

Internal distribution code:

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

**Datasheet for the decision
of 15 December 2016**

Case Number: T 0029/14 - 3.3.03

Application Number: 06727040.5

Publication Number: 1888659

IPC: C08F210/02

Language of the proceedings: EN

Title of invention:

NOVEL COPOLYMERS

Patent Proprietor:

Ineos Sales (UK) Limited

Opponents:

Chevron Phillips Chemical Company LP
THE DOW CHEMICAL CO.

Headword:

Relevant legal provisions:

EPC Art. 100(b)

Keyword:

Sufficiency of disclosure - (no)

Decisions cited:

Catchword:



Beschwerdekammern
Boards of Appeal
Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 0029/14 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 15 December 2016

Appellant: Chevron Phillips Chemical Company LP
(Opponent 1) 10001 Six Pines Drive
The Woodlands, Texas 77380 (US)

Representative: Potter Clarkson LLP
The Belgrave Centre
Talbot Street
Nottingham NG1 5GG (GB)

Appellant: THE DOW CHEMICAL CO.
(Opponent 2) 2030 Dow Center
Midland, Michigan 48674 (US)

Representative: Boulton Wade Tennant
Verulam Gardens
70 Gray's Inn Road
London WC1X 8BT (GB)

Respondent: Ineos Sales (UK) Limited
(Patent Proprietor) Hawkslease Chapel Lane
Lyndhurst
Hampshire SO43 7FG (GB)

Representative: Hawkins, David George
Mathisen & Macara LLP
Communications House
South Street
Staines-upon-Thames, Middx TW18 4PR (GB)

Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted on 23 October 2013 rejecting the opposition filed against European patent No. 1888659 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman D. Semino
Members: O. Dury
 R. Cramer

Summary of Facts and Submissions

I. The appeals by opponents 1 and 2 lie from the decision of the opposition division rejecting the oppositions lodged against European patent EP 1 888 659.

II. Claim 1 of the granted patent read as follows:

"1. A copolymer of ethylene and an alpha-olefin, said copolymer having a

(a) density $>0.930 \text{ g/cm}^3$,

(b) melt index (g/10 min) > 4 ,

(c) molecular weight distribution (MWD) > 3.0 , and

(d) full notch creep test (FNCT) > 250 hours."

III. Two notices of opposition to the patent were filed requesting revocation of the patent in its entirety.

IV. In the contested decision the following documents were *inter alia* cited:

D7: WO-A-2004/020 487

D18: Applicant/patent proprietor's letter of the examination proceedings, dated 28 July 2009

In that decision, the opposition division in particular held that:

- the patent in suit fulfilled the requirements of sufficiency of disclosure because it contained two working examples and the description contained further information how to prepare the copolymers claimed;
- the subject-matter of the granted claims was novel over *inter alia* D7.

- V. Opponent 1 (appellant 1) lodged an appeal against the above decision and requested that the decision of the opposition division be set aside and the patent be revoked.
- VI. Opponent 2 (appellant 2) lodged an appeal against the above decision and requested that the decision of the opposition division be set aside and the patent be revoked. Together with the statement of grounds of appeal *inter alia* the following document was filed:

D32: US 5 281 679

- VII. In its reply to the statements of grounds of appeal dated 4 September 2014 the patent proprietor (respondent) requested that the the appeals be dismissed (main request) or, alternatively, that the patent be maintained in amended form according to the auxiliary request filed therewith.

Claim 1 of the auxiliary request read as follows (additions as compared to granted claim 1 are indicated in **bold**, deletions in ~~strikethrough~~):

"1. A copolymer of ethylene and an alpha-olefin, said copolymer having a
(a) density $>0.930 \text{ g/cm}^3$,
(b) melt index (g/10 min) > 4 ,
(c) molecular weight distribution (MWD) > 3.0 , ~~and~~
(d) full notch creep test (FNCT) > 250 hours, **and**
(e) a Composition Distribution Branch Index (CDBI) in the range 55 - 75%."

Also, the following document was *inter alia* cited:

D38: Declaration by Dr. C. Chai

dated 30 April 2014

VIII. Oral proceedings were held on 15 December 2016 in the presence of all parties, at the end of which the Board announced its decision.

