

Citation: The Coca-Cola Company (Re), 2021 CACP 26
Commissioner's Decision #1579
Décision du commissaire n° 1579
Date: 2021-05-13

TOPIC:	O00	Obviousness
	B00	Ambiguity or Indefiniteness
SUJET:	O00	Évidence
	B00	Caractère ambigu ou indéfini

Application No. : 2,718,279

Demande n° 2 718 279

IN THE CANADIAN PATENT OFFICE

DECISION OF THE COMMISSIONER OF PATENTS

Patent application number 2,718,279 having been rejected under subsection 30(3) of the *Patent Rules* (SOR/96-423) as they read immediately before October 30, 2019 (the former *Patent Rules*), has consequently been reviewed in accordance with paragraph 199(3)(c) of the *Patent Rules* (SOR/2019-251). The recommendation of the Patent Appeal Board and the decision of the Commissioner are to refuse the application.

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INTRODUCTION

- [1] This recommendation concerns the review of rejected Canadian patent application number 2,718,279, which is entitled “Bio-Based Polyethylene Terephthalate Polymer and Method of Making the Same” and is owned by The Coca-Cola Company (the Applicant). A review of the rejected application has been conducted by the Patent Appeal Board (the Board) pursuant to paragraph 199(3)(c) of the *Patent Rules*.
- [2] As explained in more detail below, our recommendation is that the Commissioner of Patents refuse the application.

BACKGROUND

The Application

- [3] The application was filed under the *Patent Cooperation Treaty* and has an effective filing date in Canada of March 3, 2009. It was laid open to public inspection on October 1, 2009.
- [4] The rejected application relates to the use of bio-based polyethylene terephthalate “PET” polymers, in the manufacture of food and beverage containers. Bio-based PET polymers are derived from renewable resources and share similar properties as petroleum-derived PET polymers.
- [5] The application has 22 claims on file, which were received at the Patent Office on November 14, 2016.

Prosecution History

- [6] On October 23, 2017, a Final Action (FA) was written pursuant to subsection 30(4) of the former *Patent Rules*. The FA states that the instant application is defective on the grounds that:
- claims 1–22 (all claims on file) are anticipated and do not comply with section 28.2 of the *Patent Act*;
 - claims 1–22 (all claims on file) are obvious and do not comply with section 28.3 of the *Patent Act*; and
 - claims 11, 12 and 22 are indefinite and do not comply with subsection 27(4) of the *Patent*

Act.

- [7] In a response to the FA (RFA) dated April 20, 2018, the Applicant proposed an amended set of 41 claims (proposed claims set-1) and submitted arguments addressing the defects raised in the FA.
- [8] As the Examiner still considered the application not to comply with the *Patent Act* and the former *Patent Rules*, pursuant to paragraph 30(6)(c) of the former *Patent Rules*, the application was forwarded to the Board on August 31, 2018 for review along with an explanation outlined in a Summary of Reasons (SOR). Specifically, the SOR indicates that, in view of the Applicant's arguments presented in the RFA, the defect of anticipation is withdrawn. Further, proposed claims set-1 is not considered to overcome the defects raised under section 28.3 and subsection 27(4) of the *Patent Act*, as well as introducing new defects under subsection 27(4) of the *Patent Act*.
- [9] In a letter dated September 13, 2018, the Board forwarded to the Applicant a copy of the SOR and requested that the Applicant confirm its continued interest in having the application reviewed.
- [10] In a letter dated December 6, 2018, the Applicant confirmed its interest in having the review proceed.
- [11] The present panel (the Panel) was formed to review the instant application under paragraph 199(3)(c) of the *Patent Rules*. The Panel sent a preliminary review letter (PR letter) dated February 12, 2021, which set out our preliminary analysis and opinion that claims 11, 12 and 22 are not indefinite as indicated in the FA and SOR but that all the claims on file are obvious and do not comply with section 28.3 of the *Patent Act*. The PR letter further provided a preliminary analysis of proposed claims set-1, indicating that this proposed claim set would not overcome the defect raised under section 28.3 of the *Patent Act* and that certain claims are further indefinite and thus could not constitute a necessary amendment in accordance with subsection 86(11) of the *Patent Rules*. The PR letter also provided the Applicant with an opportunity to make oral and/or written submissions.
- [12] The Applicant responded to the PR letter on March 15, 2021 (RPR) proposing an amended set of 18 claims (proposed claims set-2) along with written submissions in support of the patentability of these claims. A hearing was held via videoconference on March 30, 2021. At the hearing, the Applicant clarified that although the written submissions were made in

respect of proposed claims set-2, they are also applicable to the claims on file.

