Internal distribution code:

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

Datasheet for the decision of 8 May 2024

Case Number: T 1844/21 - 3.3.03

Application Number: 15197727.9

Publication Number: 3176213

IPC: C08L23/06, F16L9/12, C08F2/00

Language of the proceedings: EN

Title of invention:
ETHYLENE COPOLYMER COMPOSITION

Patent Proprietors:
SCG Chemicals Co., Ltd.
Mitsui Chemicals, Inc.

Opponent:
Borealis AG

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - improvement not credible - obvious alternative

Decisions cited:
T 0500/89

Europäisches Patentamt
European Patent Office
Office européen des brevets

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 1844/21 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 8 May 2024

Appellant: (Patent Proprietor)	SCG Chemicals Co., Ltd. 1 Siam Cement Road Bangsue Sub-district Bangsue District Bangkok 10800 (TH)
Appellant: (Patent Proprietor)	Mitsui Chemicals, Inc. 2-1, Yaesu 2-chome Chuo-ku Tokyo 104-0028 (JP)
Representative:	Scholz, Volker Boehmert & Boehmert Anwaltspartnerschaft mbB Pettenkoferstrasse 22 80336 München (DE)
Respondent: (Opponent)	Borealis AG Trabrennstrasse 6-8 1020 Vienna (AT)
Representative:	Maiwald GmbH Elisenhof Elisenstraße 3 80335 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 20 August 2021 revoking European patent No. 3176213 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	D. Semino
Members:	M. Barrère
	R. Cramer

Summary of Facts and Submissions

I. The appeal of the patent proprietors lies against the decision of the opposition division revoking European patent No. 3 176 213. The decision was based on the patent as granted as the main request and a set of amended claims as auxiliary request 1.

II. The following document was *inter alia* cited in that decision:

D7: EP 1 460 105 A1

III. The contested decision, as far as it is relevant to the present appeal, can be summarised as follows:

- The subject-matter of granted claim 1 was not novel in view of document D7.

- The subject-matter of claim 1 of auxiliary request 1 lacked an inventive step over D7 as the closest prior art.

IV. With the statement of grounds of appeal, the patent proprietors (appellants) filed a set of claims as main request.

V. Oral proceedings were held before the Board on 8 May 2024.

VI. The appellants requested that the decision under appeal be set aside and the patent be maintained in amended form on the basis of the main request filed with the statement of grounds of appeal. This request

corresponded to auxiliary request 1 as dealt with in the contested decision.

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

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

"1. Ethylene copolymer composition comprising an ethylene copolymer comprising an ethylene monomer and a C6-C10 α -olefin comonomer;

the ethylene copolymer having a total density of 0.945-0.980 g/cm^3 and

a melt flow rate under 5 kg load (MFR_5) of 0.10-0.50 g/10 min;

the ethylene copolymer having a C6-C10 α-olefin comonomer content of 1-5 %wt;

wherein a M_x/M_y is not less than 14.0 (wherein M_x/M_y is the molecular weight distribution obtained from gel permeation chromatography); and

a strain hardening modulus <Gp> of the ethylene copolymer is from 58.9 to 72.5 MPa.

wherein a gpcBR index of the ethylene copolymer is from 0.20 to 0.80 with

$$gpcBR = = \left[\left(\frac{K M_{V,CC}^{\alpha}}{[\eta]} \right) \cdot \left(\frac{M_W}{M_{W,CC}} \right)^{\alpha} - 1 \right] = \left[\left(\frac{[\eta]_{CC}}{[\eta]} \right) \cdot \left(\frac{M_W}{M_{W,CC}} \right)^{\alpha} - 1 \right]$$

where $M_{W,CC}$, $M_{V,CC}$ and $[\eta]_{CC}$ are the weight average molecular weight, viscosity average molecular

weight, and intrinsic viscosity from conventional gel permeation chromatography (GPC) calculation, respectively, assuming polymer is linear with no Long Chain Branch (LCB), the [η] term is the actual intrinsic viscosity, which is the measured value from the online viscometer, calculated by the viscometer peak area method for high precision; M_W is the weight average of absolute molecular weight from LS detector, also calculated by the LS peak area method for high precision; and the values of Mark-Houwink parameters, α and K, are 0.725 and 0.0004416, respectively, for polyethylene in 1,2,4-trichlorobenzene (TCB) at 160°C."

The other claims of this request are not relevant to this decision.

VIII. The appellants' 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:

The subject-matter of claim 1 of the main request involved an inventive step over document D7 as the closest prior art.

IX. 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:

The subject-matter of claim 1 of the main request lacked an inventive step over document D7 as the closest prior art.

Reasons for the Decision

Main request

1. Inventive step

1.1 Closest prior art and distinguishing feature

The parties agreed with the opposition division that:

document D7 (and in particular example 1 thereof) represented the closest prior art for the subject-matter of claim 1 and

the subject-matter of claim 1 differed from example 1 of D7 in that the ethylene copolymer had:

(i) a strain hardening modulus <Gp> of from 58.9 to 72.5 MPa (instead of 58.4 MPa in example 1 of D7).

The Board has no reason to depart from that view.

1.2 Problem to be solved

1.2.1 According to the appellants, the technical effects which can be attributed to feature (i) were a higher ACT (resistance to an Accelerated Creep Test) and a higher Charpy impact resistance at low temperature (such as -30°C). These effects could be derived from examples 1 and 2 of the patent (in comparison with comparative example I). In that context, reference was made to T 500/89 (point 4.3 of the Reasons) in which the corresponding Board found that the fact that individual parameter areas taken *per se* were known did

not imply that it was obvious to combine them to solve the problem according to the contested patent (statement of grounds of appeal, page 13, second to fourth paragraph).

