

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

HUHTAMAKI FLEXIBLE PACKAGING GERMANY GMBH & CO. KG,

Petitioner,

v.

ADAPA FLEXIBLES DENMARK SLAGELSE A/S,

f/k/a DANAPAK FLEXIBLES A/S,

Patent Owner.

PGR2023-00008

Patent 11,260,624

**PATENT OWNER'S REPLY TO PETITIONER'S OPPOSITION TO
PATENT OWNER'S REVISED MOTION TO AMEND**

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UPDATED EXHIBIT LIST

Exhibit No.	Description
2001	U.S. Patent No. 11,504,954 assigned to Huhtamaki Flexible
2002	U.S. Patent App. No. 16/425,067 Application File History (in-part)
2003	U.S. Patent App. Pub. No. 20150225151A1 to Osborn <i>et al.</i>
2004	Redline Comparison Between Riis and Osborn
2005	U.S. Patent 11,504,954 NFOA Response dated 11 March 2021
2006	U.S. Patent 11,504,954 FOA Response dated 3 August 2022
2007	Huhtamaki Parent Website – Business Segments
2008	Huhtamaki Parent Website – Contact Us
2009	Huhtamaki Parent Website – Executive Team
2010	Huhtamaki Parent Annual Report 2021
2011	Corrected PHV Affidavit (Timothy P. Getzoff)
2012	EP Patent App. No. 15202962.5 – '624 Priority Application
2013	Curriculum Vitae – Dr. Stephen McCarthy
2014	Declaration of Dr. Stephen McCarthy
2015	Deposition Transcript – Dr. Richard Spontak
2016	Second Declaration of Dr. Stephen McCarthy
2017	U.S. Patent No. 11,504,954 Assigned to Huhtamaki Flexible - Application File History
2018	U.S. Patent No. 11,504,954 FOA Response dated 12 August 2021
2019	U.S. Patent No. 11,504,954 Declaration of Huhtamaki Inventor Manuella Herb dated 12 August 2021
2020	U.S. Patent App. Pub. No. 2017/0136747 to Torradas <i>et al.</i>
2021	Second Deposition Transcript – Dr. Richard Spontak
2022	Third Declaration of Dr. Stephen McCarthy

I. THE SUBSTITUTE CLAIMS¹ ARE PATENTABLE OVER THE PRIOR ART

A. Riis and Wypych fail to render obvious Claims 14, 15, and 20–24.

1. As confirmed in Petitioner's own representations in other proceedings before the Office, Riis's .65 mil LDPE layer in Riis's Example 5 "Film" primarily serves as a bulk layer and does not serve as a tie layer or a layer of a multi-layer tie layer.

As evidenced in numerous filings, Riis (alone or in view of a POSITA's knowledge) discloses that the .65 mil LDPE layer in Riis's Film primarily serves as a bulk layer and does not serve as a tie layer.² In its Opposition to Patent Owner's Revised Motion to Amend (RMTA) ("Opposition"), Petitioner has, and continues to, allege³ that the .65 mil LDPE layer primarily serves as a tie layer. Opposition, 2; EX2021, 198:10–15. However, in other proceedings before the Office, Petitioner has taken contradictory positions — providing evidence consistent with Patent Owner's position here and in conflict with its own.

a) In other proceedings before the Office, Petitioner has represented, in the context of Riis's Film, that a regular LDPE layer is a structural layer used to serve bulking purposes and to enable creation of a film despite providing poor adhesion to a neighboring COC layer, confirming that Riis's .65 mil LDPE layer primarily serves as a bulk layer.

During prosecution of U.S. App. No. 16/516,792 (which has an earliest possible priority date of July 24, 2018 and is assigned to Petitioner), in the

¹ All Claims referenced in this Reply are Substitute Claims.

² See *e.g.*, EX1004 ¶¶ [0065], [0071]; EX2014 ¶¶ 83, 91–95, 100; EX2015, 83:9–22; EX2016 ¶ 151; EX1036, 196.

³ Relying solely on its expert's conclusory statements and a generous reading of a single sentence in Riis that polyolefin bulk layers can, in some embodiments, serve as tie layers. See *e.g.*, EX1003 ¶ 82 (citing EX1004 ¶ [0135]).

