

**Internal distribution code:**

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

**Datasheet for the decision  
of 16 December 2022**

**Case Number:** T 2411/19 - 3.3.03

**Application Number:** 10702954.8

**Publication Number:** 2384351

**IPC:** C08L23/04, C08L23/06,  
C08L23/08, C08F2/00,  
C08F297/08, B65D41/00

**Language of the proceedings:** EN

**Title of invention:**

HIGH-DENSITY POLYETHYLENE COMPOSITIONS, METHOD OF PRODUCING  
THE SAME, CLOSURE DEVICES MADE THEREFROM, AND METHOD OF MAKING  
SUCH CLOSURE DEVICES

**Patent Proprietor:**

Dow Global Technologies LLC

**Opponent:**

TotalEnergies OneTech Belgium

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

Inventive step - closest prior art - implicit disclosure (no)  
Inventive step - main request (yes)

**Decisions cited:**

G 0002/10, G 0001/16



**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 2411/19 - 3.3.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.03**  
**of 16 December 2022**

**Appellant:** Dow Global Technologies LLC  
(Patent Proprietor) 2040 Dow Center  
Midland, MI 48674 (US)

**Representative:** Boulton Wade Tennant LLP  
Salisbury Square House  
8 Salisbury Square  
London EC4Y 8AP (GB)

**Respondent:** TotalEnergies OneTech Belgium  
(Opponent) Zone Industrielle C  
7181 Senefte (BE)

**Representative:** Garcia Martin, Margarita  
TotalEnergies OneTech Belgium  
Patent Department  
Zone Industrielle C  
7181 Senefte (Feluy) (BE)

**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 11 July 2019  
revoking European patent No. 2384351 pursuant to  
Article 101(3) (b) EPC.**

**Composition of the Board:**

**Chairman** D. Semino  
**Members:** M. Barrère  
A. Bacchin

## Summary of Facts and Submissions

I. The appeal of the patent proprietor lies against the decision of the opposition division revoking European patent number 2 384 351.

II. The following document was, amongst others, cited in the opposition division's decision:

F5: WO 2008/136849 A1

III. In that decision the opposition division held, *inter alia*, that:

- F5 was the closest prior art for the subject-matter of claim 1 of the main request, the composition of example 2 comprising a green colourant coming structurally closest to the composition of claim 1. Claim 1 differed from that green coloured composition in that the high-density polyethylene (HDPE) composition was characterised by:

(i) a density in the range of 0.950 to 0.960 g/cm<sup>3</sup> and

(ii) a melt index (I<sub>2</sub>) in the range of from 2 to 10 g/10 minutes

and the low molecular weight ethylene polymer of the composition had:

(iii) a density in the range of 0.960 to 0.975 g/cm<sup>3</sup>.

The problem to be solved was the provision of a HDPE composition, suitable for closure devices like bottle caps, having improved processability. The distinguishing features (i) to (iii) were suggested by F5. Therefore claim 1 of the main request lacked an inventive step over F5.

- IV. The patent proprietor (appellant) lodged an appeal against said decision. With the statement of grounds of appeal the appellant filed a main request (corresponding to the main request dealt with in the contested decision) as well as auxiliary requests 1 to 23.

Moreover the following documents were filed by the appellant:

F10: Environmental Stress Crack Resistance of Polyethylene, Ineos, May 2008 (submitted with the statement of grounds of appeal)

F13: A. Shebani, MSc thesis, "The correlation of the molecular structure of polyolefins with environmental stress cracking resistance", December 2006, cover page and pages 30 to 32 (submitted with letter of 3 July 2020)

- V. With the rejoinder to the statement of grounds of appeal, the opponent (respondent) filed the following documents:

F11: Declaration of Jean-Christophe Dewart dated 7 April 2020

F12: Brochure about Hyperform® HPN-20F, Milliken

VI. A communication under Article 15(1) RPBA 2020 was issued which contained the preliminary opinion of the Board.

VII. Oral proceedings were held before the Board on 16 December 2022.

VIII. The final requests of the parties were as follows:

(a) The appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request or any one of auxiliary requests 1 to 23, all filed with the statement of grounds of appeal.

(b) The respondent requested that the appeal be dismissed.

IX. Claim 1 of the main request read as follows:

"1. A high-density polyethylene composition comprising:

a first component comprising a high molecular weight ethylene alpha-olefin copolymer having a density in the range of 0.927 to 0.938 g/cm<sup>3</sup>, and a melt flow rate (I<sub>21</sub>) in the range of 4 to 10 g/10 minutes; and

a second component comprising a low molecular weight ethylene polymer having a density in the range of 0.960 to 0.975 g/cm<sup>3</sup>;

wherein said high-density polyethylene composition comprises 40 to 60 percent by weight of the first component, based on the total weight of the first

and second components, and has a melt index ( $I_2$ ) in the range of from 2 to 10 g/10 minutes, a density in the range of from 0.950 to 0.960 g/cm<sup>3</sup>, and a flow direction shrinkage to cross flow direction shrinkage ratio measured according to ISO 294-4 after 48 hours in the range of from 2 to 3.2, and an environmental stress crack resistance (ESCR) ( $F_{50}$ ) according to ASTM D-1693, condition B at 50°C., and using 10 percent Branched Octylphenoxy Poly(Ethyleneoxy) Ethanol, in the range of equal to or greater than 50 hours."

