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Datasheet for the decision of 3 December 2015

Case Number:	T 0864/12 - 3.3.03
Application Number:	98943014.5
Publication Number:	1022308
IPC:	C08L23/12, C08L23/10, C08F4/64, C08L23/04
Language of the proceedings:	EN

Title of invention:
POLYPROPYLENE COMPOSITION

Patent Proprietor:
Chisso Corporation

Opponents:
Novolen Technology Holdings C.V.
Basell Polyolefine GmbH

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (no)

Decisions cited:
G 0007/95, G 0001/95, T 0859/06

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Case Number: T 0864/12 - 3.3.03

DECISION
of Technical Board of Appeal 3.3.03
of 3 December 2015

Appellant:
(Opponent 1)
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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted on**

14 February 2012 concerning maintenance of the European Patent No. 1022308 in amended form.

Composition of the Board:

Chairman	M. C. Gordon
Members:	D. Marquis
	R. Cramer

Summary of Facts and Submissions

I. The appeal by opponent 1 lies from the interlocutory decision of the opposition division posted on 14 February 2012 maintaining European patent N° 1 022 308 (based on application number 98 943 014.5) in amended form.

II. The patent was maintained with a set of 10 claims of which independent claim 1 read as follows:

"1. A polypropylene composition comprised of 20-95% by weight of a polypropylene defined in the following [I] and 5-80% by weight of a propylene-α-olefin copolymer defined in the following [II]:

[I] a polypropylene featured by having:

(1) a ratio of isotactic pentad (mmmm) is 0.900 - 0.949,

(2) a 2,1- and 1,3-propylene units in the polymer chain is 0.2-0.5 mol%,

(3) a weight average molecular weight (Mw) is 40,000-1,000,000,

(4) a ratio of a weight average molecular weight (Mw) to a number average molecular weight (Mn), i.e. (Mw)/(Mn) is 1.5-3.8,

(5) in case of elevating the temperature of o-dichlorobenzene continuously or stepwise up to a given temperatures to measure the amount of eluted polypropylene at each temperature, the position of a main elution peak is 95-110°C and the amount of components existing in the range of ±10°C of the main elution peak is at least 90% of the total amounts of components eluted at a temperature higher than 0°C,

(6) The melting point is ranging from 152 to 158°C, and

[II] a propylene-α-olefin copolymer containing 10-90% by weight of a constituent derived from propylene and 10-90% by weight of a constituent derived from α-olefin other than propylene."

Claims 2 to 10 were directed to preferred embodiments of claim 1.

III. Notices of opposition to the patent were filed by Novolen Technology Holdings C.V. (opponent 1) and by Basell Polyolefine GmbH (opponent 2), both oppositions being filed on 7 October 2004. Opponent 1 invoked the grounds of opposition pursuant to Article 100(a) EPC (Articles 54 and 56 EPC). Opponent 2 invoked the grounds of opposition pursuant to Article 100(a) (Articles 54 and 56 EPC) and (b) EPC. The opponents cited inter alia:
D1: (EP-A-576 970)
ER2: "Thermal Analysis of Plastics" Theory and Practice, Ehrenstein, G. *et al*, Hanser Verlag Munich 2004, pages 32-34,41,42,50,67-69
ER6: A document of Perkin-Elmer relating to operating variables of DSC analysis
in the course of the opposition procedure.

IV. By decision of 8 March 2006 posted 31 March 2006, the opposition division revoked the patent on the grounds that it lacked novelty over D1.

V. An appeal (number T 859/06) was filed on 2 June 2006 against that decision by the patent proprietor, and it was requested to set aside the decision of the opposition division and to maintain the patent on the basis of the set of claims 1 to 10 according to the main request filed on 13 May 2005 during the opposition proceedings. The statement of grounds of appeal filed with a letter dated 31 July 2006 contained a reasoning as to why the main request was novel over D1. It was decided that the main request was allowable in view of Article 123(2) EPC, that it satisfied the requirements of Article 83 EPC and that it was novel in view of D1. The decision of the opposition division was set aside and the case was remitted to the first instance for further prosecution on the basis of the main request of 13 May 2005.

VI. By letter dated 29 September 2010, opponent 1 introduced the following supplementary technical reports into the proceedings:
D27: experimental report of Dr. Dimeska concerning repetition of Example 16 of D1
D28: Experimental report Nr 001/2008 of the company Ticona on the propylene sample S2009-003860.

