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Datasheet for the decision of 28 November 2023

Case Number: T 0622/21 - 3.3.06

Application Number: 13198650.7

Publication Number: 2886338

IPC: B32B27/32

Language of the proceedings: EN

Title of invention:
Extrusion coating of low density polyethylene and heat-sealed article made therefrom

Patent Proprietor:
Borealis AG

Opponent:
THE DOW CHEMICAL COMPANY

Headword:
Heat-sealed LDPE surface/BOREALIS

Relevant legal provisions:
EPC Art. 54
RPBA 2020 Art. 12(4), 12(6)

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It can be changed at any time and without notice

Keyword:
Novelty (main request and auxiliary request 1) - (no)
Admittance into the proceedings of auxiliary request 5 filed with the grounds of appeal - (no)

Decisions cited:

Catchword:

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Case Number: T 0622/21 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 28 November 2023

Appellant: (Patent Proprietor)	Borealis AG Trabrennstrasse 6-8 1020 Vienna (AT)
Representative:	Maiwald GmbH Elisenhof Elisenstraße 3 80335 München (DE)
Respondent: (Opponent)	THE DOW CHEMICAL COMPANY 2030 Dow Center Midland, Michigan 48674 (US)
Representative:	V.O. P.O. Box 87930 Carnegieplein 5 2508 DH Den Haag (NL)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 15 March 2021 revoking European patent No. 2886338 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	J.-M. Schwaller
Members:	L. Li Voti
	C. Heath

Summary of Facts and Submissions

I. The patent proprietor's appeal is against the decision of the opposition division to revoke European patent no. 2 886 338.

II. In its grounds of appeal the appellant defended the patent in the version as filed on 22 January 2021 and submitted new auxiliary request 5 as well as document **D32** (Declaration by A. Nummila-Pakarinen, dated 1 June 2016).

III. In its reply the opponent/respondent argued that the claimed subject-matter lacked novelty in view of the English translation **D22b** of document **D22** (JP 2010-95265 A). Moreover, it filed documents **D34** (Wiley Encyclopedia of Packaging Technology, 3rd ed. by K.L. Yam, 2009, pages 1089-1096), **D35** (Declaration by T.S. Peltier dated 30 November 2021) and **D38** (Declaration on NUC 8007 LDPE Stability from 2012 to 2021 by T. Plumley Karjala dated 4 December 2021), and requested that auxiliary request 5 not be admitted into the appeal proceedings.

IV. The following documents were also held relevant by the parties:

D2a: English translation of D2: "The Material Guidebook for Converting 2004", Converting Technical Institute 2003, pages 272-275;
D3: Declaration by Y. Maehara of 18 April 2018;
D5a: LDPE NUC-8007 resin analysis attached to **D5**: email by J. Wang dated 11 May 2012;
D6: Declaration on NUC-8007 by T. Plumlej Karjala dated 15 November 2018;

D13: "Troubleshooting Extrusion Coating" by Dow Plastics, 1995;
D23: Declaration by K. Kogure dated 17 January 2020;
D26: GC-MS and LC Analysis of NUC-8007 LDPE for Presence of Additives by P. Shimeall, dated 30 January 2020;
D27: B.H. Gregory, Extrusion Coating a Process Manual 2005, pages 73-75.

V. None of the parties replied in substance to the board's preliminary opinion.

VI. At the oral proceedings held on 28 November 2023, the appellant withdrew auxiliary requests 2 to 4 and the final requests of the parties were as follows:

The appellant requested that the decision under appeal be set aside and the case be remitted to the opposition division for further prosecution on the basis of the claims according to the main request filed on 22 January 2021 during oral proceedings, or as an auxiliary measure, of the claims of auxiliary request 1 filed on 22 January 2021, or of auxiliary request 5 filed with the grounds of appeal.

The respondent requested that the appeal be dismissed or, as an auxiliary measure, that the case be remitted to the opposition division for further prosecution. Further it requested that auxiliary request 5 not be admitted into the appeal proceedings.

VII. Claim 1 of the main and first auxiliary requests reads as follows:

"*1. Use of a at least a part of a polymer layer comprising a composition (Co), the composition comprising a low density homopolymer of ethylene (LDPE homopolymer) produced in a tubular reactor which composition is free of additives as a thermoplastic surface of an extrusion coated structure comprising the polymer layer and a first substrate for preparing heat-sealed articles by heat-sealing of said thermoplastic surface with a second substrate, wherein the polymer layer does not comprise any additives,*
wherein the low density homopolymer of ethylene (LDPE homopolymer) produced in a tubular reactor is having
- a melt flow rate (MFR) according to ISO 1133 (190°C, 2.16 kg) higher than 3.0 g/10 min;
- a molecular weight distribution Mw/Mn which is greater than 10; and
- a vinylidene content which is at least 15/100k C."

