained. The board stated that in view of this, it would have to be discussed whether claim 1 covered embodiments that did not result in the effects aimed at in the opposed patent.

VII. With its letter of 2 October 2011, the appellant filed

D11: A. Tanaka, "Effect of Annealing Temperature on Adhesion of Polyester Film to Electrolytically Chromium Coated Steel", Iron and Steel, 1999; and

D12: A. Tanaka, "Variation of Biaxial Orientation of Polyester Film on Laminated Steel in the Lamination Process", Iron and Steel, 2000, pages 1-6.

VIII. With its subsequent letter of 18 November 2011, the appellant filed first to sixth auxiliary requests:

(a) Claim 1 of the first auxiliary request differs from claim 1 of the main request in that the feature "wherein the low temperature crystallisation temperature is measured by differential scanning calorimetry" has been added.

(b) Claim 1 of the second auxiliary request differs from claim 1 of the first auxiliary request in that the planar coefficient has been added at the end of the claim:

*"wherein the planar orientation coefficient of said film consisting of polyethylene terephthalate resin after being covered on said metal sheet by heat bonding ranges from 0 to 0.05 at the contacting portion of said film to said metal sheet ( $n_1$ ), and ranges from 0.03 to 0.15 at the surface portion of said film ( $n_2$ )";*

- (c) Claim 1 of the third auxiliary request differs from claim 1 of the second auxiliary request in that a further parameter has been introduced, namely the biaxial orientation of the film:

*"wherein the biaxial orientation of the film of said polyethylene terephthalate resin after being covered on said metal sheet by heat bonding is gradually increasing from the contacting portion of said film to said metal sheet to the surface portion of said film";*

- (d) Claim 1 of the fourth auxiliary request corresponds to claim 1 of the first auxiliary request apart from the limitation of the LTC temperature to 140-150°C;
- (e) Claim 1 of the fifth auxiliary request differs from claim 1 of the fourth auxiliary request in that the biaxial orientation of the film has been introduced;
- (f) Claim 1 of the sixth auxiliary request differs from claim 1 of the fourth auxiliary request in that both the biaxial orientation of the film and the planar orientation coefficient have been introduced.

IX. A response was filed by the respondent with its letter of 8 December 2011.

X. On 20 December 2011, oral proceedings were held before the board. The parties maintained their requests made



during the written proceedings. No new requests were submitted.

XI. So far as relevant to the present decision, the appellant's arguments can be summarized as follows:

Materials that were available on the market for metal containers at the priority date of the opposed patent had several drawbacks, such as bad permeation and impact properties. The invention underlying the opposed patent aimed at improving these properties and was based on the finding that this could be done by selecting materials with LTC temperatures as required by claim 1.

The LTC temperatures in the opposed patent had been measured by DSC with a heating rate of 20°C/min. The heating rate to be applied for this measurement could be deduced from the information contained in the opposed patent. More particularly, while various polyethylene terephthalates existed on the market, there was only one material in the technical field relevant to the opposed patent and this had an LTC temperature of 128°C. The skilled person therefore simply had to determine the LTC temperature of this material at different heating rates and the heating rate that resulted in an LTC temperature of 128°C was the one to be applied in the opposed patent. Moreover, it followed from the opposed patent that polyethylene terephthalates with an LTC temperature above 165°C could not be produced. The upper limit of the claim was therefore inherently given by the polyethylene terephthalate with the highest LTC temperature available on the market.

Irrespective of this, the fact that a heating rate of 20°C/min had to be applied in order to determine the LTC temperature in the opposed patent formed part of the skilled person's common general knowledge. This followed from the ISO norm D8, according to which the LTC temperature had to be determined by DSC at a heating rate of 20°C/min. The reference to different heating rates in "Note 1" of D8 did not invalidate this conclusion but merely implied that different heating rates could be used and, if so, the rate used needed to be indicated. The fact that in the opposed patent no such indication was present clearly implied that a heating rate of 20°C/min had to be used.