ISSUES

[13] In view of the above, the following issues are considered in this review:

- whether claims 1–22 on file are obvious and are therefore non-compliant with section 28.3 of the *Patent Act*; and
- whether claims 11, 12 and 22 on file are indefinite and are therefore non-compliant with subsection 27(4) of the *Patent Act*.

[14] In addition to the claims on file, proposed claims set-2 has also been considered.

LEGAL PRINCIPLES AND PATENT OFFICE PRACTICES

Purposive construction

[15] In accordance with *Free World Trust v Électro Santé Inc*, 2000 SCC 66 and *Whirlpool Corp v Camco Inc*, 2000 SCC 67, purposive construction is performed from the point of view of the person skilled in the art in light of the relevant common general knowledge (CGK), considering the whole of the disclosure including the specification and drawings. In addition to interpreting the meaning of the terms of a claim, purposive construction distinguishes the essential elements of the claim from the non-essential elements. Whether or not an element is essential depends on the intent expressed in or inferred from the claim, and on whether it would have been obvious to the skilled person that a variant has a material effect upon the way the invention works.

[16] “Patentable subject matter under the *Patent Act*” (CIPO, November 2020) [PN2020–04] also discusses the application of these principles, pointing out that all elements set out in a claim are presumed essential unless it is established otherwise or such presumption is contrary to the claim language.

Obviousness

[17] Section 28.3 of the *Patent Act* sets out the statutory requirement that the claimed subject-matter must not have been obvious to the person of ordinary skill in the art (POSITA):

The subject-matter defined by a claim in an application for a patent in Canada must be subject-matter that would not have been obvious on the claim date to a person skilled in the art or science to which it pertains, having regard to

(a) information disclosed before the one-year period immediately preceding the filing date by the applicant, or by a person who obtained knowledge, directly or indirectly, from the applicant in such a manner that the information became available to the public in Canada or elsewhere; and

(b) information disclosed before the claim date by a person not mentioned in paragraph (a) in such a manner that the information became available to the public in Canada or elsewhere.

[18] In *Apotex Inc v Sanofi-Synthelabo Canada Inc*, 2008 SCC 61 at para 67, the Supreme Court of Canada stated that it is useful in an obviousness inquiry to follow the following four-step approach:

(1) (a) Identify the notional “person skilled in the art”;

(b) Identify the relevant common general knowledge of that person;

(2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;

(3) Identify what, if any, differences exist between the matter cited as forming part of the “state of the art” and the inventive concept of the claim or the claim as construed;

(4) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

Indefiniteness

[19] Subsection 27(4) of the *Patent Act* requires claims to distinctly and explicitly define subject-matter:

The specification must end with a claim or claims defining distinctly and in explicit terms the subject-matter of the invention for which an exclusive privilege or property is claimed.

[20] In *Minerals Separation North American Corp v Noranda Mines Ltd*, [1947] Ex CR 306 at 352, 12 CPR 99, the Court emphasized both the obligation of an Applicant to make clear in the claims the ambit of the monopoly sought and the requirement that the terms used in the claims be clear and precise:

By his claims the inventor puts fences around the fields of his monopoly and warns the public against trespassing on his property. His fences must be clearly placed in order to give the necessary warning and he must not fence in any property that is not his own. The terms of a claim must be free from avoidable ambiguity or obscurity and must not be flexible; they must be clear and precise so that the public will be able to know not only where it must not trespass but also where it may safely go.

ANALYSIS OF THE CLAIMS ON FILE

Purposive construction

The claims on file

[21] There are 22 claims on file. On page 4 of the PR letter, we expressed our preliminary view that independent claims 1, 8, 9 and 22 are representative of the claims on file for the purpose of our analysis. Claims 1, 8, 9 and 22 are as follows:

1. A beverage or food container comprising polyethylene terephthalate (PET) polymer, wherein the polymer comprises a petrochemical derived terephthalate component selected from terephthalic acid, dimethyl terephthalate and a combination thereof; and

ethylene glycol of which at least 70 weight percent derives from at least one bio-based material.

8. A beverage or food container comprising polyethylene terephthalate (PET) polymer, wherein the polymer comprises 70 weight percent terephthalic acid and 30 weight percent ethylene glycol, and wherein the terephthalate component totally derives from petrochemicals and at least 70 weight percent of the ethylene glycol derives from sugarcane.

