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**Datasheet for the decision  
of 14 December 2017**

**Case Number:** T 0731/14 - 3.3.03

**Application Number:** 04017147.2

**Publication Number:** 1619217

**IPC:** C08L23/10, C08L23/16,  
B32B27/32, H01B7/00

**Language of the proceedings:** EN

**Title of invention:**  
Cable with thermoplastic insulation

**Patent Proprietor:**  
Borealis Technology Oy

**Opponent:**  
PRYSMIAN CAVI E SISTEMI ITALIA S.r.l.

**Relevant legal provisions:**  
EPC Art. 54, 56  
RPBA Art. 12(4), 13(1), 13(3)

**Keyword:**  
Late-filed document  
Novelty - main request (yes)  
Inventive step - auxiliary request (no)  
Late-filed request - justification for late filing (no)



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Case Number: T 0731/14 - 3.3.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.03**  
**of 14 December 2017**

**Appellant:** PRYSMIAN CAVI E SISTEMI ITALIA S.r.l.  
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**Decision under appeal:** Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
21 January 2014 concerning maintenance of the  
European Patent No. 1619217 in amended form.

**Composition of the Board:**

**Chairman** D. Semino  
**Members:** D. Marquis  
C. Brandt

## Summary of Facts and Submissions

I. The appeal lies against the decision of the opposition division posted on 21 January 2014 concerning the maintenance of European patent No. 1 619 217 in amended form.

II. The European patent was granted on the basis of 26 claims, claim 1 reading as follows:

"1. Insulation layer for cables comprising a composite, whereby the composite comprises a heterophasic polymer composition (A) comprising

a polypropylene matrix (1) having a melting enthalpy of 25 to 70 J/g at a temperature range of 135 to 170°C measured according to DSC-ISO 11357 and dispersed therein

a propylene copolymer (2) having a weight average particle size of less than 1 µm, and a melting enthalpy of 0.5 to 75 J/g at a temperature range of 100 to 130°C measured according to DSC-ISO 11357."

III. A notice of opposition was filed in which revocation of the patent in its entirety was requested.

IV. During opposition proceedings, the following documents *inter alia* were cited:

D1: WO 00/41187

D2: Transmission Electron Microscope (TEM) photomicrograph of Hifax CA10A

D3: Zucchelli U., Communications Cabling EC97-IOS PRESS 1997, pages 49-56

D5: EP 1 345 901 A1

D6: C. Lotti et al., "Mechanical and Morphological Characterization of Polypropylene Toughened with Olefinic Elastomer", Materials Research, Vol. 3, No. 2, pages 37-44, 2000

D7: Polypropylene handbook, Edited by E.P. Moore Jr., Carl Hanser Verlag, 1996, pages 149-151, 245-248

D8: R.J. Kersting, "Development of UNIPOL PP High Melt Flow Polypropylene Impact Copolymers with Improved Impact Stiffness Balance", pages 109-124, published for the conference Polyolefins 2000, The international Conference of Polyolefins, Houston, TX (USA), February 27-March 1, 2000

D9: WO 02/03398

D13: Pölt et al. "Characterisation of Modified Polypropylene by Scanning Electron Microscopy", J. Appl. Polym. Science, 78, (2000), pages 1152-1161

V. The decision of the opposition division was announced at the oral proceedings on 21 November 2013. The decision was based on a main request (claims 1-26 as granted) and on a first auxiliary request filed on 16 November 2011.

VI. According to the decision of the opposition division, claim 24 of the main request was not sufficiently disclosed.

The first auxiliary request however, the claims of which corresponded to the claims of the patent as granted without claim 24, met the requirements of sufficiency of disclosure. The claims of the first auxiliary request were novel in view of the documents D1 and D9, since it had not been shown that the melting enthalpy of the polypropylene matrix as well as the melting enthalpy and the particle size of the propylene copolymers forming the heterophasic polymers described

in these documents were as claimed. The particle size of the propylene copolymer forming the dispersed elastomeric phase of the heterophasic polymers according to D1 and D9 could also not be derived from any of the documents cited. Since D9 did not disclose a combination of polyethylene and thermoplastic polymer, claims 13-15 were also novel over D9.

The heterophasic polymers of example 1 and example 2 of D1 represented the closest prior art. The claimed subject matter differed from these examples of D1 in the value of the melting enthalpy and the particle size of the propylene copolymer. Since it had not been shown that any effect resulted from these features, the problem solved had to be seen as the provision of an alternative insulation cable having environmental friendly features, being usable at high operational temperatures (above 90°C) and simultaneously presenting good mechanical properties (e.g. high impact and tensile strength). None of D1 alone, or any of D5-D8 suggested the solution that was claimed in the first auxiliary request, which was therefore inventive.

