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**D E C I S I O N**  
**of 13 June 2002**

**Case Number:** T 0909/97 - 3.3.7

**Application Number:** 90908693.6

**Publication Number:** WO 90/14453

**IPC:** D01F 6/30

**Language of the proceedings:** EN

**Title of invention:**

Elongated object made of a copolymer of carbon monoxide and an olefinically unsaturated monomer, and method for the production thereof

**Patentee:**

DSM N.V.

**Opponent:**

- I. Shell Internationale Research Maatschappij B.V.  
II. Akzo Nobel N.V.

**Headword:**

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**Relevant legal provisions:**

EPC Art. 54(3)

**Keyword:**

"Novelty (no) - priority claim not valid - earlier European application"

**Decisions cited:**

G 0002/98, T 0073/88

**Catchword:**

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Case Number: T 0909/97 - 3.3.7

**D E C I S I O N**  
**of the Technical Board of Appeal 3.3.7**  
**of 13 June 2002**

**Appellants:**

(Opponent I)

Shell Internationale Research Maatschappij B.V.  
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**Representative:**

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(Opponent II)

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**Representative:**

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**Respondent:**

(Proprietor of the patent)

DSM N.V.  
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**Representative:**

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**Decision under appeal:**

Interlocutory decision of the Opposition Division  
of the European Patent Office posted 27 June 1997  
concerning maintenance of European patent  
No. 0 472 630 in amended form.

**Composition of the Board:**

**Chairman:** R. E. Teschemacher  
**Members:** G. Santavicca  
B. J. M. Struif

## Summary of Facts and Submissions

I. The mention of the grant of European patent 0 472 630, in respect of European patent application 90 908 693.6 filed on 16 May 1990 and claiming a priority in the Netherlands of 19 May 1989 (NL 8901253), was published on 30 November 1994. The patent as granted comprised 14 claims and independent claim 1 read as follows:

"Elongated object made of an orientated carbon monoxide-ethylene copolymer, characterized in that the modulus of elasticity is at least 30 GPa and the tensile strength is at least 1.2 GPa."

II. Two notices of opposition were received on 17 August 1995 (opponent I) and on 30 August 1995 (opponent II), respectively.

Opponent I requested revocation of the patent in its entirety on the grounds of Article 100(a) EPC, that the claimed subject-matter lacked novelty and inventive step, and of Article 100(b) EPC, that the invention was not sufficiently disclosed.

Opponent II requested revocation of the patent to the extent of claims 1 to 6 and 9 to 14 on the grounds of Article 100(a) EPC, that the claimed subject-matter lacked novelty and inventive step.

The oppositions are supported, *inter alia*, by the following documents:

D1: EP-A-0 360 358

D6: EP-A-0 456 306

III. In an interlocutory decision announced at the end of oral proceedings, the Opposition Division found that amended claims 1 to 9, received on 18 April 1996 and forming the sole request, fulfilled the requirements of the EPC. Claim 1 as granted had not been amended. According to that decision, *inter alia*:

- (a) The amendments to the claims and the description fulfilled the requirements of Article 123 EPC, paragraphs 2 and 3.
- (b) The invention in the patent in suit was sufficiently disclosed and met the requirements of Article 83 EPC.
- (c) The patent in suit validly claimed the priority right, in accordance with T 73/88 (OJ EPO 1992, 557).
- (d) As a consequence of the validity of the priority claim, the date of priority counted as the filing date for the patent in suit, so that D6 did not belong to the prior art, whereas D1 was prior art pursuant to Article 54(3) EPC.
- (e) The subject-matter of claim 1 was novel, in particular over D1.
- (f) As to inventive step, the claimed subject-matter was not obvious over the cited prior art.

IV. Two notices of appeal against that decision were received on 22 August 1997 by opponent II (appellant I) and on 26 August 1997 by opponent I (appellant II), respectively. The prescribed appeal fee was paid on the

same days. The statements of the grounds of appeal were received on 3 November 1997 (appellant II) and on 4 November 1997 (appellant I), respectively.

Appellant II filed *inter alia* the original version of European patent application 90 201 177 (D14), the first priority document of D6.

- V. By letter dated 15 May 1998, the proprietor (respondent) filed an amended set of claims 1 to 8 as the sole request, which replaced the previous request on file. Amended claim 1 read as follows:

"Fibres, tapes and films made of an orientated carbon monoxide-ethylene copolymer, characterized in that the modulus of elasticity is at least 30 GPa and the tensile strength is at least 1.2 GPa."

Furthermore, ASTM-D790-86, cited on page 5, line 47 of the patent in suit, was submitted as document D15.