9. A beverage or food container comprising polyethylene terephthalate (PET) polymer, wherein the polymer comprises a terephthalate component selected from terephthalic acid, dimethyl terephthalate and a combination thereof; and

ethylene glycol, wherein the terephthalate component partially or totally derives from at least one bio-based material and at least 70 weight percent of the ethylene glycol derives from at least one bio-based material.

22. A bio-based container comprising bio-based polyethylene terephthalate (PET) polymer, wherein the polymer comprises

from 25 to 75 weight percent of a terephthalate component, wherein the terephthalate component is selected from terephthalic acid, dimethyl terephthalate, isophthalic acid and combination thereof; and

from 20 to 50 weight percent of a diol component, wherein the diol component is selected from ethylene glycol, cyclohexane dimethanol and a combination thereof;

wherein at least one weight percent of the terephthalate component and/or diol component is derived from at least one bio-based material.

- [22] The dependent claims 2–7 and 10–21 define further limitations with regard to: the terephthalate component, the type of bio-based material, the proportion of terephthalate component and ethylene glycol comprising the PET polymer, the source of the terephthalate component and/or ethylene glycol, the type of container and the intrinsic viscosity of the container.
- [23] The Applicant did not contest or comment on the Panel’s consideration of claims 1, 8, 9 and 22 as being representative of the claims on file in the RPR, or at the oral hearing. Likewise, the Applicant did not contest our characterization of dependent claims 2–7 and 10–21 as providing further limitations with regard to: the terephthalate component, the type of bio-based material, the proportion of terephthalate component and ethylene glycol comprising the PET polymer, the source of the terephthalate component and/or ethylene glycol, the type of container and the intrinsic viscosity of the container.

The POSITA

- [24] In the PR letter, on pages 5–6, we adopted the characterization of the POSITA used in the FA, which had not been disputed by the Applicant in the RFA. The POSITA was characterized as:

The person skilled in the art (or *person of ordinary skill in the art*, POSITA) is considered to be a producer of PET containers for food or beverages. In the correspondence of 12 February 2016, the applicant refers to the POSITA as a “converter”, *i.e.* a person “engaged in the conversion of plastic resins into finished products, *e.g.* food and beverage containers”, but “not a person of skill in the preparation of polymers”. In the examiner’s view, it is clear that the POSITA is involved in the preparation of the PET polymer, in particular in selecting appropriate monomers for the polymerization. In any case, both views are taken into account in the analysis that follows.

- [25] The Applicant did not contest the Panel’s characterization of the POSITA in the RPR or at the oral hearing. Accordingly, we adopt the above characterization for our analysis.

The relevant common general knowledge

[26] In the PR letter at pages 6–7, after reviewing the CGK identified in the FA and the Applicant’s submissions in the RFA, we preliminarily agreed with the CGK set out in the FA. We also identified further points of CGK taken from the Description of the instant application:

The common general knowledge of the POSITA is that PET containers are made from PET resin. It is also part of the common general knowledge of the POSITA that PET resin is prepared from the polymerization of a terephthalate component (TA, or an ester thereof) and EG. The POSITA also knows that TA and EG are typically derived from petroleum but that the origin or source of the TA and EG components does not change the resulting PET product.

The RFA, on page 4, concedes that the POSITA would include “one skilled in the art of polymer chemistry”; however, the characterization of the relevant CGK was in dispute:

With respect to identifying the relevant common general knowledge of that person (1b), the Examiner asserted that such person would understand that terephthalic acid and ethylene glycol are typically derived from petroleum but the origin or source of these components does not change the resulting PET product. We disagree with the Examiner. The description teaches at paragraph [0006] that there is a need for PET derived from renewable resources that shares similar properties as petroleum-derived PET. Further, other ingredients as taught in paragraph [0014] can be added to the bio-based PET polymer to improve desired properties. It is desired that the claimed invention be similar to petroleum based PET since that has good properties. However, it is further desired that the product of the claimed invention also be different to petroleum-derived products in that it be more environmentally friendly, more recyclable and this results from derivation from bio-based material that is distinguished by at least C-14 measurable levels. [Emphasis in original]

After reviewing the specification and the references cited therein, we agree that the characterization of the skilled person presented in the FA is reasonable, and therefore we adopt it in this review.