Auxiliary requests 1 to 23 are not relevant to this decision and their text is therefore not reproduced in the following.

- X. The appellant's submissions, in so far as they are pertinent to the present decision, may be derived from the reasons for the decision below. They were essentially as follows:

- (a) Main request

- (i) Inventive step

The subject-matter of claim 1 of the main request involved an inventive step over example 2 of F5.

- XI. The respondent's submissions, in so far as they are pertinent to the present decision, may be derived from the reasons for the decision below. They were essentially as follows:

- (a) Main request

- (i) Inventive step

The subject-matter of claim 1 of the main request did not involve an inventive step over example 2 of F5.

## **Reasons for the Decision**

### **Main request**

#### 1. Inventive step

##### 1.1 Closest prior art

The parties hold that the closest prior art for the subject-matter of claim 1 of the main request is to be selected within the disclosure of F5. The Board has no reason to depart from that view.

However, while the respondent considers that the green composition of example 2 is an appropriate starting point for assessing inventive step, the appellant holds that the skilled person would choose a composition without additive. In particular, the appellant argued that the skilled person, knowing that the shrinkage ratio and ESCR (environmental stress crack resistance) are to be measured on the composition not containing any pigment, would start from a "natural" high-density polyethylene composition (HDPE composition) not containing further components such as pigments (see F5, page 49, table).

The Board sees no reason why the skilled person would necessarily choose a composition without an additive as a starting point for further development.

Claim 1 of the main request does not specify whether the HDPE composition comprises additives or not. In



view of the wording "composition comprising", the presence of additives is not excluded. In fact, as pointed out by the appellant, paragraph [0027] of the opposed patent clearly states that the HDPE composition may include additives such as pigments. Thus, claim 1 covers compositions comprising additives and in particular pigments. Already for that reason, the Board considers that the green composition of example 2 is a realistic starting point to evaluate inventive step.

As to the question whether the shrinkage ratio and the ESCR are to be measured on a composition not containing further components such as pigments, the Board notes that claim 1 only specifies that the HDPE composition is characterised by said properties. Claim 1 does not mention whether the "composition" is pigment-free or not. As explained previously, the presence of additives (including pigment) is not excluded by the scope of claim 1. Hence, the Board has no reason to consider on the basis of claim 1 alone (which is considered to be clear by itself), that the shrinkage ratio and the ESCR should be measured on anything else than the entire composition. In fact, even the test methods described in paragraphs [0071] and [0086] of the patent make no mention of a pigment-free composition. In the examples of the opposed patent, the shrinkage is actually also measured on the coloured compositions (see table VI). Furthermore, in the examples of the patent, the limitation of the shrinkage ratio is understood as excluding the coloured compositions which do not meet this requirement.

For these reasons, the Board has no reason to depart from the opposition division's view that the green composition of example 2 of F5 is a suitable starting point to evaluate inventive step.

## 1.2 Distinguishing features

According to the contested decision, claim 1 of the main request differs from the green composition of example 2 (hereinafter the "green composition") in that:

- the HDPE composition is characterised by:

- (i) a density in the range of 0.950 to 0.960 g/cm<sup>3</sup> and
- (ii) a melt index (I2) in the range of from 2 to 10 g/10 minutes

and the low molecular weight ethylene polymer of the composition has:

- (iii) a density in the range of 0.960 to 0.975 g/cm<sup>3</sup>.

The distinguishing features (i), (ii) and (iii) are not disputed by the parties and the Board has no reason to deviate from that view.

However, the parties disagree on whether the ESCR of the green composition is at least 50 hours (and therefore on whether this parameter represents an additional distinguishing feature or not).

1.2.1 The appellant argues that the ESCR value can change when a pigment is added. Therefore it cannot be assumed that the ESCR of the green composition is identical or close to the ESCR of the "natural" composition. The appellant further points out that the exact composition of the green composition is not known.

1.2.2 In agreement with the opposition division, the respondent considers that the presence of a pigment has no significant effect on the ESCR of a HDPE composition. Therefore, as the ESCR of the unpigmented composition is 101,2 hours, it can be expected that the ESCR of the corresponding pigmented compositions is at least 50 hours.

