

**Internal distribution code:**

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

**Datasheet for the decision  
of 19 July 2022**

**Case Number:** T 0144/20 - 3.3.05

**Application Number:** 12789264.4

**Publication Number:** 2710652

**IPC:** H01M2/16, D21H27/00, D21H15/02,  
H01G11/52, H01M2/14, H01M2/18,  
H01M10/052, D21H13/10

**Language of the proceedings:** EN

**Title of invention:**  
SINGLE-LAYER LITHIUM ION BATTERY SEPARATOR

**Patent Proprietor:**  
Dreamweaver International, Inc.

**Opponent:**  
Heinemann, Christoph

**Headword:**  
BATTERY SEPARATOR/Dreamweaver

**Relevant legal provisions:**  
EPC Art. 56

**Keyword:**  
Inventive step - (no)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
**Chambres de recours**

Boards of Appeal of the  
European Patent Office  
Richard-Reitzner-Allee 8  
85540 Haar  
GERMANY  
Tel. +49 (0)89 2399-0  
Fax +49 (0)89 2399-4465

Case Number: T 0144/20 - 3.3.05

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.05**  
**of 19 July 2022**

**Respondent:** Dreamweaver International, Inc.  
(Patent Proprietor) 18 Brozzini Court, Suite B  
Greenville, SC 29615 (US)

**Representative:** Stephenson, Philip  
Bailey Walsh & Co LLP  
1 York Place  
Leeds, LS1 2DR (GB)

**Appellant:** Heinemann, Christoph  
(Opponent) c/o Müller Schupfner & Partner  
Bavariaring 11  
80336 München (DE)

**Representative:** Heinemann, Monica  
Abitz & Partner  
Patentanwälte mbB  
Postfach 86 01 09  
81628 München (DE)

**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
31 October 2019 concerning maintenance of the  
European Patent No. 2710652 in amended form.**

**Composition of the Board:**

**Chairman** E. Bendl  
**Members:** J. Roider  
O. Loizou

## Summary of Facts and Submissions

- I. The appeal by the opponent (appellant) lies from the opposition division's interlocutory decision to maintain the patent on the basis of auxiliary request 5, filed during the oral proceedings in opposition.
- II. Both the patent proprietor and the opponent filed appeals against this decision and paid the appeal fee. However, the patent proprietor (now respondent) did not file a statement of grounds of appeal. At the oral proceedings before the board, the respondent informed the board that its appeal was no longer pursued.
- III. The set of claims as maintained by the opposition division (auxiliary request 5) is the only claim request submitted by the (now) respondent in appeal proceedings.
- IV. The following documents referred to in the decision under appeal are of relevance here:
- D2a WO 2010/044264 A1; publication of the Japanese PCT application PCT/JP2009/005365, published on 22 April 2010
- D2b US 2011/0206972 A1; publication of the US national phase application of D2a, published on 25 August 2011
- V. Claim 1 of auxiliary request 5 reads:  
*"1. A polymeric battery separator comprising a nonwoven combination of microfibers and nanofibers, wherein said combination of microfibers and nanofibers is present as*

*a single layer within said separator, and wherein said separator provides sufficient porosity for electrolyte ion transfer therethrough and suitable prevention of electrode contact when present within a battery, wherein said nanofibers have an average diameter less than 1000 nm, wherein said microfibers have a diameter greater than 3000 nanometers, and wherein said nanofibers and microfibers are intermingled such that at least a portion of said nanofibers reside in the interstices between said microfibers; and wherein the battery separator has a cross direction (CD) tensile strength greater than 100 kg/cm<sup>2</sup> optionally greater than 250 kg/cm<sup>2</sup>."*

VI. The parties' arguments under Article 56 EPC can be summarised as follows.

The appellant argued that the subject-matter of claim 1 did not disclose the features required to solve the problem stated by the respondent, in particular with regard to the cross direction tensile strength. Since the claimed value was not ambitious and was already obtained in prior art, the subject-matter of claim 1 lacked an inventive step starting from D2a/D2b.

The respondent submitted that by selecting appropriate microfibres, the claimed cross direction tensile strength could be obtained, something not rendered obvious by the prior art.