With regard to whether the CGK of the POSITA would include knowledge that the origin or source of the PET precursors does not change the resulting PET product, our preliminary view is that this information was generally known and accepted without question by the bulk of those who are engaged in the particular art of polymer chemistry and more specifically the production of PET polymers. In this regard, the description makes no distinction regarding the preparation of PET using bio-based components or petroleum-derived components. Likewise, statements in the description support the use of conventional processes, that are within the grasp of the POSITA, for the conversion of bio-based materials into the precursor components: [Emphasis added]

- The diol component may be partially or totally derived from at least one bio-based material using any process (para [0021]) [Emphasis added].
- The terephthalate may be partially or totally derived from at least one bio-based material using any process (para [0024]) [Emphasis added].

Although the presence of C-14 can be used to physically differentiate bio-based PET from petroleum-derived PET, there is no evidence suggesting that the polymers can be chemically differentiated. Indeed, the description is clear that bio-based PET can comprise as little as one weight percent of the diol and/or the terephthalate component derived from a bio-based material. In view of the foregoing, it is our preliminary view that the POSITA would not expect the source or origin to affect the chemical properties of PET precursors terephthalic acid and ethylene glycol and therefore any resultant PET products would be indistinguishable in terms of appearance, function and recyclability.

We also add to the identified CGK the following teachings from the description regarding bio-based materials:

- It is known in the art that carbon-14 (C-14), which has a half-life of about 5,700 years, is found in bio-based materials but not in fossil fuels (para 0016).
- C-14 levels can be determined by measuring its decay process (disintegrations per minute per gram carbon or dpm/gC) through liquid scintillation counting).

[27] In the RPR on pages 6–7, and at the oral hearing, the Applicant continued to dispute that the CGK of the POSITA would include knowledge that “the origin or source of the PET precursors does not change the resulting PET product” arguing that there was no evidence to support this aspect of the CGK. In this regard it is noted that our views are consistent with modern atomic theory: “all the isotopes of a given element have virtually identical *chemical* properties—all give the same kinds of chemical reactions” (Chemistry: The Study of Matter and Its Changes, Brady and Holum, 1993, John Wiley & Sons, Inc., pages 44–45). Dating back to work done in the early nineteenth century, these concepts are taught in general chemistry textbooks and are expected to form part of the CGK of the POSITA.

[28] The Applicant further contends that the POSITA would have knowledge that plastic resins are made from petroleum and would have some knowledge of methodology to make petroleum based resins and form petroleum based products. In our view, CGK in relation to the instant application should not be limited to only knowledge of petroleum based raw materials and their uses. Instead, any knowledge related to plastics resins may be relevant.

Furthermore, the “BACKGROUND” of the application indicates that production of polylactic acid bioplastics from bio-based materials are related common knowledge. In our view, the use of bio-based raw materials to make any type of bioplastic will share similar inherent properties that address similar environmental concerns.

[29] In light of the above, we conclude that the relevant CGK, as set out in PR letter is appropriate and we adopt it for our analysis.

Essential elements

[30] On page 7 of the PR letter, we expressed our preliminary view on the essential elements of the claims:

Consistent with the practice guidance provided in *PN 2020-11-03*, there is no use of language in the claims indicating that any of the elements are optional, a preferred embodiment or one of a list of alternatives. Therefore, our preliminary view is that the POSITA would consider all of the elements in the claims to be essential.

[31] The Applicant did not contest or comment on our preliminary identification of the essential elements in the RPR, or at the oral hearing. Accordingly, our analysis will proceed on the above identification of the claim elements that are essential.

Obviousness

[32] All 22 claims on file were rejected in the FA for obviousness.

The POSITA and the relevant CGK

[33] The POSITA and the relevant CGK have been set out above as part of the purposive construction of the claims. The above identification of the relevant CGK as of the publication date is also considered to be valid as of the claim date and thus applicable for the purpose of assessing obviousness.

Identify the inventive concept of the claim in question or, if that cannot readily be done, construe it

[34] As indicated in the PR letter, consistent with the inventive concept identified in the FA, we have considered the essential elements of the claims on file in our assessment of obviousness. Further, we indicated that the inventive concept includes characteristics that

are inherent in the definition of bio-based components:

The FA, on page 3, identifies the inventive concept as follows:

The inventive concept of the present claims pertains to containers wherein petroleum-derived monomers are replaced with bio-based monomers. Thus the claimed bio-based PET containers comprise (i) a terephthalate component which, in some embodiments, is at least partially obtained from bio-based materials, and (ii) a diol component which, in some embodiments, is at least partially obtained from bio-based materials. It is noted that in independent claims 1, 8 and 9, at least 70 weight percent of the EG derives from bio-based material, while claim 22 only requires that “at least one weight percent of the terephthalate component and/or the diol component is derived from at least one bio-based material.”