VII. A second oral proceedings took place before the opposition division on 26 January 2012 to discuss the inventive step of the main request. In its decision, the opposition division maintained the patent on the basis of the main request as submitted with letter dated 13 May 2005.

VIII. An appeal against that decision was filed by opponent 1 on 12 April 2012 in which it was requested to set aside the decision of the opposition division and to revoke the patent. The statement of grounds of appeal filed on 25 June 2012 contained a reasoning as to why the main request lacked an inventive step over D1 in combination with D27/D28 and ER6 with reference to the findings of decision G 7/95. Revocation of the patent was requested.

IX. With a letter dated 18 December 2012, the patent proprietor submitted his reply to the statement of grounds of appeal and requested to dismiss the appeal as being unfounded and to maintain the opposed patent as upheld according to the main request filed on 13 May 2005.

X. On 15 June 2015, a summons to attend oral proceedings on 3 December 2015 were dispatched by the Board.

XI. On 19 August 2015, the patent proprietor stated that he would not attend oral proceedings and requested a decision according to the current state of the file.

XII. By letter dated 8 October 2015 opponent 2 stated that he would not attend the oral proceedings. No substantive arguments were advanced and no request in respect of the appeal was made.

XIII. On 28 October 2015 the Board issued a communication setting out its preliminary position on the case.

XIV. By letter dated 29 October 2010 appellant/opponent 1 stated that he would not attend the oral proceedings and withdrew the request for oral proceedings.

XV. Oral proceedings were held on 3 December 2015.
No party attended.

XVI. The appellant/opponent 1's arguments may be summarised as follows:

Inventive step

Example 16 of D1 represented the closest prior art. It disclosed a polypropylene composition comprising 69% of a polypropylene homopolymer and 31% of a propylene-ethylene copolymer having an ethylene content of 15%. It had been shown in the replication of example 16 of D1 reported in D27 that the polypropylene composition fulfilled the conditions (1) to (5) of claim 1 of the main request. D28 was a further report relating to the determination of the melting point of the polypropylene [I] prepared according to D27 i.e. the rework of example 16 of D1. D28 employed the same method for determining the melting point as disclosed in the patent in suit, i.e. a DSC7 instrument. D28 showed that the melting point determined with a sample size of 2 mg was within the claimed range. Since claim 1 did not limit the sample size to be employed for the DSC determination of the melting point of the polypropylene, any sample size known could be used. ER6 and ER2 taught that a sample size of 2 mg was within the ranges that could be used with the DSC7 calorimeter employed in the examples of the patent in suit, which was also that used in D28. Since the polypropylene composition of example 16 of D1 was according to claim 1, the conclusions of the decisions G 1/95 and G 7/95 could be applied to the present case and it had to be concluded that claim 1 was not inventive in view of D1 alone.

XVII. The respondent/patent proprietor's arguments may be summarised as follows:

Inventive step

D1 was the closest prior art. The polypropylene corresponding to component [I] of claim 1 did not possess a melting point falling within the claimed range of 152 to 158°C. The sample size commonly used for the determination of the melting point of polymer compositions as claimed was 5 mg. ER2 also disclosed that a sample size 5 mg to 10 mg was used for the determination of the melting point using DSC. A sample size of 5 mg had to be used to allow a comparison between the melting point of the polypropylene of example 16 of D1 as measured by DSC and that of claim 1 of the patent in suit. The use of a sample size of 2 mg in D28 was an arbitrary measure in order to obtain a melting point falling into the claimed range. It was uncertain whether D27 and D28 were so relevant that they could be used in the assessment of inventive step. As the claimed subject matter was novel over D1, the conclusions of the decisions G 1/95 and G 7/95 could not be applied to the present case. The claims of the operative request were inventive in view of D1.

XVIII. The appellant/opponent 1 requested that the decision under appeal be set aside and that the European patent No. 1 022 308 be revoked.

XIX. The respondent/patent proprietor requested that the appeal be dismissed.

Reasons for the Decision

1. Inventive step

1.1 The novelty of claim 1 of the present request over the same disclosure of example 16 of D1 has been addressed and has been decided upon by the board in decision T 859/06. It appears to the board in its present composition that the facts of the case have not changed since that decision. The decision provided in T 859/06 on novelty is res judicata and the present board consequently has no power to reconsider whether the requirements of Article 54 EPC have been met.