Claim 1 of auxiliary request 5 differs therefrom in that it additionally requires that "*heat-sealing is done by applying heat to the surfaces to be joined to soften or melt them while applying pressure to the place where they need to be joined*".

Reasons for the Decision

Main request and auxiliary request 1 - Novelty

1. Claim 1 of these requests relates to the use of at least part of a polymer layer comprising a composition as a thermoplastic surface of an extrusion coated structure comprising the polymer layer and a first substrate for preparing heat-sealed articles by heat-sealing of said thermoplastic surface with a second substrate, wherein said composition comprises a low density polyethylene (**LDPE**) homopolymer produced in a

tubular reactor having a melt flow rate according to ISO 1133 (190°C, 2.16 kg) (**MFR**) higher than 3.0 g/10 min, a molecular weight distribution **Mw/Mn** which is greater than 10, and a vinylidene content (**VDC**) which is at least 15/100kC, and wherein said composition and said polymer layer are free of additives.

1.1 The appellant argued in writing that D22b and D23 (cited to support its novelty objection based on D22b), both filed during opposition proceedings, should not be considered since the opposition division did not correctly apply its discretionary power to admit late-filed documents.

The board notes that D22b and D23 were admitted because of their prima facie high relevance (see pages 8-9 of the decision under appeal) as regards novelty of the claimed subject-matter, and so the opposition division correctly exercised its discretionary power to admit late-filed documents. The documents are therefore in the proceedings.

1.2 As regards the admittance of the additional documents mentioned below in the discussion of novelty, the board notes that this issue was no longer disputed by the parties so that the board has no reason to diverge from its preliminary opinion of 28 April 2023 (points 2.2, 3.1 and 3.2) that they have to be considered either.

2. As regards the novelty of claim 1 at issue, for the reasons following, the board finds that D22b/example 3 discloses directly and unambiguously a use having all the features of claim 1.

2.1 Example 3 of D22b (paragraphs [0040]-[0044]) relates to a container for instant noodles consisting of a barrel

2, a bottom 3 and a lid 4, the container being made by forming the barrel 2 (from the extrusion coated laminate of figure 7 comprising paper as outer layer, LDPE as adhesive layer, HDPE (high density polyethylene) as barrier layer and LDPE as innermost layer) into a blank of annular sector shape having both ends bonded together, bonding bottom 3 (being the extrusion coated laminate of figure 3 made of paper as outer layer and LDPE as innermost layer) to one end of the barrel 2 and thereafter bonding the lid 4 to the other end of barrel 2. The description (paragraphs [0045]-[0052]) further describes the experiments made on container 1 formed according to example 3.

2.2 The container thus corresponds to the one represented in figure 1 and described in paragraph [0029], in which a portion of the innermost LDPE layer of the bottom, representing at least a part of a polymer layer comprising a composition as a thermoplastic surface of an extrusion coated structure comprising the polymer layer and a first substrate as required by claim 1 at issue, is bonded to a portion of the innermost LDPE layer of the barrel and thus to a second substrate for preparing container 1.

2.3 As taught in D22b (paragraph [0052]), since both the barrel 2 and the bottom 3 have a polyethylene resin layer as innermost layer, bonding is enabled at a relatively low bonding temperature.

In the appellant's view this paragraph would not relate to the bonding of the two innermost layers with each other, but to the temperature applied during extrusion coating in the preparation of the laminates used as barrel and bottom, respectively, which both comprise the same type of innermost layer. In its view this was

confirmed by the following paragraph [0053] which taught that the use of the LDPE as adhesive layer in the barrel laminate (prepared by extrusion coating) enables bonding at a relatively low bonding temperature, "as in the above".

However, in the board's view, the skilled person reading these two paragraphs with common sense would understand that they relate to different steps of the article preparation, with the first paragraph relating to the innermost layers **only** and thus to the step of bonding the bottom to the barrel described in paragraph [0044] of example 3, whilst the second paragraph relating only to the adhesive layer of the barrel laminate concerns the barrel preparation described in paragraph [0041] of the same example, wherein the barrel is made by extrusion coating and pressure bonding the adhesive layer between the paper and the HDPE layers, the wording "as in the above" just underlining that in both cases a lower temperature as usual may be applied to achieve bonding.

This conclusion is confirmed by paragraph [0025], similar to [0052], which also explicitly relates to both innermost layers and **their capacity** of bonding at a relatively low bonding temperature.

2.3.1 Since it is common general knowledge (D34, page 1089, left column) that the achievement of a heat-seal requires heat (energy), time and pressure, the step of bonding the innermost thermoplastic layers with each other described in D22b by bringing them into contact with each other (thus using pressure) and elevating the temperature complies necessarily, in the board's view, with all the characteristics of a heat sealing step as commonly known.