The RFA, on page 4, submits that the inventive concept also includes characteristics of the bio-based components:

The inventive concept (2) is the combination of bio-based components that provides beverage or food containers that emit less greenhouse emissions, can be made from a renewable source, are more environmentally friendly and can be physically distinguished from petroleum based containers based on C-14 levels - and yet can be recycled in current recycling systems.

In our preliminary view, the inventive concept identified in the FA is consistent with the essential elements of the claims. Further, to the extent that the RFA has identified characteristics that are inherent in the definition of bio-based components, in our preliminary view, the inventive concept includes these features. Specifically, consistent with the background of the description, bio-based components are derived from renewable resources and can be distinguished from petroleum-derived components based on levels of C-14. Therefore, in our preliminary view, the POSITA would consider these inherent features of bio-based materials to be part of the inventive concept of the claims. However, with respect to the identification that bio-based components provide beverage or food containers that emit less greenhouse emissions and that can be recycled in current recycling systems, in our preliminary view, any purported benefits must be directly attributable to the claimed subject-matter. In the present case, the claims do not define any aspects associated with the life cycle of the container. Therefore, in our preliminary view, they are not considered to form part of the inventive concept.

[35] In the RPR letter on pages 7–8, and at the oral hearing, the Applicant argued that the claimed invention is a green technology “that helps resolve or mitigate environmental impacts or conserve the natural environment and resources” and that benefits such as decreasing CO₂ emissions and conservation of petroleum resources are directly a function of the claimed invention.

[36] Having considered the Applicant's arguments, we note that the specification discloses that petrochemically-derived PET contributes to greenhouse gas emissions, petrochemicals cannot be regenerated at a rate comparative to their consumption and that there exists a need for a PET derived from renewable resources that shares similar properties as petroleum-derived PET. Therefore, we agree that in addition to the inherent properties of bio-based components i.e. they are derived from renewable resources and can be distinguished from petroleum-derived components based on levels of C-14, the specification also supports an inventive concept of beverage containers comprising bio-based PET that contribute to less greenhouse gas emissions and conserve petroleum resources. However, the fact that bio-based PET can be recycled in current recycling systems is not, in our opinion, a benefit of bio-based components as compared to petrochemically-derived PET. Therefore, this property is not a feature particular to bio-based PET and as such should not form part of the inventive concept.

Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed

[37] In the PR letter, the following two documents were applied against the claims on file:

D5: US 6500890 EDWARDS et al. 1 December 2002 (31-12-2002)

D6: JP 2007-176873 KATO et al. 12 July 2007 (12-07-2007)

[38] D5 discloses the production of improved polyethylene terephthalate resins for use in rigid packaging, such as two-liter soft drink containers (column 1). In particular, the quality of the bottle resin is improved by the addition of small amounts of an inert particulate additive, which allows for resins that can be formed into high-clarity bottles possessing reduced coefficient of friction.

[39] D6 discloses the production of resins using raw materials derived from biomass, a carbon neutral and renewable resource, as an alternative to petroleum derived raw materials. The biomass is not limited—any organic compound which is synthesized from carbon dioxide and water by solar energy is contemplated, including: corn, sugar cane, kenaf, legume, straw, chaff (para. [0030]). Methods for the conversion of biomass into various biomass derived organic compounds are disclosed, including ethylene glycol and terephthalic acid (para [0019]). D6 further discloses, at para [0083], the use of conventional methods for the synthesis of polyethylene terephthalate using biomass derived raw materials (i.e. bio-based

PET). D6 concludes that resins obtained by the present invention can simultaneously solve the problems of suppression of global warming due to carbon dioxide circulation, resource exhaustion, and the like without impairing the mechanical characteristics, heat resistance, and the like of known resins, and are useful for resin molded products, fibers, and film applications.

[40] The PR letter, on page 9, identified the differences between the cited prior art and the inventive concept of the claims:

In our preliminary view, the state of the art is represented by prior art document D6. D5 is considered as another relevant document.

Further, in our preliminary view, the differences between the inventive concept of the claims on file and the cited prior art are:

- D6 does not specifically disclose that beverage or food containers can be made from the bio-based PET.
- D5 does not disclose the use of bio-based components in the preparation of PET beverage containers.
- Neither D6 or D5 disclose bio-based containers comprising the recited source and amounts of the terephthalate component or diol component.

[41] In the RPR, the Applicant did not dispute our identification of the differences. Moreover, we note that the inclusion of certain beneficial features of bio-based PET in the inventive concept does not change these differences. As compared to petrochemically-derived plastics, all bio-based plastics can be considered as green technologies that will contribute to less greenhouse gas emissions and conserve petroleum resources (see D6).