- VI. By a communication in preparation for the scheduled oral proceedings, the Board detailed *inter alia* the following points to be discussed:

- (a) The interpretation of the term "modulus of elasticity" in amended claim 1;
- (b) The validity of the priority right of the patent in suit. In particular, attention was drawn to G 2/98 (OJ EPO 2001, 413);
- (c) The assessment of novelty over any of D1 and D6.

- VII. In response, by letter received on 4 April 2002, the respondent withdrew the request for oral proceedings

and announced that they would not attend.

VIII. By letters received on 2 May 2002 (appellant I) and on 22 May 2002 (appellant II), respectively, the appellants announced that they would not attend the oral proceedings and requested a decision on the basis of the written submissions made during the opposition and appeal proceedings.

IX. Oral proceedings were held on 13 June 2002 in the absence of the parties, in compliance with Rule 71(2) EPC.

X. As to novelty, the arguments of the appellants can be summarised as follows:

(a) The subject-matter of the claims of the patent in suit, in particular that of claim 1, was not entitled to the priority date as claimed.

According to the patent in suit, the modulus of elasticity referred to was the tangent modulus of elasticity determined at 80% of the elongation at break (E-modulus (80%)), whereas the priority document referred only to the general term "modulus".

Since the modified modulus of elasticity of claim 1 in suit could not be directly and unambiguously derived from the priority application, and since the general term "modulus" of the priority document and the E-modulus (80%) of claim 1 of the patent in suit were not the same, as shown for instance in table 1 of the patent in suit, the subject-matter of claim 1 of

the patent in suit and that of the priority application had not the same content.

Therefore, claim 1 of the patent in suit did not enjoy the priority date of 19 May 1989.

Consequently, the subject-matter of claim 1 was only entitled to the filing date of the patent in suit.

As a further consequence thereof, D6 was an earlier European application pursuant to Article 54(3) EPC, as far as it was entitled to the priority right of European patent application 90 201 177 of 9 May 1990.

- (b) The subject-matter of claim 1 of the patent in suit lacked novelty.

D6 disclosed fibres made of CO/ethylene copolymer, which, according to any of Examples 1k, 1p and 1q, had an initial modulus of elasticity higher than 30 GPa and a tenacity (tensile strength) greater than 1.2 GPa. This also applied to the fibres of Examples 2a-2e, 3c, 6b-d and 7a of D6. All these fibres had been mentioned in the first priority document of D6.

Since the E-modulus (80%) as defined and exemplified in the patent in suit was always greater than the initial modulus also exemplified therein for comparison, these fibres of D6 consequently anticipated the subject-matter of claim 1 in suit.

XI. The counter-arguments of the respondent can be



summarised as follows:

- (a) The term "elongated objects" in claim 1 as granted, objected to as encompassing more subject-matter than that of the priority document, had been replaced by the term "fibres, tapes and films", in compliance with the priority document.
- (b) The features of the claimed subject-matter which were not present in the priority document were neither related to the effect nor to the character and nature of the invention.
- (c) In particular, the modulus in the priority document had been measured in accordance with ASTM D-790-86 as well.

Consequently, the priority right could be validly claimed.

- (d) Therefore, D6 did not belong to the prior art at all.

XII. The appellants (opponents) requested that the decision under appeal be set aside and that the patent be revoked.

XIII. The respondent (patentee) requested that the appeal be dismissed and that the patent be maintained on the basis of the set of claims filed by letter dated 15 May 1998.

### **Reasons for the Decision**

1. The appeals are admissible.

*Novelty*

2. The appellants have argued that the subject-matter of claim 1 in suit lacks novelty, *inter alia* over specific embodiments of D6. Since D6 was filed after the priority date of the patent in suit, the assessment of novelty requires an examination of the entitlement to the claimed priority date for the subject-matter of amended claim 1 in the light of the description.

*The terms of claim 1*

- 2.1 Claim 1 concerns fibres, tapes and films made of an orientated carbon monoxide-ethylene copolymer, which are defined by a specified modulus of elasticity and a specified tensile strength.

According to page 5, lines 43 to 54, of the patent in suit, the following items of information concerning the modulus of elasticity can be gathered:

- (a) The tensile strength and the modulus of elasticity are determined using a Zwick 1435 tensile strength tester on test pieces having a clamped length of 150 mm using a pulling speed of 15 mm/min (ie 10% of the clamped length/min) in an environment with a temperature of 21°C and a relative humidity of 65%.
- (b) The stress-strain curves of the oriented CO-copolymer fibres show a shape analogous to that in Figure X1.1 in Appendix 1 of ASTM standard D790-86, so that, analogous to the determination of the

flex modulus according to this standard, the tangent modulus also gives a more representative value than the initial modulus in interpretation of these curves.

- (c) The "modulus of elasticity" is the tangent modulus of elasticity determined in the point where the elongation is 80% of the elongation at break. In the examples it is referred to as "E-modulus(80%)".
- (d) For comparison the - less representative - initial modulus is also given in the measurement results, derived from the stress-strain curve in the range of 0 to 0.4% strain.