IX. The arguments of the appellants, as far as relevant to the present decision, were essentially as follows:

(a) Example 5 of D32 was carried out according to the general teaching of the description of the patent in suit and led to a copolymer satisfying the requirements specified in features (a), (b) and (c) of granted claim 1. Throughout the proceedings the patent proprietor argued that the process used in that example did not lead to copolymers satisfying feature (d) of granted claim 1. In particular, the patent proprietor put forward that very specific process conditions e.g. in terms of catalyst system, reactor temperature, ratios of comonomers and/or hydrogen/ethylene (H₂/C₂), such as those used in the examples of the patent in suit, had to be used in order to satisfy the combination of parameters (a) to (d) specified in granted claim 1. Considering that such information was neither indicated in the patent in suit nor was it shown to belong to common general knowledge, the patent in suit did not provide sufficient information to prepare the claimed polyethylene copolymers without undue burden over the whole scope of granted claim 1. In particular, the patent in suit failed to provide any information on how to control parameter (d), which was determined under unusual conditions in the patent in suit.

- (b) The copolymer prepared in example 14 of D7 was also prepared according to the general teaching of the description of the patent in suit. In that respect it was explicitly stated in the patent in suit that the catalysts of D7 could suitably be used to prepare the copolymers of the invention. In particular, the catalyst system prepared in example 14 of D7 was made from the same components as those used in examples 1-2 of the patent in suit. The process conditions used in example 14 of D7 were further very similar to those used in examples 1-2 of the patent in suit. However, the copolymer of example 14 of D7 did not satisfy at least features (a), (b) and (c) according to granted claim 1. That result was a further evidence that the patent in suit did not satisfy the requirements of sufficiency of disclosure.
- (c) The CDBI feature, which was held by the respondent during the oral proceedings before the Board to characterise the claimed copolymers, was not a feature mentioned in claim 1 of the main request and was therefore not relevant.
- (d) Considering that the copolymers of claim 1 of the auxiliary request were *inter alia* characterised by the same combination of features (a) to (d) as those of claim 1 of the main request, the same arguments as for the main request were also valid for the auxiliary request.

X. The arguments of the respondent, as far as relevant to the present decision, may be summarised as follows:

- (a) In examples 1-2 of the patent in suit the preparation of copolymers as defined in granted

claim 1 was disclosed in detail. The person skilled in the art would, on the basis of the information provided for those examples, know from its common general knowledge how to prepare other copolymers encompassed by the scope of the granted claims, in particular copolymers comprising other comonomers and having different densities and/or melt index.

- (b) The skilled person would understand from the patent in suit as a whole that examples 1-2 of the patent in suit illustrated the suitable choice of reaction conditions to be used for obtaining the copolymers defined in granted claim 1. As explained in D18, the copolymers of the invention were prepared by careful choice of the process conditions. In contrast, the preparation processes carried out in the examples of D7 and D32 cited by the opponents differed from that teaching in particular regarding either the comonomers ratio C6/C2 (D7), the H2/C2 ratio (D7) or the nature of the catalyst and cocatalyst (D32).

- (c) D7 was directed to the preparation of copolymers for making films and not of rotomoulded articles as in the patent in suit. Therefore, it was not surprising that the properties of the copolymer prepared in example 14 of D7 were much different from those of the copolymers prepared in the patent in suit, in particular in respect of features (a) to (c) according to granted claim 1. The skilled person knew that in particular different densities (a) and melt indexes (b) were required for both type of applications and that it was possible to tailor those properties by adjusting the H2/C2 and C6/C2 ratios.

- (d) The polymers of the invention were characterised by a unique structure in terms of monomer distribution, which could be quantified in terms of parameter CDBI as indicated in paragraphs 20-26 of the patent in suit. Such a structure was not obtained in example 14 of D7 or example 5 of D32.
- (e) For those reasons the granted patent satisfied the requirements of sufficiency of disclosure.
- (f) During the oral proceedings before the Board it was agreed that, should claim 1 of the main request be held not to fulfil the requirements of sufficiency of disclosure, the same conclusion would apply to claim 1 of the auxiliary request.

XI. The appellants requested that the decision under appeal be set aside and that the patent be revoked.

The respondent requested that the appeals be dismissed or, alternatively that the decision under appeal be set aside and the patent be maintained in amended form on the basis of the auxiliary request filed with letter of 4 September 2014.