Furthermore, the two scientific papers D11 and D12, which were written by one of the inventors of the opposed patent, confirmed that at a date close to the priority date of the opposed patent temperatures such as the melting points of polyesters had been measured using DSC at a heating rate of 20°C/min.

Even though a heating rate of 16°C/min was used in D7 to determine the LTC temperature, this document did not invalidate the above conclusion. In fact, D7 additionally measured a glass transition temperature, the measurement of which was difficult. This was the reason why, exceptionally, the heating rate was decreased in D7 to 16°C/min.

Also D9, which used a heating rate of 10°C/min, was not relevant because in this document what was determined was the amount of amorphous polyethylene terephthalate, rather than the LTC temperature.

Finally, D10, which applied a heating rate of 10°C/min, was not relevant either as this document referred to thermoplastic and thermosetting materials in general and the skilled person would therefore not have consulted this norm to learn about a standard procedure for the determination of the LTC temperature of polyethylene terephthalate. Moreover, referring to D8, D10 confirmed that a heating rate of 20°C/min was the standard.

For the above reasons, the skilled person knew what heating rate to apply when determining the LTC temperature in the opposed patent. The LTC temperature as required by claim 1 thus was not ambiguous and therefore, the patent in the form of the main request was sufficiently disclosed.

As to the auxiliary requests, the planar orientation coefficient assisted the skilled person in selecting the right materials. Therefore at least these requests, in which claim 1 was restricted with regard to this parameter, were sufficiently disclosed.

XII. So far as relevant to the present decision, the respondent's arguments can be summarized as follows:

Polyethylene terephthalate is a family of materials and it was therefore not possible to calibrate the DSC heating rate by measuring commercially available polyethylene terephthalate having an LTC temperature of 128°C. The heating rate to be applied in order to determine the LTC temperature could thus not be deduced from the opposed patent.

The appellant's argument that D8 proved that, on the basis of his common general knowledge, the skilled person would apply a heating rate of 20°C/min when determining the LTC temperature in the opposed patent was not correct. In fact, D8 was not referred to in the opposed patent and did not give unambiguous advice on the heating rate to be applied, as heating rates different from 20°C/min could be used according to "Note 1" of this norm. Moreover, the LTC temperature was determined in D7 at a heating rate different from 20°C/min, namely 16°C/min. In D9, even one of the inventors of the opposed patent used a heating rate different from 20°C/min, namely 10°C/min to determine the exothermic crystallisation peak, ie the LTC temperature. Finally, the norm D10 equally recommended a heating rate of 10°C/min for the determination of the glass transition temperature.

Consequently, there were various documents giving different recommendations for the heating rate to be used when determining the LTC temperature. The skilled person hence did not know what heating rate to apply in the opposed patent. This conclusion could not be invalidated by D11 and D12, as these documents were post-published and referred to a different type of measurement, namely that of melting points.

A3 clearly showed that the application of different heating rates led to different LTC temperatures for one and the same material. Consequently, the omission of the heating rate in the opposed patent implied that the LTC temperature range covered by claim 1 was ambiguous. As the skilled person therefore did not know whether he

worked within or outside of the scope of claim 1, sufficiency of disclosure had to be denied.

With regard to the auxiliary requests, no evidence had been provided that by selecting the parameters incorporated into the claims of the auxiliary requests, the skilled person would inevitably be able to carry out the invention so as to fulfil the LTC temperature requirement.

- XIII. During the oral proceedings, the board pointed out that D8 and D10 did not reflect the common general knowledge at the filing date of the opposed patent and in fact did not refer to the measurement of the LTC temperature.

Concerning the auxiliary requests, the claims of which required a certain planar orientation coefficient, the board referred to comparative examples 2, 3, 7, 8 and 9, from which it followed that selecting a planar orientation coefficient as required by these claims did not result in polyethylene terephthalate films having properties aimed at in the opposed patent.