At the oral proceedings before the Board, the appellants further argued that the purpose of the opposed patent was to provide a polyethylene (PE) composition for the manufacture of pipes conform to the norm PE100RC (standing for "resistant to crack"). In contrast, the PE compositions of D7 only met the requirement PE125 but not PE100RC (D7, paragraph [0014]). Therefore, even if the problem to be solved were to be formulated as the provision of an alternative composition, it should be acknowledged that this alternative must comply with the PE100RC standard.

1.2.2 As regards the objective technical problem, the Board shares the view of the opposition division (contested decision, page 10, third paragraph) and the respondent (point 8 of the rejoinder) for the following reasons:

(a) According to the established jurisprudence, an advantageous effect demonstrated in a comparative test can be taken as an indication of inventive step. If comparative tests are chosen to demonstrate an inventive step on the basis of an improved effect, the nature of the comparison with the closest state of the art must be such that the alleged advantage or effect is convincingly shown to have its origin in the distinguishing feature of the invention compared with the closest state of the art (Case Law of the Boards of Appeal, 10th edition 2022, I.D.4.3.2.).

(b) As noted by the opposition division, comparative example I (used by the appellants to justify a technical effect) differs from present claim 1 not only by the strain hardening modulus <Gp> (corresponding to distinguishing feature (i)) but also by the gpcBR parameter. It is therefore not clear whether the inferior properties associated to comparative example I have their origin in the strain hardening modulus <Gp>, the gpcBR parameter or the combination of the two. It is also pointed out that comparative example I cannot be representative of example 1 of D7, which has only <Gp> but not the gpcBR parameter as a distinguishing feature.

(c) The appellants provided two graphs showing the results obtained in the examples of the patent (statement of grounds of appeal, pages 13 and 14). In their view the graphs would show that an improved Charpy impact strength (at -30°C) can only be obtained if both the strain hardening modulus <Gp> and gpcBR are within the ranges specified in claim 1. In the Board's view, the graphical presentation of the experimental data does not alter the fact that the comparative examples have two distinguishing features with respect to the examples falling under claim 1 (<Gp> and gpcBR) which is not the case for example 1 of D7. Therefore, it cannot be concluded that the Charpy impact strength can be improved only if both <Gp> and gpcBR are within the ranges specified in claim 1 and that an improvement is present with respect to the closest prior art.

(d) The reference to T 500/89 is not appropriate in the present context. The quoted passage of the decision

(point 4.3 of the Reasons) refers to the question of obviousness once it has been established that a technical problem was solved (but not to the definition of the objective technical problem). Moreover, T 500/89 concerns a situation in which there were several distinguishing features, each of which was individually known (point 4.2 of the Reasons). In the present case, however, only one distinguishing feature was identified by the parties.

(e) With respect to the alleged fact that the PE composition according to claim 1 meets the PE100RC norm in contrast to the compositions of D7, the Board agrees with the respondent that no experimental evidence has been provided to show that the composition of example 1 of D7 did not meet this standard, whereas the compositions according to claim 1 necessarily met it.

1.2.3 Consequently, in the absence of suitable comparative examples, the effect associated to distinguishing feature (i) alone is not known and the problem to be solved is therefore the provision of an alternative ethylene copolymer composition suitable for pipes having high crack resistance (corresponding to the problem identified by the opposition division on page 10, fourth paragraph of the contested decision).

1.3 Obviousness of the solution

1.3.1 It remains to be assessed whether it was obvious to a person skilled in the art wishing to provide an alternative ethylene copolymer composition suitable for pipes having high crack resistance to increase the strain hardening modulus <Gp> from 58.4 MPa (as in

example 1 of D7) to a value of from 58.9 to 72.5 MPa (distinguishing feature (i)).

1.3.2 In their written submissions, the appellants assumed a different problem to be solved, namely the provision of a composition with improved properties (statement of grounds of appeal, page 14, point 9.6). For that reason alone, their written arguments concerning the obviousness of feature (i) are not convincing.

1.3.3 During the oral proceedings before the Board, the appellants further argued that a skilled person would have no reason to modify the compositions of D7, as they would not expect these compositions to be suitable for producing pipes that meet the PE100RC standard.

1.3.4 However, as noted above (point 1.2.2 (e)), the Board does not recognise any evidence that the compositions according to present claim 1 would satisfy the PE100RC requirement while the composition of example 1 of D7 would not. For this reason, the appellants' arguments are not persuasive.

1.3.5 In conclusion, on the basis of the appellants' submissions, the Board has no reason to depart from the findings of the opposition division that a slight increase of the strain hardening modulus <Gp> from 58.4 MPa to a value between 58.9 MPa and 72.5 MPa is an obvious option for a skilled person wishing to provide an alternative ethylene copolymer composition (contested decision, page 10, penultimate paragraph). Moreover, as the respondent pointed out at the oral proceedings, the mere reproduction of example 1 of D7 can lead to a value of the parameter <Gp> falling within the scope of present claim 1 (see letter of

5 February 2021, page 11, table with a value of 59.6 MPa).

1.4 For these reasons, the subject-matter of claim 1 of the main request lacks an inventive step over example 1 of D7 taken as the closest prior art.

2. As the sole request of the appellants is not allowable, the appeal is to be dismissed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

D. Hampe D. Semino

Decision electronically authenticated