Response dated August 3, 2022 ("Second FOA Response") to the Final Office Action dated April 7, 2022, Petitioner explicitly identified that the "**structure layer** in Osborn[s Example 5 film] is **the 'bulk' layer**[,] which is a polyolefin[,], such as PE or LLDPE⁴." EX2006, 12:11,12 (emphasis added⁵) — Osborn (EX2003) provides priority for Riis and reproduces much of Riis's disclosure (See EX2004), including Riis's Example 5 (EX2003 ¶ [0100]). The "structure layer" term used by Petitioner was derived from Torradas (EX2020), which defines a "structure layer" as a layer that can be combined with a barrier layer to provide bulk mechanical and barrier properties. EX2020 ¶ [0121]; *see also* EX2022 ¶ 72.

In the Second FOA Response, Petitioner also illustrated, in a first column of a table, a first film structure according to Osborn ("Osborn1") and, in an adjacent column of the table, a second film structure according to Osborn ("Osborn2").⁶ EX2006, 10. For the Osborn1 film structure, Petitioner **explicitly labeled** a layer (which corresponds to the .65 mil LDPE layer's position in Riis's Film's sealant film) as a "polyolefin bulk layer" made of PE, LLDPE, and m-LLDPE. For the Osborn2 structure, Petitioner identified a corresponding layer (positioned in the same row as, and next to, that labeled polyolefin bulk layer in Osborn1) as being made of LDPE. *Id.*

⁴ LDPE is similarly a polyolefin.

⁵ Emphasis added throughout this Reply unless otherwise noted.

⁶ The structure of Osborn2 is the same as Riis's Example 5 Film.

Additionally, in the Response dated August 12, 2021 ("First FOA Response") to the Final Office Action dated May 13, 2021, Petitioner submitted in a sworn Declaration of Petitioner's own inventor, Manuella Herb, that, though "[u]sing regular LDPE allows [] a multilayer structure **[to be created]**" (EX2018, 9:5–15), the bond between the regular LDPE layer and a COC layer is weak such that the COC layer "**more or less easily delaminates** or can be peeled off from the neighboring LDPE layer." EX2019 ¶ 10.

Accordingly, Petitioner has previously indicated to the Office that the .65 mil LDPE layer is a polyolefin **bulk layer** that is included between the EAA and COC layer to provide **bulk mechanical** properties and to enable the multilayer structure **to be created** (see EX2022 ¶¶ 67–72) **in spite of** the .65 mil LDPE layer's poor secondary tying functionality. See *id.* ¶¶ 73–76. Thus, consistent with Patent Owner's positions, Petitioner's own representations to the Office provide further evidence establishing the .65 mil LDPE layer is primarily serving as a bulk layer.

b) In other proceedings before the Office, Petitioner has submitted laboratory testing showing that a regular LDPE layer "easily delaminates" from a neighboring COC layer, confirming that Riis's .65 mil LDPE layer does not serve as a tie layer or a layer of a multi-layer tie layer under Petitioner's own tie layer definition.

Patent Owner and Petitioner agree that a tie layer should provide sufficient adhesion between adjacent layers. Dr. Spontak recently confirmed his understanding of a tie layer as follows: "the definition of [a] tie layer is to enable

adhesion and to mitigate delamination." EX2021, 183:23–189:4.

Dr. Spontak has taken the position that the .17 mil EAA layer and the .65 mil LDPE layer together form a tie layer and that, at an individual level, both of these layers are tie layers. *Id.*, 191:11–192:6. According to Dr. Spontak, the .65 mil LDPE layer is a tie layer since it "***is needed for good adhesion to the COC layer, the contact layer.***" *Id.*, 191:15–20; *see also id.*, 207:12–17 (Dr. Spontak agreeing that the .65 mil LDPE layer should not easily delaminate or peel off from the COC layer); *Id.*, 203:14–19 (Dr Spontak stating: "I would be very surprised if [the .65 mil LDPE layer and .43 mil COC layer] didn't have substantial adhesion").

However, Petitioner's own inventor, Manuella Herb, has submitted that the bond between a regular LDPE layer and a COC layer (as disclosed in Riis) is weak such that the COC layer "***more or less easily delaminates*** or can be peeled off from the neighboring LDPE layer." EX2019 ¶ 10. Manuella supported this position with claims that laboratory testing shows that "the bond between a regular LDPE layer and a [connected] COC layer" within a laminate structure including "aluminum/ethylene acrylic acid [(EAA)] copolymer/ LDPE/ COC⁷ has a strength per length of 0.5 N per 15 mm." *Id.*

Accordingly, in other proceedings before the Office, Petitioner has itself provided evidence establishing that the .65 mil LDPE layer fails to serve

⁷ The same layer combination as Riis's Example 5.