Reasons for the Decision

Main request

- 1. Sufficiency of disclosure
 - 1.1 In order to meet the requirements of sufficient disclosure, an invention has to be disclosed in a manner sufficiently clear and complete for it to be

carried out by the skilled person, without undue burden, on the basis of the information provided in the patent specification, if needed in combination with the skilled person's common general knowledge. This means in the present case that the skilled person should be in particular able to prepare a copolymer according to granted claim 1 which is defined by

- the requirement that it is a copolymer of ethylene and an alpha-olefin;
- the combination of four parameters as defined in features (a) to (d).

1.2 In order to prepare those copolymers, the patent in suit provides information regarding:

- the comonomers (paragraphs 27, 28 and 74);
- the catalyst system comprising a catalyst (paragraphs 29-41), a cocatalyst (paragraphs 29 and 42-59) and possibly a support (paragraphs 60-65);
- the process to be used (such as slurry or gas phase) and processing conditions (paragraphs 67-73).

The preparation of specific mixed catalyst systems and their use to prepare ethylene-hexene copolymers in a gas phase fluidised bed reactor satisfying all four parameters (a) to (d) according to granted claim 1 is further provided in examples 1 and 2 (paragraphs 81-95 and Table 1 of the patent in suit). In both examples, use is made of a monocyclopentadienyl metallocene complex and of a boron containing cocatalyst, which are identified in the description as most preferred embodiments (paragraphs 41, 59, 81, 83-88, 91-94). In that respect, it is conspicuous that both examples were carried out under similar conditions in terms of catalyst system (same components for the catalyst system metallocene/support/cocatalyst, same catalyst

preparation method, same comonomers, same reactor type and very similar process conditions as indicated in the Table of paragraph 95).

1.3 The opponents put forward that various examples disclosed in prior art documents were carried out according to the general teaching of the patent in suit but failed to lead to copolymers according to granted claim 1.

1.3.1 a) Example 14 of D7 deals with the preparation of an ethylene-hexene copolymer in a gas phase fluidised bed. The process used in example 14 of D7 is similar to that used in examples 1-2 of the patent in suit: same process (gas phase fluidised bed), same monomers (ethene and hexene), similar catalyst components (compare: page 15, lines 24-27 and page 16, lines 1-13 of D7 with paragraphs 81-95 of the patent in suit; same order of magnitude for the Ti and B loadings, similar temperature, similar H₂/C₂ ratio). From the comparison of the catalyst preparation (paragraphs 92-94 of the patent in suit; page 16, lines 2-13 of D7) and of the process features specified in the Table of paragraph 95 of the patent in suit and in the upper Table on page 21 of D7, it is apparent that the process used in example 14 of D7 differs from that used in examples 1-2 of the patent in suit at least e.g. in some aspects of the preparation of the catalyst system and in the comonomer ratio C₆/C₂ (which is about one order of magnitude higher in the patent in suit). Nevertheless, it remains that the process carried out in example 14 of D7 is according to the general teaching of the patent in suit regarding the measures to be taken to prepare the copolymers of granted claim 1 (see section 1.2 above). In particular, it is explicitly stated in paragraph 66 of the patent in suit that suitable

catalysts for carrying out the invention are those described in D7. Also, there is no mention in the patent in suit that any particular process conditions should be used, in particular not regarding the C6/C2 ratio. Further considering that neither granted claim 1 nor the patent specification contain any limitation in terms of comonomer amount (here C6: hexene), it cannot be concluded that the patent in suit contains any implicit teaching related to the criticality of the C6/C2 ratio. Therefore, the process carried out in example 14 of D7 is in line with the general teaching of the patent in suit regarding how to prepare the copolymers of granted claim 1.

b) However, the ethylene-hexene copolymer prepared in example 14 of D7 does not satisfy at least features (a), (b) and (c) according to granted claim 1 (see the lower Table on page 21 of D7: rows 1, 2 and 6). It is further noted that no data is available on file regarding feature (d).