From the appendix to standard method ASTM D-790-86, in particular from Figure X1.1 and its explanation given therein, it can be gathered that the values of the tangent modulus are always determined by compensating for the presence of a toe region at the beginning of the stress-strain curve, ie by determining the modulus in a linear region after the initial toe region by constructing a tangent to the maximum slope of the stress-strain curve.

The presence of a toe region and of a linear region in the stress-strain curves of the claimed fibres was confirmed by the letter of the respondent dated 15 May 1998 (point 1.4).

These facts are reflected in the values for the tangent modulus of elasticity (E-modulus (80%)) in comparison with the values for the initial modulus, both exemplified in the patent in suit for the same fibres.

According to tables 1 to 8 of the patent in suit, the values for the initial modulus of elasticity of all tested fibres are always lower than their corresponding values for the tangent modulus of elasticity (E-modulus (80%)).

Consequently, for the same fibres, the tangent modulus of elasticity as specifically defined in the patent in suit can only be greater than the corresponding initial modulus of elasticity.

From the above reasons it follows that, for the same fibre of CO-ethylene copolymer, any initial modulus of elasticity of at least 30 GPa would inevitably correspond to a higher value for the tangent modulus of elasticity (E-modulus (80%)) and would thus fall within the range defined in amended claim 1 under appeal.

*Entitlement to priority date of the patent in suit*

2.2 The appellants have argued that the subject-matter of claim 1 is not entitled to the priority date as claimed in the patent in suit.

2.2.1 According to decision G 2/98 (see point VI-b *supra*) of the Enlarged Board of Appeal, the requirement for claiming priority of the "same invention", referred to in Article 87(1) EPC, means that priority of a previous application in respect of a claim in a European patent application in accordance with Article 88 EPC is to be acknowledged only if the skilled person can derive the subject-matter of the claim directly and unambiguously, using common general knowledge, from the previous application as a whole. By that decision, former decision T 73/88 (see point III-c *supra*), mentioned in

the decision under appeal and dealt with in G 2/98, had been overruled.

2.2.2 Priority application NL 8901253 of 19 May 1989, in its English version as filed pursuant to Rule 38(5) EPC, concerns polymer filaments, tapes and films with a high modulus and a high strength, which consist of an oriented carbon monoxide-ethylene copolymer (claim 1).

2.2.3 The filaments, tapes or films of the priority document have a high strength and a high modulus, **after uniaxial stretching** (emphasis added), of **more than 1.2 GPa** (emphasis added) and **more than 30 GPa** (emphasis added), respectively, or, **after biaxial stretching** (emphasis added), of more than 0.5 GPa and more than 5 GPa, respectively, and a high melting point compared with, for instance, polyethylene, of up to about 257°C at a CO content of 50% (see page 2, lines 16 to 22).

This passage is the only general disclosure in the priority document which refers to the ranges of values for strength and modulus, which values are in line with those as shown in Examples I to III.

Consequently, the values of the modulus of "more than 30 GPa" only apply to CO-ethylene copolymers **after uniaxially stretching** (emphasis added), whereas in amended claim 1 of the patent in suit the claimed modulus relates to any oriented CO-ethylene copolymers.

2.2.4 Furthermore, whilst in the priority document the modulus refers to "more than 30 GPa" and the strength to "more than 1.2 GPa", whereby these open ranges do not include the lower limiting values of 30 GPa and 1.2

GPa, respectively, the presently claimed ranges of "at least 1.2 GPa" and of "at least 30 GPa", respectively, do cover the lower limiting values of 30 GPa and 1.2 GPa.

2.2.5 According to Example 1 in the priority document, the stretched filament has a strength of 1.9 GPa and a modulus of 50 GPa, measured at room temperature with the aid of an Instron tensile strength tester at a drawing speed of 10% per minute (page 4, lines 22 to 25). However, there is no mention in the priority document whether such a modulus is the tangent modulus according to ASTM D-790-86 and whether it is determined in a point where the elongation is 80% of the elongation at break.

2.2.6 From the above, it follows that the values of the modulus of elasticity defined in amended claim 1 and interpreted in light of the description do not result directly and unambiguously from the priority document as a whole. Hence, the priority application does not disclose the subject-matter of amended claim 1.

Consequently, the date of priority cannot count as the date of filing for the subject-matter of claim 1 of the patent in suit (Article 89 EPC). Therefore, the relevant date for determining the prior art which may be cited against the subject-matter of amended claim 1 is the date of filing of the European patent in suit, namely 16 May 1990.

*Priority right of D6*

2.3 European patent application 91 201 040.2 was filed on 2 May 1991, claiming a first priority date of 9 May

1990, which lies before the relevant filing date of the patent in suit, and was published as D6 on 13 November 1991, ie after the filing date of the patent in suit.