- XIV. The appellant (patent proprietor) requested that the decision under appeal be set aside and that the case be remitted to the first instance for further prosecution on the basis of the claims as granted (main request), or on the basis of the first to sixth auxiliary requests filed with letter of 18 November 2011.

- XV. The respondent (opponent) requested that the appeal be dismissed.

## Reasons for the Decision

1. The appeal is admissible.
2. *The invention underlying the opposed patent*
  - 2.1 The opposed patent is directed to polyethylene terephthalate resin covered metal sheets from which metal containers can be produced (page 2, lines 5-12). The opposed patent in particular addresses the problem of providing low-cost polyethylene terephthalate films that have
    - an excellent adhesion to the metal sheet such that it does not peel off therefrom, in particular under the severe conditions during the manufacturing of the container (referred to herein below as "peel resistance"),
    - excellent permeation resistance such that the content of the metal container can not permeate through the film and corrode the metal substrate, and
    - excellent impact resistance such that upon mechanical impact, no cracks are formed in the film (page 2, lines 23-57 and lines 50-51).
  - 2.2 According to claim 1 of the opposed patent, the polyethylene terephthalate film is characterised by a "low temperature crystallisation temperature" (hereinafter also referred to as "LTC temperature") ranging from 130-165°C.

As to the relevance of the LTC temperature for the solution of the problem addressed in the opposed patent, the following is stated on page 3, line 44 through page 4, line 5 of the opposed patent:

*"In case where a polyethylene terephthalate resin having a low temperature crystallization temperature less than 130 DEG C, the crystallization velocity is large, which causes the great change of the biaxial orientation of the film by a slight change of the temperature of the metal sheet during the film covering process. Resultantly, the biaxial orientation widely varies in the film. When the biaxial orientation in the portion near the metal substratum is not lost enough, peeling-off of the film or origination of cracks in the film is caused in the forming of the polyethylene terephthalate resin covered metal sheet and as a result it can not be formed into a can. On the other hand, when the biaxial orientation is almost wholly lost in the entire film, the polyethylene terephthalate resin covered metal sheet can be formed into a can. However, when a content is packed in such a can and it is stored for a certain period of time, the content permeates the film and corrodes the metal substratum, or slight impact to the can causes cracks in the film. That is, When [sic] such a resin is used, the temperature range of a metal sheet to obtain a polyethylene terephthalate resin covered metal sheet having a favorable orientation structure of the film is so narrow that the operability is extremely poor.*

On the other hand, it is extremely difficult in a sense of economy to manufacture a Homo polymer film consisting of polyethylene terephthalate resin having a low temperature crystallization temperature more than 165 DEG C alone." (emphasis added).

From the above statement, it can be deduced that polyethylene terephthalate covered metal sheets with an LTC temperature below 130°C have poor peel, permeation and impact (crack) resistance and cannot be formed into a can. On the other hand, polyethylene terephthalate covered metal sheets with LTC temperatures above 165°C are extremely difficult to manufacture economically, ie at low cost.

This is confirmed by comparative examples 1-3 (table 3) and 16-18 (erroneously numbered 7-9, table 4), where an LTC temperature of 128°C (see table 1) results in insufficient peel and impact resistance.

2.3 It thus follows from the opposed patent that an LTC temperature of 130-165°C, ie as required by claim 1, is crucial in order to solve the problem addressed in the opposed patent, ie to obtain a low-cost polyethylene terephthalate covered metal sheet suitable to be formed into a metal container and having excellent peel, permeation and impact resistance.