1.2 The patent in suit relates to a polypropylene composition obtained by polymerisation with a metallocene catalyst and displaying flexibility, low temperature impact-strength, heat-resisting property and rigidity (paragraphs 1 and 59). The polypropylene is required to have:
(1) a ratio of isotactic pentad (mmmm) is 0.900 - 0.949,
(2) a 2,1- and 1,3-propylene units in the polymer chain is 0.2-0.5 mol%,
(3) a weight average molecular weight (Mw) is 40,000-1,000,000,
(4) a ratio of a weight average molecular weight (Mw) to a number average molecular weight (Mn), i.e. (Mw)/(Mn) is 1.5-3.8,
(5) in case of elevating the temperature of o-dichlorobenzene continuously or stepwise up to a given temperatures to measure the amount of eluted polypropylene at each temperature, the position of a main elution peak is 95-110°C and the amount of components existing in the range of ±10°C of the main elution peak is at least 90% of the total amounts of components eluted at a temperature higher than 0°C,
(6) The melting point is ranging from 152 to 158°C (claim 1).

1.3 D1 relates to metallocenes containing aryl-substituted indenyl derivatives as ligands which can be used as catalysts components in the preparation of polyolefins of high isotacticity, narrow molecular weight distribution and very high molecular weight (page 1, lines 9 to 12). Example 16 of D1 discloses the polymerisation of propylene with such a catalyst. Example 16 of D1 was considered by the parties to be the most relevant disclosure for the subject-matter of the patent in suit.

1.4 According to the decision G 7/95 of the Enlarged Board of Appeal, an allegation that the claims lack novelty in view of the closest prior art document may be considered in the context of deciding upon the ground of inventive step (G 7/95, Order, second paragraph). Therefore, a finding of lack of novelty in these circumstances may inevitably result in such subject-matter being unallowable on the ground of lack of inventive step. Although the circumstances of the present case differ from those of G 7/95 and the associated decision G 1/95, in that the reasons for the lack of availability of the ground pursuant to Article 54 EPC are not the same, the Board is of the opinion that the conclusion drawn up by the Enlarged Board of Appeal may be applied here. Following the decision G 7/95, should Example 16 of D1 be found to disclose a composition according to claim 1 of the patent in suit, that claim may be found to lack an inventive step.

1.5 In the process of example 16 of D1, liquid propylene is polymerized in the presence of a toluene solution of methylaluminoxane. Hydrogen was introduced in the gas space of the reactor and methylphenylsilylbis(2-methyl-4-phenylindenyl) zirconium dichloride rac-7 was added to the reactants in a toluene solution of methylaluminoxane before carrying out the 1st polymerization step for 5 hours at 50°C. Gas was released from the reactor to reduce the pressure, ethylene gas was introduced and the polymerization was continued for a further 14 hours at 40°C before the reaction was terminated. A block copolymer was obtained wherein the melting point of the polymer of the first polymerization step was 159°C and the glass transition temperature of the polymer of the second polymerization step was -38°C. Fractionation of the product gave the following composition: 69% by weight of homopolymer, 31%

by weight of copolymer, the copolymer having an ethylene content of 15% by weight.

1.6 Example 16 of D1 discloses therefore the preparation of a polypropylene composition comprising 69% of a polypropylene homopolymer and 31% of a propylene-ethylene copolymer. The ratio of ethylene in the copolymer was 15%, which is within the claimed range of 10 to 90% specified for component [II] of claim 1 of the operative request. Example 16 of D1 does however not disclose any of the properties (1) to (5) of homopolymer [I] required in claim 1 of the patent in suit.

1.7 D27 is an experimental report relating to a repetition of the preparation disclosed in example 16 of D1. The polymer was prepared according to the procedure disclosed in example 16 with the difference that it was scaled down from a reactor volume of $150dm^3$ to $5dm^3$. There is no reason to doubt that the repeat provided in D27 was representative of the process disclosed in example 16 of D1. That was also not disputed by the patent proprietor during the appeal procedure. The polypropylene homopolymer fraction obtained in D27 was isolated and analysed.