- 1.3.2 a) Example 5 of D32 deals with the preparation of an ethylene-butene copolymer in a gas phase fluidised bed using a supported catalyst system comprising a bicyclopentadienyl metallocene catalyst and an aluminoxane cocatalyst (D32: col. 18, lines 5-15, 18-31, 62-68 and second entry in the Table in col. 17-18). In that respect it is conspicuous that the catalyst used in example 5 of D32 is a **bicyclopentadienyl metallocene catalyst** and not a **monocyclopentadienyl metallocene complex**, which is taught in paragraph 29 of the patent in suit as being a preferred type of metallocene complex and which is used in examples 1-2 of the patent in suit. It remains however that the catalyst used in example 5 of D32 falls under the generic definition of a "metallocene

catalyst system" specified in said paragraph 29 or in the broadest process claim 11 as granted. It is also true that the cocatalyst used in example 5 of D32 is an aluminoxane and not a boron containing compound as used in examples 1-2 of the patent in suit (in fact the preferred type of cocatalyst indicated in paragraph 59 of the patent in suit). However, it is indicated in paragraph 42 of the patent in suit that any cocatalyst typically used with metallocenes may be used and aluminoxanes are specifically mentioned in paragraphs 43-45 of the patent in suit. In view of the above, the preparation process used in example 5 of D32 is in line with the general teaching of the patent in suit as to how to prepare the copolymers of granted claim 1 (see section 1.2 above).

b) It was agreed by the parties that the copolymer so prepared fulfilled at least features (a) to (c) of granted claim 1 (Table in columns 17-18 of D32, second entry; see also col. 18, lines 16-68).

Regarding feature (d), it was neither shown nor argued that said feature would be mandatorily achieved when features (a) to (c) were satisfied. To the contrary, the respondent acknowledged during the oral proceedings before the Board that feature (d) would not mandatorily be inherently satisfied when features (a) to (c) were met as e.g. derivable from the data given in Table 1 of the patent in suit for the comparative examples HD3850UA and HD3570UA (further taking into account the MWD values of 3.9 and 4.2, respectively, indicated in D38).

However, in particular during the oral proceedings before the Board, the respondent argued that the process conditions used in example 5 of D32 did not

lead to a FNCT > 250 hours according to parameter (d) specified in granted claim 1. Should that argument of the respondent not be valid, the subject-matter of granted claim 1 would not be novel over example 5 of D32. In any case, in the absence of any evidence on parameter (d) and to the respondent's benefit in respect of novelty, it is considered hereinafter that the copolymer prepared in example 5 of D32 does not satisfy feature (d) according to granted claim 1.

1.3.3 In view of the above, it may be agreed with the appellants that example 14 of D7 and example 5 of D32 were both carried out according to the general teaching of the patent in suit but led to the preparation of copolymers of ethylene and an alpha-olefin either satisfying none of features (a) to (c) (D7) or satisfying features (a) to (c) but not feature (d) (D32).

1.4 Under such circumstances, it can be concluded that the general teaching of the patent does not provide sufficient information for the skilled person to prepare reliably, with a good chance of success, copolymers as defined in granted claim 1 and the question has to be answered if the skilled person is in a position to overcome that deficiency from information given elsewhere in the patent in suit, in particular in the examples, and/or from its common general knowledge.

1.4.1 In that respect, the patent proprietor put forward that very specific process conditions e.g. in terms of reactor temperature, ratios of C6/C2, H2/C2, such as those used in the examples of the patent in suit, had to be used if one was to obtain the specific combination of features (a) to (d) defined in granted claim 1.

However, that apparently crucial information, which is according to the respondent indispensable in order to obtain a copolymer according to granted claim 1, is not indicated in the patent in suit. It is in particular conspicuous that the patent in suit does not contain any hint that any particular processing conditions are essential in order to prepare the polymers defined in granted claim 1. It is further noted that granted claim 11, which is the granted process claim of broadest scope, contains no limitation apart from the use of a specific type of catalyst system, namely a metallocene as a generic term, which is in line with the statement in paragraph 11 of the patent in suit according to which the invention is about copolymers according to claim 1 prepared using a metallocene catalyst. In particular, the skilled person finds no guidance in the patent in suit as a whole in order to know what should be changed in the processes used in example 14 of D7 or example 5 of D32 in order to obtain a copolymer satisfying parameter (d) while maintaining parameters (a) to (c) in the ranges defined in granted claim 1.

- 1.4.2 It was also not shown that the skilled person could rely on his general knowledge in order to compensate for that lack of information.