[42] In light of the above, we conclude that the differences between the prior art and the claims on file are those set out in the PR letter.

Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

[43] In the PR letter, we expressed our view on page 10 that the differences between the cited prior art and the claims on file could be bridged by the relevant CGK:

Given that D6 confirms that polyethylene terephthalate synthesized using biomass derived raw materials has the same characteristics as the conventional, petroleum derived polymer, we are of the preliminary opinion that it would have been obvious to the POSITA reading D6 that alternative biomass derived PET resins would also be expected to have the same characteristics as conventional, petroleum derived PET resins.

It is also noted that D6, like the instant application, recognizes the inherent benefits associated with the use of biomass—a carbon neutral, renewable resource—as compared to conventional petroleum derived raw materials. Therefore, in our preliminary opinion, no degree of invention is required for recognizing properties that are inherent in any biomass derived material.

We further consider that conventional PET resins for use in rigid packaging, such as two-liter soft drink containers are known from D5. Indeed, the RFA concedes on page 10 that D5 is “directed to conventional PET petroleum container technology”. Therefore, it is our preliminary view that it would have been obvious to the POSITA that biomass derived terephthalic acid and/or ethylene glycol can be used to produce PET bottle resins having the same characteristics.

Additionally, there is no indication or suggestion in the specification or the CGK that ingenuity would be required from the POSITA to select the source and amounts of the terephthalate component or diol component to use in the synthesis of the PET polymer resin as claimed. This is consistent with the view expressed in the RFA on page 4 indicating that “the degree of invention (4) is not in the synthesis of bio-based PET resin per se”.

[44] In response, the Applicant argued on pages 15–18 of the RPR that differences between the claims and the cited prior art are not obvious because a POSITA and the CGK they possess would not be motivated to combine the teachings of D5 and D6:

In this aspect we must also consider the motivations of a person of skill in the particular PET application. As discussed above, a person of skill in the art for the claimed application, i.e. food and beverage containers, is a converter, and we submit that a person of skill in the art of producing PET food and beverage containers would not have been motivated, with any reasonable expectation of success, at the time of the present invention to substitute the petroleum-derived monomers, even partially, to provide a PET food and beverage container given that (i) it would have been far more expensive to produce such a container than to produce a PET container made from petroleum-derived monomers, and (ii) a reliable and adequate supply of raw materials (i.e., bio-monomers, bio-PET resin) would have been far more difficult to obtain.

Importantly, a person of skill in the art has no interest in making one PET food or beverage container, but rather is only interested in mass producing such containers—which we submit is [key to] *sic* understanding the motivation of a person of skill in the art. Put simply, success to a person of skill in the art of producing PET food and beverage containers constitutes mass production at a low cost, with benefit of reliable and adequate supply of raw materials.

With respect to cost, we submit that a person [of] *sic* skill in the art would not have been motivated, with a reasonable expectation of success to substitute the petroleum-derived monomers in PET with bio-derived monomers (even partially) to providing a PET food or beverage container- given that the cost would have been significantly greater than an identical bottle made from petroleum-derived monomers, where the increased cost at the time of the present invention (and even now) is attributable to the scarcity of bio-refineries (a term used to described the facilities that process biomass to provided biobased monomers).

A POSITA and the CGK they possess would not combine the teachings of D5 and D6 since both are directed to solving different problems and solution than that presently claimed. Furthermore, the teachings of D5 and D6 do not combine since D5 is directly solely to conventional PET bottles and no where suggests to substitute a bio-based component or how such a bio-based component could be obtained and combined.

- [45] We respectfully disagree. Firstly, the prior art already disclosed a motive to produce bio-based PET food and beverage containers. As indicated above, the state of the art is represented by D6 which establishes a motivation in the art to provide biomass-use resins that replace resins using conventional petroleum resources as raw materials—to solve problems of suppression of global warming and exhaustion of resources (see para [007]).
- [46] With regard to motivation of the POSITA, it is noted that the Applicant points out that the cost and availability of bio-based components would have de-motivated the POSITA from substituting petroleum-derived monomers in PET with bio-derived monomers. Notwithstanding that the Applicant has focused solely on the converter as the POSITA for the purposes of motivation, when the “team” that comprises the POSITA in this case also includes a polymer chemist, we are of the opinion that these concerns would not deter the POSITA from producing a bio-based version of PET. In addition to the motivation provided by D6, the “BACKGROUND” of the application specifically acknowledges that there was a general desire to move away from petrochemically-derived PET and to find a substitute. In our view, at the claim date, the POSITA was aware that there was a need for a bio-based version of PET: “there exists a need for a PET derived from renewable resources that shares similar properties as petroleum-derived PET” (see para [0006]).
- [47] Furthermore, it is our view, that the POSITA would have been led to combine the cited prior art to accomplish this end. D6 provides not only the motivation for the POSITA to find the solution the instant application addresses, but also provides methods of extracting various organic raw materials from biomass including ethylene glycol (paras [0062]–[0064]) and terephthalic acid (Example 1). Additionally, D6 confirms that polyethylene terephthalate resin which is synthesized from biomass-derived raw materials