1.2.3 As to the question whether the ESCR of the green composition is according to claim 1 or not, the Board cannot agree with the respondent's position for the following reasons:

According to established case law, a prerequisite for a finding that a claimed feature is disclosed in the prior art, which also applies in the context of inventive step is that the claimed subject-matter must be directly and unambiguously derivable from the prior art (see e.g. G 2/10, OJ EPO 2012, 376, reasons 4.6, G 1/16, OJ EPO 2018, A70, reasons 17). In other words, it has to be beyond doubt - not merely probable - that the claimed subject-matter was directly and unambiguously disclosed in a prior art document.

Therefore, starting from the information that the ESCR of the "natural" composition is 101.2 hours (see F5, page 46, table II, example 2), the question is not whether it is probable that the green composition derived therefrom is characterised by an ESCR of at least 50 hours but whether it is directly and unambiguously derivable from the disclosure of F5 that the level of at least 50 hours is maintained.

As noted by the appellant, the exact composition of the green material is not mentioned in F5. The nature of

the additives (which are undoubtedly present due to the green colour) is not disclosed. In fact, although the composition is said to be green, the composition of the colourant (pigment or dye) is not indicated. Even if a pigment has been used, F5 is silent about its nature (organic or inorganic). Since the exact composition of the additives present in the green composition is not known, the Board considers that it cannot be assumed that the ESCR of the green composition is as defined in claim 1.

The respondent relies on F11 (a declaration by Mr. Dewart) as evidence that pigments have no effect on the ESCR of polyethylene compositions. However, a declaration alone (without experimental data) is not sufficient to reach the level of proof which is required in this situation, all the more as the conclusion derived from the declaration is contested by the opposing party. The appellant submitted F13 to show that organic and inorganic pigments have opposite effects on the ESCR (see F13, page 32, table 2.4). However, the Board is not convinced that the teaching of F13 necessarily applies to HDPE compositions. Furthermore, F13 merely makes reference to other studies rather than providing direct experimental evidence. In any case, regardless of whether the facts alleged in F11 and F13 are convincing or not, it is again pointed out that the nature of the additive present in the green composition is not known. Hence, even if it were proven that certain pigments have no effect on the ESCR of a HDPE composition, it would still not be sufficient to provide evidence that the green composition which could contain any conceivable additive would also be clearly and unambiguously characterised by a value of the ESCR as defined in claim 1.

While it is acknowledged that an aim of F5 is to provide compositions with a good ESCR, it is also noted that F5 teaches that the ESCR (using 10% Igepal) should be preferably at least 10 hours (see F5, pages 10-11, bridging paragraph). Although it can be considered that the green composition of F5 should have a value of the ESCR of at least 10 hours, this is not sufficient to assume that the required level of at least 50 hours is necessarily reached for this composition.

The Board is therefore of the opinion that there is insufficient evidence on file to show that the ESCR of the green composition is identical or close to the ESCR of the natural composition. Therefore the ESCR is a further distinguishing feature between claim 1 and the green composition of example 2 (distinguishing feature (iv)).

### 1.3 Problem to be solved

According to the contested decision, the problem to be solved is the provision of a HDPE composition, suitable for closure devices like bottle caps, having improved processability.

The parties do not contest the definition of the problem to be solved and the Board has no reason to deviate from that view.

### 1.4 Obviousness

The respondent did not consider feature (iv) as a distinguishing feature, nor was this distinguishing feature addressed in the appealed decision. Hence the reasoning of the respondent leading to lack of

inventive step is incomplete and cannot convince already on this basis.

Notwithstanding the above, the decisive point for inventive step, is whether the skilled person had sufficient information based amongst others on the teaching of F5 to prepare compositions in accordance with claim 1, i.e. meeting not only feature (iv) but also the other features of claim 1 (including the distinguishing features (i), (ii) and (iii)). The respondent did not explain why arriving at the composition of claim 1 starting from the green composition would be obvious. The decision of the opposition division relies on general passages of F5. However, as exemplified in the table of page 49, F5 encompasses a large range of possible shrinkage ratios. The same applies to the ESCR (see F5, table II). Which specific measures should be applied to meet all the requirements of operative claim 1, including in particular values of the shrinkage ratio and of the ESCR according to claim 1, has not been explained by the respondent, is not indicated in F5 and is not apparent to the Board. This is especially true since the exact composition of the green material in example 2 of F5 is not disclosed, which makes any modification of the green composition speculative.

Therefore the subject-matter of claim 1 involves an inventive step starting from the green composition of example 2 of F5.

2. As the only objection against the main request does not succeed, the Board does not need to decide on any other issue and the patent is to be maintained on the basis of the claims of the main request.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division with the order to maintain the patent on the basis of the claims of the main request filed with the statement of grounds of appeal and after any necessary consequential amendments of the description.

The Registrar:

The Chairman:



D. Hampe

D. Semino

Decision electronically authenticated