- 1.4.3 That deficiency is not overcome by the fact that the patent in suit contains two examples 1-2 illustrative of the subject-matter of granted claim 1. Indeed, apart from the very specific combination of experimental conditions used in examples 1-2 (process type, (co)monomers, catalyst system, process conditions; all of which being very similar conditions, as explained in section 1.2 above), the patent in suit provides no

teaching regarding the interaction of the compositional features (e.g. nature and amounts of comonomers, catalyst system) and/or of the process conditions (e.g. process type, H₂/C₂ and C₂/C₆ ratio, temperature) on the properties (a) to (d) specified in granted claim 1 of the copolymer prepared. In particular in respect of feature (d) of granted claim 1, although the patent in suit contains information in order to determine it (see paragraphs 101-107), it was in particular not shown that the skilled person, on the basis of the information provided in examples 1-2 of the patent in suit, optionally in combination with the information provided in the description and/or with common general knowledge, could understand what had to be modified if that property fell outside the range defined in granted claim 1. Therefore, it has to be concluded that the patent in suit fails to provide a clear guidance how to prepare successfully and without undue burden copolymers according to granted claim 1 also using components and process conditions different from those used in examples 1-2 of the patent in suit.

- 1.5 During the oral proceedings before the Board the respondent argued that the skilled person knew that it was possible to modify the density and the melt index of the copolymer prepared in example 14 of D7 by varying the H₂/C₂ and C₆/C₂ ratios along the line of examples 1-2 of the patent in suit, so that the requirements specified in the granted claims for those features be satisfied.

In that respect, it is noted that that argument is only related to features (a) and (b) of granted claim 1, not specifically to features (c) and (d). Also, no evidence in support of that argumentation was provided. More important, no argument or explanation was provided to

explain why the experimental conditions that would be necessary in order to fulfil features (a) and (b) would mandatorily lead to the requirements of granted claim 1 in terms of features (c) and (d) to be satisfied.

Under such circumstances and in view of the evidence on file, it can neither be concluded that it was shown which measures should be taken to modify the process of example 14 of D7 or of example 5 of D32 in order to arrive successfully at a copolymer according to granted claim 1, nor that those measures are taught in the patent in suit and/or are known in the art. For those reasons, the argument of the respondent did not persuade.

- 1.6 The respondent also argued that the copolymers of the invention were characterised by their unique structure as could be quantified in terms of parameter CDBI (Composition Distribution Branch Index).

However, the copolymers according to granted claim 1 are not limited in terms of CDBI. Besides, considering that no information regarding CDBI is indicated in respect of examples 1-2 of the patent in suit, it cannot be unambiguously concluded that those examples are or not in the "typical" range indicated in paragraph 25 of the patent in suit. Also, no comparison in respect of CDBI with the copolymers of either example 14 of D7 or example 5 of D32 is on file. Finally, it is explicitly stated in col. 16, lines 3-31 of D32 that the copolymers of D32 produced in gas phase, i.e. including that of example 5, generally exhibit a CDBI of 50-75%, which is well in line with the indication in paragraph 25 of the patent in suit that the CDBI of the copolymers of the invention generally is between 55-75 %. For those reasons, the

argument of the respondent did not convince.

1.7 Under those circumstances, the skilled person wanting to prepare an ethylene-alpha olefin copolymer exhibiting the combination of features (a) to (d) according to granted claim 1 is, apart from working according to the specific conditions of examples 1-2 of the patent in suit, left with the task of performing an elaborate program in order to find out essential aspects of the preparation conditions to be used. In other words, the skilled person can only establish by trial and error without sufficient guidance whether or not his particular choice of working conditions (process type, (co)monomers, catalyst system and preparation thereof, process conditions) will provide, with a good chance of success, a copolymer according to granted claim 1, which amounts to an undue burden.

1.8 For that reason, the main request does not satisfy the requirements of sufficiency of disclosure and is, therefore, not allowable (Article 100(b) EPC).

Auxiliary request

2. Claim 1 of the auxiliary request only differs from claim 1 of the main request in that the copolymers defined therein are characterised by an additional parameter (e) which has to be satisfied in addition to the four parameters (a) to (d). However, since those copolymers are also characterised by the same combination of features (a) to (d) as in claim 1 of the main request, the same conclusion as for the main request has to be drawn. In this respect no additional arguments have been presented by the respondent, so that no additional analysis is necessary for the Board. Therefore, also the auxiliary request does not satisfy

the requirements of sufficiency of disclosure and is not allowable.

3. None of the patent proprietor's requests being allowable, the patent in suit has to be revoked.

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:



B. ter Heijden

D. Semino

Decision electronically authenticated