2.4 Low temperature crystallisation occurs if a crystallisable polymeric material such as polyethylene terephthalate is first heated above its melting point, such that all crystals are melted, and then quenched, ie rapidly cooled, such that the polymer chains are



"frozen" and crystallisation is suppressed. Upon subsequent heating, the chains are "unfrozen", ie they regain their mobility, such that they can crystallise, resulting in an exothermic peak when using differential scanning calorimetry (DSC). This crystallisation occurs at a lower temperature than "ordinary" crystallisation, which takes place upon slowly cooling a previously molten material; therefore it is termed "low temperature crystallisation" (LTC) and the temperature at which it occurs is the "low temperature crystallisation temperature" ("LTC temperature").

- 2.5 As is evidenced by A3 (figure 4 and first paragraph of the left-hand column on page 30), the values obtained for the LTC temperature shift by nearly 21°C if the heating rate applied to determine the LTC temperature (in the step denoted as "subsequent heating" above) is changed from 2°C to 16°C/min. This implies that, depending on the heating rate applied, the LTC temperature can vary by more than 21°C for one and the same polyethylene terephthalate, which variation represents more than 60% of the LTC temperature range as claimed (130°C-165°C).

*Main request (granted claims)*

3. *Sufficiency of disclosure (Article 100(b) EPC)*

- 3.1 The essence of the respondent's attack on sufficiency of disclosure was that the LTC temperature range covered by claim 1 of the main request was not well-defined, since any information with regard to the heating rate to be applied during the heating step for the determination of the LTC temperature was missing.

As the skilled person therefore did not know whether he was working within or outside of the scope of claim 1, sufficiency of disclosure had to be denied.

3.2 Accordingly, it has to be analysed whether the skilled person indeed lacks information as to what heating rate to apply when determining the LTC temperature of the polyethylene terephthalate in claim 1. In this regard, (i) the information available from the opposed patent as filed and (ii) the common general knowledge at the filing date of the opposed patent must be taken into account.

3.3 As regards point (i), all that is contained in the opposed patent as filed with regard to the determination of the LTC temperature is the indication on page 4, lines 16-20 that an exothermic peak appears when quenched polyethylene terephthalate films are gradually heated using differential scanning calorimetry (DSC). Consequently, all that the skilled person learns from the opposed patent as filed is that the LTC temperature of the polyethylene terephthalate in claim 1 is measured by means of DSC, applying gradual heating. In particular, no information as to the heating rate to be applied during this gradual heating is contained in the opposed patent.

3.3.1 The appellant argued in this respect that according to page 11, lines 36-37 of the opposed patent, polyethylene terephthalate on the market had an LTC temperature of 128°C. In order to identify the heating rate applied in the opposed patent, the skilled person therefore simply had to calibrate the DSC measurement and in particular the heating rate with the help of the

polyethylene terephthalate resin on the market such that an LTC temperature of 128°C resulted. The heating rate thereby determined was the heating rate applied in the opposed patent. The appellant's argument logically implies that at the filing date of the opposed patent either only one polyethylene terephthalate resin was available on the market or all polyethylene terephthalate resins available on the market had the same LTC temperature of 128°C. As set out by the respondent and as also acknowledged by the appellant, this was however not the case. Actually, "polyethylene terephthalate resin" constitutes a family of materials, each member having different properties, depending eg on its molecular weight, the presence and type of nucleating agents, and the intrinsic viscosity. Therefore, contrary to the appellant's allegation, a skilled person could not identify the heating rate to be applied in the opposed patent for the determination of the LTC temperature with the help of those polyethylene terephthalate resins which were available on the market at the filing date of the opposed patent.

- 3.3.2 The appellant additionally argued that it followed from page 3, lines 56-57 of the opposed patent that polyethylene terephthalates with an LTC temperature above 165°C could not be produced. In the appellant's view, the upper limit of the claim was, therefore, inherently given by the polyethylene terephthalate with the highest LTC temperature available on the market.

However, page 3, lines 56-57 in fact discloses that *"... it is extremely difficult in the sense of economy to manufacture a Homo polymer film consisting of polyethylene terephthalate resin having a low*

*temperature crystallisation temperature more than 165°C alone.*" (emphasis added). Consequently, what may be deduced from the opposed patent is that polyethylene terephthalates with an LTC temperature above 165°C are expensive to produce. This does however not mean that such polyethylene terephthalates were not available to the skilled person, be it on the market or otherwise. Hence, also this argument of the appellant must fail.