1.8 The analysis of the homopolypropylene with the sample number S-2009-003860 obtained in D27 is provided on pages 6 and 7 of D27 as well as in D28.

1.8.1 The determination of the ratio of isotactic pentad (mmmm) as well as the amount of 2,1- and 1,3-propylene units in the polymer chain of the homopolypropylene was carried out by C^{13}-NMR run at 130°C and according to a procedure disclosed on page 4 of D27. The method used in D27 to determine these parameters is very close to that disclosed in paragraphs 22 to 25 of the patent in suit.

The ratio of isotactic pentad (mmmm) of the polypropylene was 0.9476 mol% and is within the claimed range of 0.900 to 0.949. The amount of 2,1- and 1,3-propylene units in the polymer chain was measured to be 0.253 which is within the claimed range of 0.2 to 0.5 mol%. The homopolypropylene according to D1, example 16, fulfils therefore the conditions (1) and (2) of claim 1 of the operative request.

1.8.2 The weight average molecular weight (Mw) and the ratio of Mw/Mn of the homopolypropylene was determined by GPC (page 3) according to a method close to that disclosed in paragraph 28 of the patent in suit. The value of the weight average molecular weight (Mw) was 256,600 g/mol, within the claimed range of 40,000 to 1,000,000 g/mol and the ratio of Mw/Mn was calculated to be 2.8, within the claimed range of 1.5 to 3.8. The homopolypropylene according to D1, example 16, fulfils therefore also the conditions (3) and (4) of claim 1 of the operative request.

1.8.3 The characteristic factor (5) of the homopolypropylene according to D1, example 16, was determined by the temperature raising elution fractionation procedure. That procedure was conducted at 140°C in o-dichlorobenzene at 1 ml/min flow rate, corresponding to the method disclosed in paragraph 35 of the patent in suit. The position of the main elution peak was at 108.3°C, within the claimed range of 95°C to 110°C and the amount of components existing in the range of ±10°C of the main elution peak was 96.1%, at least 90% of the total amounts of components eluted at a temperature higher than 0°C as claimed. The homopolypropylene according to D1, example 16, fulfils therefore also the condition (5) of claim 1 of the operative request.

1.8.4 Claim 1 of the operative request requires a melting point ranging from 152°C to 158°C for the polypropylene [I]. The method of measurement of the melting point is however not indicated in the claim. The method of determination of the melting point is only disclosed in paragraph 32 of the patent in suit. There it is disclosed that the melting point of the polymers or copolymers was measured by a DSC7 type Differential Scanning Calorimeter (manufactured by Perkin-Elmer Inc.) according to the method wherein polypropylene is heated from room temperature at a heat-elevation rate of 30°C/min up to 230°C, maintained at the same temperature for 10 minutes, then depressed in temperature at a rate of -20°C/min down to -20°C, maintained at the same temperature for 10 minutes and again heated at a rate of 20°C/min whereby a temperature showing a peak of melting is determined as melting point (Tm). The size of the sample used to perform the measurement is not defined in the patent in suit. Both parties acknowledged that the size of the sample used for the determination of the melting point with a DSC7 Calorimeter had an influence on the value of the melting point obtained. The patent proprietor argued in that respect that different melting points for the same polypropylene would be obtained from a sample size of 2mg and a sample size of 5mg (page 3 of the reply to the statement of the grounds of appeal) and that the sample size employed in D28 had been selected such that a value of the melting point within the scope of the operative claim would be obtained. The dependence of melting point on sample size is indeed experimentally confirmed on page 2 of D28 wherein the same sample S-2009-003860 was subjected to two melting point determinations using the DSC7 calorimeter and a method equivalent to that used in the patent in suit, the first determination being performed on a sample size of 2mg (melting point of 157.78°C) and the second on a sample size of 5mg (melting point of 158.95°C). The results provided in D28 show that depending on the sample size chosen for the determination of the melting point by DSC, the same polypropylene [I] otherwise satisfying the conditions (1) to (5) of claim 1 of the operative request would be considered to be within the ambit of claim 1 when a sample size of 2mg was used and outside when a sample size of 5mg was used instead. This demonstrates that the sample size chosen for the determination of the melting point by DSC is critical to the definition of the melting point in claim 1 of the operative request. The absence of a definition of the sample size to be used for the determination of the melting point in claim 1 therefore means that this parameter has to be broadly interpreted, to the extent that any applicable sample size for use with the DSC7 instrument has to be considered as appropriate for carrying out the determination, with a consequent spread of obtained values for one and the same polymer.