Petitioner's stated purpose of a tie layer: *providing good adhesion to the COC layer*. Thus, under Petitioner's expert's own definition, the .65 mil LDPE layer is neither a tie layer nor a layer of a multi-layer tie layer. See EX2022 ¶¶ 73–77.

As such, the .65 mil LDPE layer primarily serves as a bulk layer and does not serve as a tie layer. See *id.* ¶¶ 78, 79.

2. Riis's sealant film, which has a coextrusion layer including (1) a .17 mil EAA single-layer tie layer, (2) a .65 mil LDPE bulk layer, and (3) a .43 mil COC contact layer fails to disclose, teach, or suggest a "coextrusion layer consisting of [(1) a] tie layer [comprising a first layer and a second layer] and [(2) a] contact layer," as recited in Claim 14.

In addition to the .65 mil LDPE layer primarily serving as a bulk layer and not serving as a tie layer, Riis's disclosure **explicitly** discourages the use of multi-layer tie layers for multi-layer films created according to Riis (EX1004 ¶ [0071]), further evidencing that tie layers in multi-layer films disclosed in accordance with Riis's invention (such as Riis's Film) are single-layer tie layers. See EX2022 ¶¶ 62–65. Accordingly, the coextrusion layer forming the sealant film of Riis's Film includes a .17 mil **single-layer** tie layer (of EAA), a .65 mil single-layer bulk layer (of LDPE), and a .43 mil single-layer contact layer (of COC) and, thus, fails to disclose the above-referenced feature in Claim 14.

3. Riis's single-layer tie layer (i.e., Riis's .17 mil EAA layer) having a loading of ~4.0 g/m² fails to disclose, teach, or suggest "[a] tie layer, or each of [a] first layer of the tie layer and the second layer of the tie layer, ha[ving] a loading in the range of 7 to 20 g/m²," as recited in Claim 14.

As noted *supra* § I.A.2, Riis's Film discloses a single-layer tie layer

(consisting of the .17 mil EAA layer). It therefore follows that Riis's single-layer tie layer fails to disclose, teach, or suggest that "each of [a] first layer of [a] tie layer and the second layer of the tie layer[] has a loading in the range of 7 to 20 g/m²," as recited in Claim 14. See EX2022 ¶ 80.

Also, according to Petitioner's calculations, the .17 mil EAA layer (and, thus, Riis's single-layer tie layer) has a loading range of 3.94 g/m² to 4.15 g/m² (*Id.* ¶ 83), which fails to disclose, teach, or suggest "[a] tie layer . . . [having] a loading in the range of 7 to 20 g/m²," as recited in Claim 14. Moreover, a POSITA would be discouraged from increasing the .17 mil EAA layer's thickness since a POSITA would expect doing so would compromise the delamination strength of Riis's Film. See *id.* ¶ 84. Here, the .17 mil EAA layer's thickness would need to nearly double to meet the loading range claimed in Claim 14.

4. Riis, in view of Wypych, fails to disclose, teach, or suggest the above-referenced features or the additional distinguishing features of Claims 15 and 20–24.

Wypych is simply used to provide material properties for Riis's Film. Petition, p. 80. Thus, Riis, in view of Wypych, similarly fails to disclose, teach, or suggest this feature. Claims 15 and 20–23 at least depend on Claim 14 and recite additional distinguishing features over Riis in view of Wypych. Claim 24 recites similar subject matter as Claim 14. Thus, Riis, in view of Wypych, similarly fails to disclose, teach, or suggest Claims 15 and 20–24.

B. Riis, Wypych, and Holzmuller fail to render Claims 16–18 obvious.

1. Riis, in view of Wypych, fails to render Claims 16–18 obvious.

a) Assuming, arguendo, Riis, in view of Wypych, includes a multi-layer tie layer, the ~4.0 g/m² loading of Riis's .17 mil EAA layer and the ~15.2 g/m² loading of Riis's .65 mil LDPE layer fails to disclose, teach, or suggest the tie layer loading ranges in Claims 16–18.