3.3.3 On the basis of the information present in the opposed patent as filed, the skilled person would thus not know what heating rate to apply for the determination of the LTC temperature.

3.4 It remains to be examined whether this information was available to the skilled person on the basis of the common general knowledge at the filing date of the opposed patent (point (ii) above).

3.4.1 The appellant argued in this respect that the skilled person would deduce from the norm D8 that, by default, a heating rate of 20°C/min had to be applied for the determination of the LTC temperature in the opposed patent.

First of all, as the date of D8 (15 March 1999) is significantly later than the filing date of the opposed patent, the information present in D8 cannot, in the absence of any further evidence, be considered to have been part of the common general knowledge at the filing date of the opposed patent. Hence, D8 is not to be taken into account when deciding on the question what heating rate the skilled person would use in order to determine the LTC temperature in the opposed patent.

Quite apart from that, D8 does not refer to the determination of the LTC temperature and for this reason also it cannot be relevant to the question of what heating rate the skilled person would apply for the determination of the LTC temperature in the opposed patent. In particular, the procedure applied in D8 (point 9) contains only the steps of:

- performing a preliminary thermal cycle at a rate of 20°C/min, thereby heating the sample to a temperature high enough to erase the test material's previous thermal history,
- holding the temperature for 5 minutes,
- performing a cooling cycle at a rate of 20°C/min to approximately 50°C below the extrapolated end crystallisation temperature, thereby determining the crystallisation temperature,
- holding the temperature for 5 minutes, and
- performing a second heating cycle at a rate of 20°C/min to approximately 30°C higher than the extrapolated end melting temperature, thereby determining the melting temperature.

Hence, what are determined in D8 are the melting and the crystallisation temperatures, but not the low temperature crystallisation (LTC) temperature, ie a temperature where crystallisation is observed in a heating cycle after a prior quenching step.

The appellant's argument that the skilled person would use a heating rate of 20°C/min on the basis of D8 in order to determine the LTC temperature in the opposed patent is thus not convincing.

3.4.2 Like D8, and for the same reasons, the norm D10 (from 2007) does not reflect the common general knowledge at the filing date of the opposed patent. Moreover, again like D8, D10 refers to the determination of a melting temperature (point 3.1 of table 2) rather than the LTC temperature. The same applies to documents D11 (from 1999) and D12 (from 2000) which are equally post-published and refer to the determination of melting points (D11, last paragraph of page 2) and "melting start points" (D12, point 2.3), rather than the determination of the LTC temperature. Hence, like D8, D10-D12 are not relevant to the question of what heating rate the skilled person would apply when determining the LTC temperature in the opposed patent.

3.4.3 In fact, the only documents on file which were available to the skilled person at the filing date of the opposed patent and which relate to the measurement of the LTC temperature are D7 and D9.

D7 is a patent application with a publication date of 9 April 1997, which is prior to the filing date of the opposed patent (10 April 1997). This document describes on page 11, lines 14-17 the measurement of a thermal crystallisation parameter  $\Delta T_{cg}$ . This parameter represents the difference between the peak temperature of crystallisation in DSC ( $T_c$ ) and the glass transition temperature in DSC ( $T_g$ ) (formula on top of page 6 of D7). The measurement comprises the steps of drying a

polyester, melting it, quickly cooling it, and subsequently measuring the glass transition and crystallisation temperatures by DSC at a heating rate of 16°C/min. Due to the fact that the crystallisation temperature is determined after melting and quickly cooling the sample, this temperature is in fact the LTC temperature of the sample. So, what is determined in D7 is the LTC temperature, and to do so, a heating rate of 16°C/min is applied.