1.8.5 The description of the patent in suit contains no information or guidance about the sample size to be used when performing the melting point determination according to the method of paragraph 32. The operating variables of the DSC7 calorimeter from Perkin Elmer used in the patent in suit are disclosed in ER6. The typical sample size range recommended for the DSC7 calorimeter is found in section 7.4 on page 7-3. In that section, it is disclosed that the size of samples that can be analyzed with the DSC7 calorimeter is only limited by the volume of the sample pan that is in use, keeping in mind that the sample size in conjunction with the scanning rate and the sensitivity (Y Range) will affect the quality of the results. A typical range of sample size run on the DSC7 is stated to vary from 0.5mg to 30mg. The sample sizes employed in D28 i.e. 2mg and 5mg are both within the boundaries of the sample size that can be used with a DSC7 calorimeter.

1.8.6 ER2 is an extract of a textbook on thermal analysis of plastics that was published in 2004, after the priority date of the patent in suit. The teaching of ER2 however, as far as it concerns the sample size used in DSC analysis, was acknowledged by both parties to have been part of the common general knowledge of the person skilled in the art before the priority date of the patent in suit. Though ER2 does not specifically address the parameters of the DSC7 calorimeter described in the patent in suit, it nevertheless provides some guidance about the experimental parameters that can be used for the determination of the thermal properties of polymers by DSC analysis. In the table of page 41 of ER2, the sample size chosen for melting point determination using DSC is said to vary between 5mg and 10mg, whereby it is stated in a footnote that a sample size of 1mg to 2mg is also adequate provided the instrument is sensitive enough. That passage therefore teaches that provided the instrument is sensitive enough, a sample size ranging from 1mg to 10mg can be used for melting point determination by DSC. Further on page 42 of ER2, it is disclosed that in order to be able to follow melting processes as precisely as possible and to minimize lag and heat conduction effects, it is best to keep the sample size at between 1mg and 2mg, provided the instrument is sensitive enough. Since the sample size disclosed in ER6 for the DSC7 calorimeter can be as low as 0.5mg, it is concluded that the DSC7 calorimeter as used in the patent in suit and in D28 is sensitive enough to be operated with a sample size of 2mg as well as 5mg.

1.8.7 Even if a sample size of 5mg was common in the art for the determination of the melting point of polymers using a DSC7 calorimeter, the documents D28 and ER6 show that a value of 2mg was equally operative. The absence of any definition in the patent in suit of the sample size to be employed, and the resulting consequent uncertainty regarding the melting point as defined in claim 1, cannot be overcome with help of the supplementary documentation provided during the appeal procedure. In assessing the scope of claim 1, the claimed subject-matter must therefore be given its broadest possible meaning within what can still be considered technically reasonable in that art. On the basis of D28 and ER6, the Board concludes that the melting point of 157.78°C measured in D28 on a DSC7 calorimeter with a sample size of 2mg (Table on page 2) fulfils condition (6) of claim 1 of the operative request. D28 therefore shows that the sample S-2009-003860 provided in D27, corresponding to example 16 of D1 and fulfilling the conditions (1) to (5) fulfils also condition (6). As a result, it was convincingly shown by the repetition of D1, example 16 submitted in D27 that the polypropylene composition disclosed in example 16 of D1 was according to claim 1 of the operative request.

1.9 In G 7/95, it was decided that if the closest prior art document destroys the novelty of the claimed subject matter, such subject-matter obviously cannot involve an inventive step. A finding of lack of novelty in such circumstances was then considered to result in such subject-matter being inevitably unallowable on the ground of lack of inventive step.

As shown above, the subject matter of claim 1 cannot be distinguished from example 16 of D1 which represents the closest prior art. The subject matter of claim 1,

following the considerations of G 7/95 therefore lacks an inventive step.
The operative request does not fulfil the requirements of Article 56 EPC.

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:

Beschwerdekammern des Europäischen Patentamts
Boards of Appeal of the European Patent Office
Chambres de recours de l'Office européen des brevets

M. Schalow M. C. Gordon

Decision electronically authenticated