using conventional methods, has the same characteristics as petroleum-derived polymer.

- [48] In light of the above, we consider that POSITA would have been led to combine the use of biomass-derived raw materials in conventional methods of producing PET products, such as the polyester bottle resins disclosed in D5, which the RFA acknowledges on page 10 are “directed to conventional PET petroleum container technology”. Moreover, in our view, the POSITA would have expected that biomass-derived raw materials could be used interchangeably with petroleum-derived materials in any method for producing PET based on modern atomic theory.
- [49] Although the Applicant, in the RPR on pages 15–19 and at the oral hearing, further argued that combining the teachings of D5 and D6 does not provide each and every essential element as recited in each of the independent claims, it is our view that the POSITA would not consider the source and amounts of the terephthalate component or diol component to use in the synthesis of the PET polymer resin as claimed to give rise to a surprising or unexpected result. This is consistent with the view expressed in the RFA on page 4 indicating that “the degree of invention (4) is not in the synthesis of bio-based PET resin per se”. Whether the terephthalate component and/or the diol component derives wholly or partially from a petroleum source or a bio-based material or is a combination of both, the resultant PET polymer is expected to be indistinguishable in terms of appearance, function and recyclability. Therefore, it is our view that no degree of invention would have been required from the POSITA to select the source and amounts of the terephthalate component or diol component to use in the synthesis of the PET polymer resin as claimed.
- [50] Accordingly, we conclude that the differences between the inventive concept of independent claims 1, 8, 9 and 22 and D6 are not steps which would require any degree of invention from the POSITA in view of the conventional methods for preparing PET beverage containers disclosed in D5 and their CGK.
- [51] In the PR letter, we expressed our preliminary view that none of the additional features recited in claims 2–7 and 10–21 would have required any degree of invention from the POSITA in view of their CGK. In the RPR, on pages 18–19, the Applicant argued that the teachings of D5 and D6 and the CGK do not teach or suggest the subject-matter of the dependent claims but did not identify or associate any specific limitations in the dependent claims with additional ingenuity.

[52] As indicated in the PR letter, dependent claims 2–7 and 10–21 define further limitations with regard to: the terephthalate component, the type of bio-based material, the proportion of terephthalate component and ethylene glycol comprising the PET polymer, the source of the terephthalate component and/or ethylene glycol, the type of container and the intrinsic viscosity of the container, which are CGK design options based on the intended application of the PET resins. In our view, none of these features would have required any degree of invention from the POSITA in a manner separate from the subject-matter defined in the independent claims.

[53] Our conclusion is therefore that the subject-matter of claims 1–22 on file would have been obvious to the POSITA as of the relevant date, in view of D6, D5 and their CGK, contrary to section 28.3 of the *Patent Act*.

Indefiniteness of claims 11, 12 and 22 on file

[54] Our preliminary analysis was put forth on page 11 of the PR letter as follows:

On page 11, the FA also identified minor clarity defects in claims 11, 12 and 22. Specifically, in claim 11 “it is not clear if the ethylene glycol *totally* derives from sugarcane.” Similarly, in claim 12, “[i]t is not clear if the “at least one bio-based material” refers to the material from which the terephthalate component is derived, or to that from which the ethylene glycol is derived.” Further, in claim 22, the inclusion of isophthalic acid as a member of the group for the terephthalate component was considered ambiguous because isophthalic acid and terephthalic acid are two different, mutually exclusive isomers of phthalic acid.