The set of claims of the first auxiliary request met the requirements of the EPC.

VII. The opponent (appellant) lodged an appeal against that decision. The following additional documents were cited in the statement of grounds of appeal:

- D23: data sheet of Hifax CA10A dated 24 May 2013
- D24: data sheet of Hifax CA10A dated 1 February 2005
- D25: DSC curve of Hifax CA10A presently on the market
- D26: Zhi-qiang Fan et al, Polymer 42 (2001), pages 5559-5566
- D27: DSC curve of n-heptane extract of Hifax CA10A

- D28: DSC curve of residue of Hifax CA10A after extraction with n-heptane
- D29: SEM microphotograph of Hifax CA12A and relevant particle distribution
- D30: graphic elaboration of Figure 4 of D1
- D31: data sheet of Hifax CA12A dated 16 December 2009
- D32: data sheet of Hifax CA12A dated 28 July 2005
- D33: WO 2004/066318
- D34: report of telephone consultation with the Examiner

VIII. The reply to the statement of grounds of appeal of the patent proprietor (respondent) contained a main request (corresponding to the first auxiliary request as maintained by the opposition division) as well as three auxiliary requests.

IX. In a communication sent in preparation of oral proceedings, the Board summarised the points to be dealt with and provided a preliminary view on the disputed issues.

X. With letter of 14 November 2017, the respondent filed the following documents:

- D35: Grein et. al, "Melt viscosity effects in ethylene-propylene copolymers", Rheol Acta (2007) 46:1083-1089
- D36: Horiba Scientific - A guidebook to particle size analysis, Horiba Instruments, Inc., 2012
- D37: Technical data sheet of Adflex Q 200 F dated June 10, 2017
- D38: TEM image of the random propylene copolymer used in Example 3 and Comparative Examples 1 and 2 of the patent in suit

as well as four auxiliary requests. The first and second auxiliary requests were based on a main claim as recited below.

First auxiliary request

"1. Insulation layer for cables comprising a composite, whereby the composite comprises

a heterophasic polymer composition (A) and

a polyethylene (B),

wherein the heterophasic polymer composition (A) comprises

a polypropylene matrix (1) which is a random propylene copolymer and is having a melting enthalpy of 25 to 70 J/g at a temperature range of 135 to 170°C measured according to DSC-ISO 11357 and dispersed therein

a propylene copolymer (2) having a weight average particle size of less than 1 µm, and a melting enthalpy of 0.5 to 75 J/g at a temperature range of 100 to 130°C measured according to DSC-ISO 11357."

Second auxiliary request

"1. Insulation layer for cables comprising a composite, whereby the composite comprises

a heterophasic polymer composition (A) and

a polyethylene (B),

wherein the heterophasic polymer composition (A) comprises

a polypropylene matrix (1) which is a random propylene copolymer and is having a melting enthalpy of 25 to 70 J/g at a temperature range of 135 to 170°C measured according to DSC-ISO 11357 and dispersed therein

a propylene copolymer (2) having a weight average particle size of less than 1 µm,

and wherein the propylene copolymer (2) and the polyethylene (B) have a melting enthalpy of 0.5 to 75 J/g at a temperature range of 100 to 130°C measured according to DSC-ISO 11357."

- XI. With letter of 15 November 2017, the appellant filed the standard DIN EN ISO 527-2 (Determination of tensile properties of plastics, renumbered as D39) into the proceedings.
- XII. Oral proceedings were held on 14 December 2017. During the oral proceedings the respondent withdrew the third and fourth auxiliary requests filed with letter of 14 November 2017.
- XIII. The arguments provided by the appellant, as far as relevant to the present decision, can be summarised as follows:

Admittance of evidence filed in appeal

D23 to D34 should be admitted into the proceedings. These documents were filed in response to the reasoning regarding novelty that was provided by the opposition division in its contested decision. In particular, D33



should be admitted into the proceedings as it was highly relevant to the novelty of the opposed patent. D33 was submitted at the appeal stage since the opposition division did not accept the correspondence between the product Hifax KS080 disclosed in D1 and Adflex Q 200 F and disregarded the evidence contained in D17 and D18.

D35 to D38 were all late filed documents and were not relevant to the proceedings. In particular, D37 was a very recent technical datasheet about a product for which an older version had already been provided earlier in the proceedings. As for D38, it had not been shown in how far that document could be relevant to the present case since it only contained a microphotography for which insufficient data was provided. D35 to D38 should not be admitted into the proceedings.

D39 should be admitted into the proceedings as it showed that the specimen whose properties were described in D23 had been prepared by injection moulding, as in the case of the other datasheets provided (D3 and D24).