This conclusion is further supported by the general teaching described in paragraphs [0051] and [0002] of D22b relating to the improvement of conventional paper containers already containing **inner polyethylene heat sealant layers** without using a metallic foil.

The board thus cannot agree with appellant's argument that, as suggested in declaration D32 (point 11), the bonding discussed in D22b might also be understood as requiring the use of a glue, an embodiment not foreseen at all in D22b, and which **only** discloses the use of an adhesive layer in the preparation of the barrel laminate, but not for bonding the innermost layers of barrel and bottom to each other.

2.3.2 The board concludes from the above that D22b directly and unambiguously discloses that the innermost layers of barrel and bottom are bonded by heat-sealing.

2.4 The appellant further argued that the term "heat-sealing" in claim 1 should be restrictively interpreted as defined in paragraph [0007] of the description, namely as a step done "*by applying heat to the surfaces to be joined or melt them* ***while*** *applying some pressure to the place where they need to be joined*", for example by contacting the surfaces opposite those to be joined with a hot object like a hot bar, as this type of sealing is also a well-known heat sealing method (see D34: page 1090), which method is however not applicable to the bonding of the bottom and barrel defined in D22b. The heat-sealing method of claim 1 also excludes heat-sealing steps like hot air sealing, applicable to the articles of D22b as stated in D32 (paragraph 11), wherein the source of energy (hot air) is applied to the surfaces to be bonded and removed **before** pressing them together (see D34, page 1090, Table 1).

2.4.1 The board notes that claim 1 at issue does not at all contain any limitation regarding the type of heat-sealing step to be used, thus leading the skilled person to include every known heat-sealing method and not only one wherein the surfaces opposite those to be joined are contacted by a hot object, like in hot bar sealing. Therefore, also the appellant's argument that D22b does not specify which particular industrial heat-sealing method is used, is not relevant for the evaluation of novelty.

Moreover, as explained below (point 5.2), the cited wording of paragraph [0007] does not clearly limit the type of heat-sealing method used, as also suggested by the description (paragraphs [0075]-[0076]), which teaches that heating of the areas to be sealed is done (generically) by thermal conduction from a hotter material, e.g. sealing bar(s) or roller(s), microwave heating, dielectric heating, ultrasonic, etc. (thus including an unlimited number of known heat-sealing methods) and that heating may also occur **before** or simultaneous with the application of pressure, with hot air sealing being thus not excluded.

It follows from the above considerations that claim 1 at issue cannot be seen as being limited to any heat-sealing method as suggested by the appellant.

2.5 The board thus concludes that D22b discloses the use of at least part of a polymer layer (namely the innermost NUC8007 LDPE layer of bottom 3) as a thermoplastic surface of an extrusion coated structure comprising the polymer layer and a first substrate (paper of bottom 3) for preparing heat-sealed articles (paper container 1) by heat-sealing said thermoplastic surface with a

second substrate (extrusion coated structure of barrel 2), as required by claim 1 at issue.

2.6 As regards the features of the LDPE used as innermost layer in the bottom 3 of D22b, the board has no reason to diverge from its provisional opinion, which was uncontested by the parties.

As stated in example 3, the laminates constituting the barrel 2 and the bottom 3 have as innermost layer an LDPE with brand name NUC8007.

Even though D22b, published in April 2010, does not disclose the intrinsic characteristics of LDPE NUC8007, D6 discloses that a sample of this LDPE commercial product was analysed in 2012 and found to comply with all the requirements of claim 1 at issue. The validity of this analysis has been confirmed by D35, a declaration explaining how the tested samples were stored. Moreover, even though different batches of the same product may admittedly have varied properties over the years, there is no reason to assume that the product of D22b (dated 2008), having the same brand name and being produced and commercialised by the same firm as the product tested in D6, may present substantially diverging characteristics. In particular, since the MFR tested in D6 is 6.3 g/10 min (that reported in D2a, an older disclosure of the same polymer brand as well as in D3, a document relating to the same sample tested in D6 and D5a, relating to an analysis of the same polymer brand in 2012, being also similar), it is not credible that the polymer used in D22b could have an MFR not higher than 3.0 g/10 min; similarly, it is not credible that its Mw/Mn (measured by the absolute method) could not be greater than 10 since that tested in D6 is of 17 (and that reported in

D5a is similar), nor that the VDC could not be at least 15/100k C since that of D6 is 32.4 (as confirmed in D38). Furthermore, D2a, D3 and D5a confirm that this kind of polymer is produced in a tubular reactor whilst D23 and D26 confirm, respectively, that this polymer brand and in particular the sample tested in D6 does not contain additives.