Having reviewed claims 11, 12 and 22 on file, we do not agree that these claims are unclear. In claim 11, we consider that the POSITA would readily understand that the at least one-based material that the ethylene glycol derives from is sugarcane. Likewise, in claim 12, we consider that the POSITA would readily understand that the at least one bio-based material refers to both the terephthalate component and the ethylene glycol. We also consider that the POSITA would readily understand that the groups for the terephthalate component and diol component are intended to include all of the listed members in view of the teachings of the description which clarifies what is encompassed by the term PET: “Polyethylene terephthalate and its copolyesters (hereinafter referred to collectively as “PET” or “polyethylene terephthalate”” (para [0003]). This broad definition for PET supports the groups which are also identified in the description: “the terephthalate component is selected from terephthalic acid, dimethyl terephthalate, isophthalic acid, and a combination thereof” (para [0012]) and “the diol component is selected from ethylene glycol, cyclohexane dimethanol, and a combination thereof” (para [0013]).

Therefore, it is our preliminary view that claims 11, 12 and 22 on file do comply with subsection 27(4) of the *Patent Act*.

[55] The RPR did not contest or comment on these preliminary conclusions. Our conclusion is therefore that claims 11, 12 and 22 on file are definite and comply with subsection 27(4) of the *Patent Act*.

ANALYSIS OF THE PROPOSED CLAIMS

[56] As indicated above, with the RPR the Applicant submitted proposed claims set-2. According to the RPR, the claims of proposed claims set-2 do not correspond to any of the indefinite claims that were identified in respect of proposed claims set-1 in the PR letter. We agree with this statement. Therefore, it is our view that proposed claims set-2 is directed to subject-matter which complies with subsection 27(4) of the *Patent Act*.

[57] With respect to the obviousness defect, the proposed amendments would introduce the following claim elements:

- specifying that the bio-based materials have higher C-14 levels compared to petroleum-based materials;
- specifying the presence of supplemental components;
- specifying the disintegrations per minute per gram of C-14; and
- methods of producing bio-PET polymer beverage containers.

[58] With respect to the method claims, as indicated above, consistent with modern atomic theory, the POSITA would have expected that bio-based ethylene glycol and petrochemical-derived terephthalic acid could be used in any known method for producing PET products, including a beverage container.

[59] The remaining limitations were also present in proposed claims set-1, for which we provided the following analysis in the PR letter on pages 12–13:

We have presented our preliminary view that the subject-matter of the claims on file would have been obvious at the claim date to the POSITA, as of the relevant date, in view of D6, D5 and their CGK. Further, as indicated above, we have already considered that the inventive concept of the claims on file takes into account inherent features of bio-based components, including the physical property that allows them to be distinguished from petroleum-derived components based on levels of C-14. The additional features and limitations in the proposed dependent claims can also be addressed by the reasons given with respect to the claims on file. Specifically, the recitation that the PET polymer comprises at

least 0.1 dpm/gC (disintegrations per minute per gram of carbon) of C-14 simply quantifies the amount of bio-based component based on the inherent decay rate of C-14 and would require no degree of invention from the POSITA.

Likewise, the description, at para 0014, is clear that the addition of supplemental components are design options that would require no degree of invention from the POSITA:

Other ingredients may be added to the bio-based PET polymer. Those of ordinary skill in the art would readily be able to select the suitable ingredient(s) to add to the bio-based PET polymer to improve the desired properties, which may depend on the type of application intended. In a particular embodiment, the bio-based PET polymer may further comprise a supplemental component selected from at least one coloring agent, at least one fast reheat additive, at least one gas barrier additive, at least one UV blocking additive, and a combination thereof.

Therefore, it is our preliminary view that the proposed claims, like the claims on file, define subject-matter that would have been obvious to the POSITA, as of the relevant date, in view of D6, D5 and their CGK.

[60] Therefore, considering the above elements together with the subject-matter of the claims on file, it is our view that our reasoning and conclusions concerning the obviousness of the claims on file also apply to proposed claims set-2. It follows that proposed claims set-2 are not considered a necessary specific amendment under subsection 86(11) of the *Patent Rules*.

RECOMMENDATION OF THE BOARD

[61] In view of the above, the Panel recommends that the application be refused on the basis that:

- claims 1–22 are obvious and do not comply with section 28.3 of the *Patent Act*.

Christine Teixeira

Member

Marcel Brisebois

Member

Philip Brown

Member

DECISION OF THE COMMISSIONER

[62] I concur with the findings of the Board and its recommendation to refuse the application because the claims on file do not comply with section 28.3 of the *Patent Act*.

[63] Accordingly, I refuse to grant a patent for this application. Under section 41 of the *Patent Act*, the Applicant has six months to appeal my decision to the Federal Court of Canada.

Virginie Ethier
Assistant Commissioner of Patents

Dated at Gatineau, Quebec

this 13th day of May, 2021.