The appellant argued in this respect that exceptionally a heating rate below 20°C/min had been used in D7 because, apart from the LTC temperature, also the glass transition temperature was determined, which was difficult to measure and which therefore required a lower heating rate. However, no evidence was provided for this allegation and, for this reason alone, the appellant's argument must fail.

D9 is a scientific article published in 1987, ie before the filing date of the opposed patent. Figure 7 of this document discloses DSC patterns of laminated polyethylene terephthalate films. These patterns show exothermic recrystallisation peaks that are obtained upon heating a rapidly quenched polyethylene terephthalate sample. The recrystallisation temperature (which is synonymous with the LTC temperature) thereby determined lies in the range of 110-130°C (first sentence of point 3 on page 641). The heating rate applied during the DSC measurement is 10°C/min (first sentence of point 2 on page 638).

3.4.4 Consequently, the only documents on file dealing with the measurement of the LTC temperature (and being

available at the filing date of the opposed patent), ie D7 and D9, do not teach one single but rather two different heating rates, namely 16°C/min and 10°C/min, and both heating rates are different from the one to be applied in the opposed patent according to the appellant, namely 20°C/min.

3.5 In summary, neither from the opposed patent as filed nor on the basis of his common general knowledge at the filing date of the opposed patent, would the skilled person know what heating rate to apply when determining the LTC temperature.

3.6 In view of the fact that the LTC temperature strongly depends on the heating rate applied (see point 2.5 above) and in the absence of any knowledge of what heating rate to apply, the skilled person thus is not able to establish whether a given polyethylene terephthalate film has an LTC temperature as required according to the opposed patent in order to obtain the desired peel, permeation and impact resistance. Hence, because of the unclear "heating rate" parameter, the crucial LTC temperature is so ill-defined that the skilled person, when trying to carry out the invention underlying the opposed patent, is left with having to test each individual polyethylene terephthalate as to its peel, permeation and impact resistance. In view of the numerous polyethylene terephthalates with different properties on the market (see point 3.3.1 above) and the even greater number of polyethylene terephthalates which can be synthesized using eg different reaction conditions or catalysts, this amounts to an undue burden to solve the problem addressed in the opposed patent. Its teaching thus in effect is at most a



suggestion to perform a research program in order to identify suitable materials.

- 3.7 This has the consequence that the invention underlying the opposed patent is insufficiently disclosed within the meaning of Article 100(b) EPC, because the requirement is not met that the invention is disclosed "in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art". Consequently, the main request must be refused.

4. *Article 83 EPC versus Article 84 EPC*

- 4.1 Though arriving at the same conclusion as the opposition division (point 3 of the Reasons of the opposition division's decision), the board does not share the opposition division's reasoning that led to this conclusion, namely that claim 1 of the patent did not comply with Article 83 EPC because the skilled person did not have enough information when having to decide whether a specific polyethylene terephthalate "falls into the claimed range or not" (point 2.5 of the Reasons, see point III, above).

- 4.1.1 Article 100(b) EPC or Article 83 EPC requires a European patent or a European patent application to disclose the invention in a manner sufficiently clear and complete for it to be carried out by the skilled person. (As the disclosure standard given in Article 100(b) EPC is identical to that prescribed by Article 83 EPC and the same factual and legal criteria as well as the relevant jurisprudence apply, for the sake of conciseness, henceforth reference is made to the latter provision, ie Article 83 EPC only).

4.1.2 The requirement of sufficient or "enabling" disclosure in the sense of Article 83 EPC is, as such, different from and independent from the clarity requirement pursuant to Article 84 EPC, namely that the claims, which define the matter for which protection is sought, "shall be clear and concise".