2.6.1 Even though the above discussed LDPE is known as not containing additives, the appellant argued that during extrusion coating of the laminate used as barrel 2 in D22b, the additives contained in the HDPE layer would not only migrate to the boundary with the adjacent LDPE innermost layer but would also migrate, at least during heat-sealing, through the LDPE innermost layer and reach the LDPE innermost layer of the bottom so that the latter would no longer be free of additives as required by claim 1 at issue.

The board notes however that, even though the problem of additives migration during extrusion coating was known (see for example D27, chapter 5.1, page 74 and D13, page 7, middle column, first five lines), it only concerns the migration **to the boundary layer**, which in this case is limited to the boundary layer between the HDPE layer and the innermost LDPE layer of the barrel, with a more extensive additives migration throughout the entire LDPE innermost layer and into the innermost layer of the bottom, as alleged by the appellant, being not supported by any evidence.

Moreover the bottom 3 of D22b containing only paper and the LDPE NUC8007 layer and being heat-sealed to the barrel, does not contain any additive either. Hence, also a hypothetical additive migration from the barrel as supposed by the appellant would be irrelevant for

the establishment of novelty over the use claim 1, which anyway does not concern what may occur after the relevant layers are heat-sealed.

3. The board thus concludes that the LDPE used as innermost layer in the bottom 3 of D22b has all the features required by claim 1 at issue, with the consequence that example 3 of D22b discloses a use having directly and unambiguously all the features of this claim, which thus lacks novelty under Article 54(1) EPC. The main request is thus not allowable.

Admittance of auxiliary request 5

4. This request having been filed with the grounds of appeal, its admittance into the appeal proceedings is subject to the board's discretion to be exercised as exposed in Article 12(4) RPBA 2020 in view of, inter alia, the complexity of the amendments, their suitability to address the issues which led to the decision under appeal, and the need for procedural economy. Moreover, as provided by Article 12(6) RPBA 2020, the board shall not admit requests which should have been submitted in the proceedings leading to the decision under appeal, unless the circumstances of the appeal case justify their admittance.

4.1 As stated in writing by the appellant, this new request was filed in response to the finding in the contested decision that the then pending auxiliary request 5, filed and discussed at the oral proceedings, prima facie lacked clarity and was therefore not admitted into the opposition proceedings. Presumably in order to address this clarity issue, in the new request the wording "*some pressure*" contained in said previously

filed auxiliary request 5 has been replaced by the term "*pressure*".

4.2 The board notes from the minutes of the oral proceedings (pages 7 and 8) that the proprietor, in spite of having been informed that said auxiliary request 5 was not admitted because of the lack of clarity of the term "*some pressure*", did not attempt to file a new request overcoming this objection but relied on the other auxiliary requests 6 to 10 then on file. There is thus no apparent reason why the proprietor, if it really wished to rely on a request similar to said auxiliary request 5, could not have tried in oral proceedings to correct the term "*some pressure*" with "*pressure*" as a straightforward amendment for the previous wording found unallowable by the opposition division.

4.2.1 The fact that the proceedings were held by ViCo and that the representative had apparently difficulties in communicating with the technical expert is not a convincing excuse, since the technical expert could have been contacted by other means, for example by phone. Also the fact that the opposition division reversed its preliminary opinion on novelty during oral proceedings cannot be seen as an excuse, since the novelty objection had been raised by the opponent well in advance to the oral proceedings.

Therefore, in the board's view, the proprietor **could and should** have filed an amended version of auxiliary request 5 already before the opposition division, so that there are no circumstances justifying its admission into the appeal proceedings.

4.3 By the way, the board finds that the wording "*heat sealing is done by applying heat to the surfaces to be joined to soften or melt them while applying pressure to the place where they need to be joined*", added to claim 1 without specifying the point in time when the surfaces are joined in relation to the application of heat and pressure, does not clearly identify the heat-sealing method to be applied. In fact, the above wording might be interpreted as requiring that pressure at the intended junction place is applied at the same time of heating to soften or melt the surfaces and joining them **or** at the same time of heating to soften or melt the surfaces, but before they are joined **or** after heating to soften and melt the surfaces but at the time of joining them as softening and melting of the surfaces still proceeds after removal of the source of heat.

Therefore, as stated by the respondent, the amended wording can only be considered to merely define how heat-sealing is carried out in general and is nothing more than what a skilled person would understand as a definition of heat-sealing. For this reason it is the board's view that the amended wording **does not prima facie distinguish** the claimed subject-matter from that disclosed in D22b and is not suitable to address the issues which led to the decision under appeal.

4.4 For the above reasons the board has decided not to admit auxiliary request 5 into the proceedings under Article 12(4) and (6) RPBA 2020.

5. It follows from the above considerations that none of the appellant's requests succeeds.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

A. Pinna J.-M. Schwaller

Decision electronically authenticated