VII. The appellant (opponent) requested that the decision be set aside and that the patent be revoked.

VIII. The respondent (patent proprietor) requested that the appeal be dismissed.

## **Reasons for the Decision**

1. Inventive Step, Article 56 EPC
  - 1.1 The patent is directed to an insulating, microporous, polymeric battery separator.
  - 1.2 The appellant cites D2a/D2b as the starting point for an inventive-step objection. The board agrees with this choice.
  - 1.3 D2b was published after the priority date of the patent in suit, while D2a was published before. It was neither argued, nor is there any reason to assume, that D2b was not a correct translation of D2a. Therefore, while D2b is cited here, reference is made to the corresponding passages of D2a.
2. Document D2a/D2b is directed to a nonconductive, microporous, polymeric battery separator with excellent durability under high temperature environments.
  - 2.1 The problem addressed by the patent under appeal is, according to the respondent, the provision of a battery separator that provides simultaneously low air resistance, low pore size and high tensile strength overall at relatively isotropic levels, all while exhibiting proper chemical stability, structural integrity and dimensional stability and ease in manufacture (reply to the grounds of appeal, page 2, fifth full paragraph and paragraph [0011] of the patent in suit).

- 2.2 Claim 1 at issue defines the diameter and relative position of nano- and microfibrres and the cross direction tensile strength.
- 2.3 However, the subject-matter of claim 1 does not define characteristics of the isotropy, the proper chemical stability, the structural integrity or the dimensional stability. It does also not require certain manufacturing steps which could ensure these parameters or the ease in manufacture such that these aspects of the problem cannot be considered solved by the features of the claim.
- 2.4 Moreover, the subject-matter of claim 1 does not define an acceptable level for the air resistance or pore size, let alone the features required to achieve such values such that these aspects of the problem cannot be considered contributing to the inventive step of the subject-matter of claim 1. Thus, the subject-matter of claim 1 merely differs from D2a/D2b in the explicit mention of the tensile strength in the cross direction.
- 2.5 The respondent argued that the microfibrres provide the cross direction tensile strength, while the nanofibrres do not contribute to it.

The examples contained in the patent in suit (see table 2) disclose the addition of microfibrres with a diameter of approximately 17  $\mu\text{m}$  to a base fabric of EFTEC<sup>TM</sup> A-010-04, a commercially available material, which is a combination of microfibrres and nanofibrres. However, as is apparent from the examples, the added microfibrres reduce (see table 3) the cross direction tensile strength with respect to the base fabric even to the extent that in example 5, the claimed cross direction tensile strength is not achieved anymore.

The respondent argued that by using thicker fibres, the tensile strength increased and that it was not the aim of the examples to show that the cross direction tensile strength could be achieved but rather to show that the porosity may be adjusted.

The microfibrils added in the examples have a diameter larger than 3 000 nanometres, fall within the definition of the subject-matter of claim 1, but show that the microfibrils reduce the cross direction tensile strength of the material.

There is no doubt that appropriate microfibrils can be selected such that the cross section tensile strength is improved. However, the subject-matter of claim 1 requires the mere presence of microfibrils and thus also encompasses embodiments which obviously do not solve the problem as even stated by the respondent.

Therefore, the tensile strength is not linked to the mere presence of microfibrils with a diameter of more than 3 000 nanometres.

2.6 Also, the features "intermingling" and "residing" do not provide the desired result.

According to the subject-matter of claim 1, *intermingling* is required only to the extent that at least a portion of nanofibrils *reside* in the interstices of the microfibrils. These features are not linked to the desired value of the cross directional tensile strength.

Even if they were linked to it, the extent of intermingling or residing for achieving the desired result are not apparent. Indeed, it appears that any nonwoven layer made from a combination of microfibrils



and nanofibres with the required diameters would fulfil these features.

2.7 According to the patent in suit, EFTEC™ A-010-04 could be used without any additional fibres (see paragraph [0030]). Indeed, inventive examples 1, 6, 12 and 18 use EFTEC™ A-010-04 only.

The examples suggest that the desired tensile strength is dependent on the fibrous material used for the base material for the nonwoven layer. This material is, however, not contained in the subject-matter of claim 1.

The subject-matter of claim 1 thus does not contain the features necessary to solve the problem over the entire scope claimed.

Therefore, the problem must be reformulated to a less ambitious problem, which is to provide an alternative polymeric battery separator.

D2a/D2b, particularly example 3, does not disclose that the battery separator has a cross direction tensile strength greater than 100 kg/cm<sup>2</sup>.

The patent in suit qualifies the cross direction tensile strength of 150 kg/cm<sup>2</sup>, achieved in comparison example CE2, as very low (see paragraphs [0045] and [0046]).

The claimed value of 100 kg/cm<sup>2</sup> appears thus even less ambitious. It is within a range readily achievable in the art as apparent from, *inter alia*, the patent in suit since the values disclosed for the base fabric made from the commercially available EFTEC™ A-010-04 and even counter example CE2 show a cross direction tensile strength which considerably exceeds the claimed

value.

Modifying (e.g. adding specific fibres) and processing (e.g. calendering) the battery separator such that it provides the cross directional tensile strength in the claimed range is a routine task for the skilled person not involving an inventive step.

**Order**

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

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



A. Voyé

E. Bendl

Decision electronically authenticated