This distinction eg underlies decision T 1062/98, where in point 2.1.4 of the Reasons, the board said:

*"Firstly, the question whether the skilled person is capable of determining whether a certain feature would be infringing a feature claimed is not a matter of sufficiency of disclosure as required by Article 83 EPC. ... Whether there is infringement is ... a matter to be decided by the national courts. Secondly, the determination of the scope of the claim ... relates in fact to the question whether the claims properly define the matter for which protection is sought. .... These are, however, the requirements imposed by Article 84 EPC and Rule 29(1) EPC, which do not form grounds of opposition..."*

4.1.3 There is thus a distinction between the meaning of "clear" in Article 83 EPC, which concerns the disclosure (the "technical teaching") of the application or the patent on the one hand, and in Article 84 EPC, where that expression relates to the claims, which "shall define the matter for which protection is sought" on the other hand. In short, there is a distinction between clarity of what has been disclosed and clarity of what is claimed. This distinction is, however, not always properly made, in particular in respect of so called "ambiguous

parameters", i.e. parameters present in the description and/or claims, whose exact definition and/or applicable measuring method remains doubtful.

For example, there exist numerous decisions of the boards of appeal according to which the, or at least one, relevant criterion for sufficiency of a disclosure containing an ill-defined parameter is whether the skilled person knows if he is working within or outside of the scope of the claim (eg, T 256/87 of 26 July 1988, point 10; T 387/01 of 13 January 2004, points 2.2.1, 2.2.3 and 2.2.4; T 252/02 of 7 December 2004, points 2.2.1 and 2.2.5 and T 18/08 of 17 August 2010, points 4.2.1-4.2.4; none of which published in OJ EPO). It is however, not always apparent from the reasoning of these decisions whether or not this criterion was meant to be the sole or the decisive one.

On the other hand, decisions exist that consider the question of whether or not the skilled person knows if he is working within or outside of the scope of the claims not to be a matter of sufficiency of disclosure but rather a matter of Article 84 EPC (see, eg T 396/02 of 2 August 2005, point 4.8.2 and 4.8.3, and T 1033/02 of 26 April 2006, point 11.4, neither of which published in OJ EPO).

- 4.1.4 It is certainly true that where the disclosure is insufficient within the meaning of Article 83 EPC due to the presence of an ill-defined parameter, claims defined by reference to this parameter - in the present case the LTC temperature - would lack clarity under Article 84 EPC, since establishing the exact scope of the claim would then be impossible. But that does not

allow the reverse conclusion to be drawn, namely that there is insufficient disclosure in the sense of Article 83 EPC whenever the scope of the claims is unclear, i.e. not properly defined.

The position is as follows: where a claim contains an ill-defined ("unclear", "ambiguous") parameter and where, as a consequence, the skilled person would not know whether he was working within or outside of the scope of the claim, this, by itself, is not a reason to deny sufficiency of disclosure as required by Article 83 EPC. Nor is such a lack of clear definition necessarily a matter for objection under Article 84 EPC only. What is decisive for establishing insufficiency within the meaning of Article 83 EPC is whether the parameter, in the specific case, is so ill-defined that the skilled person is not able, on the basis of the disclosure as a whole and using his common general knowledge, to identify (without undue burden) the technical measures (eg selection of suitable compounds) necessary to solve the problem underlying the patent at issue.

4.1.5 This rationale underlies eg T 608/07 of 27 April 2009, point 2.5.2 and T 815/07 of 15 July 2008, headnote, (neither of which is published in OJ EPO), where the following statements are contained:

- *"Although the board accepts that, depending upon the circumstances, such an ambiguity may very well lead to an insufficiency objection, it should be born in mind that this ambiguity also relates to the scope of the claims, ie Article 84 EPC. Since, however, Article 84 EPC is in itself not a ground*

*of opposition, care has to be taken that an insufficiency objection arising out of an ambiguity is not merely a hidden objection under Article 84 EPC. It is the conviction of this board that for an insufficiency arising out of ambiguity it is not enough to show that an ambiguity exists, eg at the edges of the claims. It will normally be necessary to show that the ambiguity deprives the person skilled in the art of the promise of the invention."* (T 608/07)

- *"The purpose of a parameter contained in a claim is to define an essential technical feature of the invention. Its significance is that the presence of this technical feature contributes to the solution of the technical problem underlying the invention. The method specified for determining the parameter should therefore be such as to produce consistent values, so that the skilled person will know when he carries out the invention whether what he produces will solve the problem or not."* (T 815/07).