2.3.1 Since the relevant date for determining the prior art is the filing date of the patent in suit (see point 2.2.6 above), D6 will become prior art pursuant to Article 54(3)(4) EPC, if the first priority date is validly claimed.

2.3.2 Examples 2k, 2p and 2q, respectively, of the first priority document of D6, namely D14, correspond identically to Examples 1k, 1p and 1q of D6 as filed and published, so that for the subject-matter of these examples the first priority date is valid.

Consequently, the subject-matter of any of Examples 1k, 1p and 1q of D6 is prior art pursuant to Article 54(3) EPC.

2.3.3 The patent in suit has been granted for the Contracting States: AT, BE, CH, DE, DK, ES, FR, GB, IT, LI, NL and SE.

From the file of European patent application 91 201 040.2, it results that designations fees were validly paid for the following Contracting States: AT, CH, DE, FR, GB, IT, LI and NL.

Consequently, in accordance with Article 54 EPC, paragraphs 3 and 4, in conjunction with Rule 23a EPC, D6 is comprised in the state of the art in respect of the overlapping Contracting States.

*Assessment of novelty over D6*

2.4.1 According to table 1 of D6, Examples 1k, 1p and 1q disclose the preparation of fibres by spinning a solution of an alternating copolymer of carbon monoxide and ethylene, wherein the spinning dope contains 1.02 parts of polymer having an intrinsic viscosity of 6.1 (determined in meta-cresol at 25°C), 12.45 parts of phenols and 1.25 parts of acetone. The spinning bath comprises acetone at a temperature of -5°C.

The fibre of Example 1k is drawn in a one-step mode at a temperature of 225°C and a draw ratio of 12.8. The fibres of Examples 1p and 1q are drawn in a two-step mode at temperatures of 225°C (1st step)/250°C (2nd step) and draw ratios of 18 and 20, respectively.

Filament properties are measured on fibres that have been conditioned at 20°C and 65% relative humidity for at least 24 hours. Tenacity (breaking tenacity), elongation (breaking elongation) and initial modulus are obtained by breaking a single filament or a multi filament yarn on an Instron tester. The gauge length for single broken filaments is 10 cm. All samples are elongated at a constant rate of extension of 10 mm/min (page 6, lines 38 to 42). The results for 3 filaments are averaged.

Therefore, the parametric properties in table 2 of D6 have been obtained under conditions corresponding to those in the patent in suit, in particular for conditioned fibres elongated at the same relative rate of 10% of the gauge length per minute.

2.4.2 Table 2 summarizes *inter alia* the tenacity and initial modulus of the fibres of Examples 1k, 1p and 1q.



According to the said table, the fibre of Example 1k has a tenacity (GPa) of 1.63 and an initial modulus (GPa) of 30.7, whilst the fibres of Examples 1p and 1q (obtained by two-step drawing and higher draw ratios) have a tenacity (GPa) of 1.9 and 2.1, and an initial modulus (GPa) of 51.2 and 55.0, respectively.

Furthermore, the elongations at break (%) of the fibres of Examples 1k, 1p and 1q, ie 6.2, 5.0 and 3.6, respectively, are at the same level as those of the fibres of the patent in suit (examples, eg table 1).

2.4.3 For the reasons given under point 2.1 *supra*, it is apparent that the values of the exemplified initial modulus of the fibres of Examples 1k, 1p and 1q of D6, in particular those of the fibres of Example 1q, are greater than the values for the initial modulus given in table 1 of the patent in suit for the fibres whose tangent modulus (E-modulus (80%)) is of at least 30 GPa as defined in amended claim 1. Hence, the exemplified values of tenacity (strength) and modulus of elasticity in these examples of D6 do fall within the definition of amended claim 1.

2.4.4 Therefore, the fibres resulting from the preparations in Examples 1k, 1p and 1q of D6 take away the novelty of the fibres defined in amended claim 1 of the patent in suit. Thus, the subject-matter of claim 1 is not novel pursuant to Article 54 EPC, paragraphs 3 and 4, as far as the overlapping Contracting States are concerned (point 2.3.3 *supra*).

2.4.5 Consequently, the ground of opposition under Article 100(a) EPC prejudices the maintenance of the patent in amended form according to the sole request.

3. The respondent has not filed any further requests, and in particular no request under Rule 87 EPC taking into account the different state of the art for different Contracting States, nor has he made any attempt to comment on the substantive points under Articles 54 (novelty over D1 and D6), 56, 83 and 123(3) EPC addressed in the Board's communication.

Therefore, there is no basis on which the further points addressed in the Board's communication may be discussed.

4. For the above reasons, the patent in suit must be revoked under Articles 111(1) and 102(1) 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:

C. Eickhoff

R. Teschemacher