According to Petitioner's calculations, Riis's .17 mil EAA layer has a loading range of 3.94 g/m² to 4.15 g/m² (EX2022 ¶ 83), which fails to disclose a loading "in the range of 5 to 19 g/m²," as recited in Claim 16, or a loading "in the range of 7 to 20 g/m²,"⁸ as recited in Claim 17.⁹ And Riis's .65 mil LDPE layer has a loading range of 15.11 g/m² to 15.34 g/m² (*id.*), which fails to disclose a loading "in the range of 1 to 14 g/m²," as recited in Claims 16 and 17.¹⁰

As noted supra § I.A.3, a POSITA would be discouraged from increasing the .17 mil EAA layer's thickness since a POSITA would expect doing so would compromise the delamination strength of Riis's Film. Also, a POSITA would be discouraged from decreasing the .65 mil LDPE layer's thickness to meet the claimed loading ranges since a POSITA would expect doing so would compromise the structure, heat sealability, and barrier properties of Riis's Film. See *id.* ¶ 85.

b) In other proceedings before the Office, Petitioner has asserted that similar loading ranges and relative loading ranges claimed by Petitioner are simply not in Osborn, confirming that Riis does not disclose, teach or suggest the tie layer loading ranges in Claims 16–18.

⁸ Here, the .17 mil EAA layer's thickness needs to nearly double. EX2022 ¶ 88.

⁹ Petitioner acknowledges the same. Opposition, 7, 10.

¹⁰ Petitioner acknowledges the same. Opposition, 7, 10.

In fact, in other proceedings before the Office, Petitioner has taken positions consistent with Patent Owner's position that Riis does not disclose, teach, or suggest the tie layer loading ranges in Claims 16–18. Specifically, in the Second FOA Response (while addressing the layer thicknesses claimed in Petitioner's US App. 16/516,792), Petitioner stated "[t]he Examiner does not, and cannot, point out any clear teaching or suggestion of the claimed thickness layer ranges¹¹ in the Osborn reference . . . ***because such teaching is not there.***" EX2006, 13. Petitioner continued, "assuming *arguendo* that the extrapolation from Osborn leads to the [] layer thicknesses . . . instantly claimed, there is ***simply no teaching or suggestion in Osborn*** . . . [of] the claimed relative thicknesses¹² in present claims (58–62)." *Id.*

Accordingly, Riis (alone or in view of Wypych and/or a POSITA's knowledge) fails to disclose, teach, or suggest the tie layer loading ranges in Claims 16–18. See EX2022 ¶¶ 89–94. Petitioner does not assert otherwise, instead relying on the combination with Holzmuller.

2. Holzmuller fails to cure the deficiencies of Riis in view of Wypych.

a) Petitioner's combination of Riis and Wypych with Holzmuller fails because it hinges on Riis's .65 mil LDPE layer being a tie layer.

¹¹ Claim 58 recited a film having an acrylic acid-containing joining layer, a polyethylene layer, and a COC layer, each having "layer thickness[es] in the range from about 7 μm [.28 mils] to about 15 μm [.59 mils]." EX2006, 6. (i.e., EAA and LDPE loadings from ~6.5 g/m² to ~13.8 g/m² (EX2022 ¶ 90).)

¹² Claim 58 also recited "the thickness values of [the acrylic acid-containing, the polyethylene, and the COC] layers . . . differ by no more than 15%." EX2006, 6.

Petitioner alleges that the intermediate bonding layers in Holzmuller are tie layers. EX1038 ¶ 103 (Dr. Spontak stating "Holzmuller teaches relative interacting thickness for intermediate bonding layers (i.e., tie layers)"). Petitioner further alleges that "a skilled artisan [would be motivated] to tailor and optimize the thicknesses, and thus the loadings, of the intermediate bonding layers as applied to Riis's LDPE and EAA tie layers." *Id.* ¶ 99. As such, Petitioner's combination of Riis and Holzmuller relies on the .65 mil LDPE layer being a tie layer to have compatibility with the intermediate bonding layers in Holzmuller. See EX2022 ¶¶ 95–101.

Accordingly, Petitioner's above reasoning betrays one reason for Petitioner's adamancy (in spite of compelling contradictory evidence) that the .65 mil LDPE layer is a tie layer: Petitioner understands the combination of Riis with Holzmuller fails if the .65 mil LDPE layer is not a tie layer.

b) Petitioner's combination of Riis and Wypych with Holzmuller fails because a POSITA would not be motivated to modify or combine Riis with Holzmuller.