The same rationale also underlies the decision in *Kirin-Amgen Inc v. Hoechst Marion Roussel Ltd* [2004] UKHL 46 of the United Kingdom House of Lords, where Lord Hoffmann said (the other members all agreeing):

*"[if]... finding out which ones work will need extensive experiments, then that in my opinion is not merely lack of clarity; it is insufficiency. The lack of clarity does not merely create a fuzzy boundary between that which will work and that which will not. It makes it impossible to work the*

*invention at all until one has found out what ingredient is needed."* (point 126).

*First auxiliary request*

5. *Sufficiency of disclosure (Article 100(b) EPC)*

Claim 1 of the first auxiliary request differs from claim 1 of the main request in that the feature "wherein the low temperature crystallisation temperature is measured by differential scanning calorimetry" has been added. This addition does not alter the fact that the heating rate to be applied for the differential scanning calorimetry (DSC) measurement is not known to the skilled person. The arguments presented above with regard to sufficiency of disclosure of the main request therefore equally apply to the first auxiliary request. Sufficiency of disclosure has therefore to be denied for the first auxiliary request as well (Article 100(b) EPC).

*Fourth auxiliary request*

6. *Sufficiency of disclosure (Article 100(b) EPC)*

Claim 1 of the fourth auxiliary request differs from claim 1 of the first auxiliary request in that the LTC temperature range has been restricted to 140°C-150°C.

The restriction of the LTC temperature range does not change the finding made with regard to the main request that this range is ill-defined and that this results in a lack of sufficiency of disclosure. Therefore,

sufficiency of disclosure has to be denied also for the fourth auxiliary request (Article 100(b) EPC).

*Second, third, fifth and sixth auxiliary requests*

7. *Sufficiency of disclosure (Article 100(b) EPC)*

Claim 1 of these auxiliary requests (see point VIII above) differs from claim 1 of the first and fourth auxiliary requests by way of the following amendments:

- (a) incorporation of the feature "wherein the planar orientation coefficient of said film consisting of polyethylene terephthalate resin after being covered on said metal sheet by heat bonding ranges from 0 to 0.05 at the contacting portion of said film to said metal sheet ( $n_1$ ), and ranges from 0.03 to 0.15 at the surface portion of said film ( $n_2$ )";

and/or

- (b) incorporation of the feature "wherein the biaxial orientation of the film of said polyethylene terephthalate resin after being covered on said metal sheet by heat bonding is gradually increasing from the contacting portion of said film to said metal sheet to the surface portion of said film".

No evidence has been provided by the appellant that by selecting a planar orientation coefficient and/or a gradual increase of biaxial orientation as required according to the above amendments (a) and/or (b), the skilled person is able to select those low-cost

polyethylene terephthalate covered metal sheets having the desired peel, permeation and impact resistance, thereby overcoming the objection under Article 100(b) EPC. In fact, the opposite is true. The orientation coefficients of samples 2 and 3 in table 3 and of samples 16-18 in table 4 (erroneously referred to as samples 7-9) are as required according to amendment (a) above. Nevertheless, these samples are all denoted "Comparative Example" in these tables and none of these samples has the desired peel and impact resistance.

Hence, the selection of a planar orientation coefficient and/or a gradual increase of orientation as required in claim 1 of the second, third, fifth or sixth auxiliary requests cannot be assumed to assist the skilled person in obtaining the effects aimed at by the opposed patent. Therefore, sufficiency of disclosure must also be denied for these requests (Article 100(b) EPC).



**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:

G. Röhn

W. Sieber