In addition to Patent Owner's explanation in its RMTA explaining that the polymeric, structural, and functional differences between Riis's Film and the film structure disclosed in Holzmuller would undermine a motivation to modify or combine Riis with Holzmuller, Patent Owner notes that Petitioner takes a backwards approach to experimenting with Riis to achieve the film in Claims

16–18. *See* EX2022 ¶ 103. Specifically, Petitioner treats Riis's Film as a starting point for a POSITA to experiment with the thicknesses of the layers disclosed in Riis to meet the claimed loading ranges. *Id.* However, Riis's Film, itself, represents an end point of experimentation. *Id.* Thus, contrary to Petitioner's approach, a POSITA modifying Riis's Film would not begin experimentation anew with Riis's Film, haphazardly modifying thicknesses in view of Holzmuller's thickness ranges, but would instead make only minor changes that maintain the character (e.g., the structure, relative thicknesses, etc.) of Riis's Film. *Id.*

c) Petitioner's combination of Riis and Wypych with Holzmuller fails because a POSITA would not have a reasonable expectation of success in modifying or combining Riis with Holzmuller.

In addition to Patent Owner's explanation in its RMTA explaining that the polymeric, structural, and functional differences between Riis's Film and the film structure disclosed in Holzmuller would undermine a motivation to modify or combine Riis's Film with Holzmuller, Patent Owner notes that a POSITA would not have a reasonable expectation of success in modifying or combining Riis's Film with Holzmuller.

To support an expectation of success in applying the loading ranges to the EAA layer and the LDPE layer in Riis, Petitioner states that "Holzmuller teaches relative interacting thickness for intermediate bonding layers (*i.e., tie layers*) that result in synergistic effects of the overall film." Opposition, 13. However,

Holzmuller does not provide that modifying *the thicknesses* of bonding layers results in synergistic effects. Instead, Holzmuller alleges "it is possible to combine *materials* the positive properties of which have an additive effect and . . . offer an intermediate layer material . . . [with] high mechanical . . . [and] chemical stability." EX1034 ¶ [0020]. That is, Holzmuller provides that polymer materials may be blended to form intermediate bonding layers having high mechanical and chemical stability. See EX2022 ¶¶ 109–114.

To further support the reasonable expectation of success, Petitioner glosses over the different film manufacturing processes disclosed in Riis and Holzmuller and provides no explanation why the layer thicknesses "achievable" for the intermediate bonding layers in Holzmuller can similarly be achieved for the .17 mil EAA and .65 mil LDPE layer in Riis. Opposition, 13. Indeed, Petitioner provides no reasons supporting the position (and a POSITA would not expect) that layer thicknesses achieved for the intermediate bonding layers in Holzmuller using joint extrusion techniques can simply be applied to the .17 mil EAA and .65 mil LDPE layer in Riis formed using three-layer coextrusion techniques. See EX2022 ¶¶ 35–37, 104–108.

Accordingly, Riis, in view of Wypych and Holzmuller, fails to render the tie layer loading ranges in Claims 16–18 obvious.

3. The laboratory testing submitted by Petitioner in other proceedings before the Office provides further evidence of criticality of the tie layer loading

ranges in Claims 16–18.

Consistent with the position that it would have been unexpected to achieve a film including a coextrusion layer having a tie layer (such as a multi-layer tie layer having an EAA layer and a polyethylene layer) and a COC contact layer with the low loadings obtained in the '624 Patent, while maintaining mechanical and chemical robustness, Petitioner has submitted to the Office, in another proceeding, laboratory testing claiming that (as late as July 24, 2018) it would have been unexpected for a film structure like Riis's Film (i.e., including a coextrusion layer of ethylene acrylic acid [(EAA)] copolymer/LDPE/COC coated to an aluminum layer) to exhibit mechanical robustness. *See* EX2022 ¶¶ 119–122.

Accordingly, even modified or combined with Wypych and Holzmuller, Riis fails to render the tie layer loading ranges in Claims 16–18 obvious.

II. PETITIONER'S SOLE CHALLENGE TO THE RMTA IS ON § 103 GROUNDS.

Petitioner does not challenge the sufficiency of Patent Owner's RMTA on any procedural or substantive grounds other than the 35 U.S.C. 103 grounds.

III. CONCLUSION

Patent Owner requests the Board grant Patent Owner's RMTA and, if the '624 Patent claims are found unpatentable, find the substitute claims patentable.

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On: March 26, 2024

For: Patent Owner

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CERTIFICATE OF SERVICE

I, Steven A. Avena, hereby certify that a copy of the foregoing has been served on the attorneys of record of Huhtamaki Flexible Packaging Germany GmbH & Co. KG ("Petitioner") electronically by email¹ as of today, March 26, 2024, at the following electronic addresses:

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¹ Petitioner has consented to electronic service by email. See Petition, § II.D.