Main request

Novelty

D1 disclosed insulation layers according to claim 1 of the main request containing the commercially available products Hifax CA10A (copolymer 2) and Hifax CA12A (copolymer 3).

Claim 1 of the main request required the melting enthalpies of both components (1) and (2) of the heterophasic polymer composition to be within defined

ranges but it did not indicate whether the enthalpies had to be measured on the whole composition or on the isolated components. D27 and D28 showed that the melting enthalpies measured on the isolated components of a commercially available Hifax CA10A were within the claimed ranges. It could therefore be concluded that the melting enthalpies of the copolymer 2 of D1 were as claimed in the main request.

Also, the TEM microphotograph of Hifax CA10A provided in D2 showed that that product had an average particle size as claimed. Since D3, D23, D24 and D25 showed that the characteristics of Hifax CA10A had remained the same over the years, it was established that the product used in D2, D27 and D28 was the same as the copolymer 2 used in D1. For these reasons, the main request lacked novelty over D1.

The graphical determination of the melting enthalpy that was carried out in D30 on the basis of Figure 4 and Table 1 of D1 showed that Hifax CA12A corresponding to the copolymer 3 had melting enthalpies as claimed. A weight average particle below 1  $\mu\text{m}$  could be derived from D29 showing a SEM microphotograph of Hifax CA12A. D3, D31 and D32 established that the characteristics of Hifax CA12A had not changed since its disclosure in D1. Also for these reasons, the claimed subject matter lacked novelty over D1.

#### Inventive step

D1 represented the closest prior art. None of the examples provided in the patent in suit established the presence of an improvement resulting from the selected particle size over the known compositions of D1. The problem was therefore the provision of an alternative

material as cable insulation with respect to those already known from D1. D5, D6, D7 and D8 taught that the average particle size of the dispersed rubber phase was the most effective way to improve impact strength of heterophasic propylene copolymers. D5 to D8 therefore provided a motivation for the skilled person to use a heterophasic polypropylene having an average particle size according to claim 1 of the main request. The fact that none of these documents referred to applications as insulating material for cables, nor disclosed the melting enthalpies of the polymers did not render their teaching irrelevant when assessing the inventive step of the claimed subject matter. The claimed subject matter lacked an inventive step.

Admittance of the first and second auxiliary requests

The auxiliary requests had been filed late and raised new issues. There was however no objection to their admittance into the proceedings.

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

Admittance of evidence filed in appeal

D23 to D33 should not be admitted into the proceedings due to their late filing and lack of prima facie relevance. Moreover, documents D23 to D25, D27 to D29 as well as D31 and D32 were not prior art documents in the present case, since they were all published after the filing date of the patent in suit.

D35 to D38 were relevant to the proceedings and did not open new issues. Also, these documents were filed in reply to questions arising from the communication of

the Board as well as the arguments provided by the appellant in writing. D35 to D38 should be admitted into the proceedings.

Main request

Novelty

Copolymer 2 (Hifax CA10A) disclosed in D1 was not according to the main request since the melting enthalpy corresponding to the propylene fraction (23,8 J/g in Table 1) was outside the claimed range of 25 to 70 J/g. Besides, the DSC analysis of the commercially available Hifax CA10A (D25) showed that its melting enthalpy between 135 and 170°C was not according to the main request. D27 and D28 were not relevant since the melting enthalpies disclosed therein were measured on the isolated components of Hifax CA10A and not on the whole composition as in the patent in suit.

D1 was also silent about the weight average particle size of the dispersed phase and none of the additional pieces of evidence showed that the compositions of D1 had a weight average particle size within the claimed range. Besides, the documents provided at most allowed the determination of the number average particle size and not of the weight average particle size. Since the values obtained for the number and weight average particle size on the same particles could differ, it was not possible to conclude that any of the documents provided disclosed a weight average particle size within the claimed range.

As to Hifax CA12A, a comparison of the impact strength property as determined in D3 and D31 showed that the

product had changed over the years. Also, the quality of the SEM microphotograph of Hifax CA12A provided in D29 was not such that it could allow for a determination of the particle size.

The claimed subject matter was therefore novel over D1.

#### Inventive step

D1 represented the closest prior art and in particular the insulating layer of comparative example 4 which contained the copolymer 3 could be considered as a suitable starting point. The problem solved over D1 was to provide an insulation layer showing an improved balance between flexural modulus, impact strength and high temperature stiffness. The examples of the patent in suit, in particular example 3 and comparative examples 1 and 2 showed that that problem was solved by the claimed subject matter. Example 3 of the patent in suit was representative of claim 1 as the base polymer 3 also contained an ethylene propylene rubber (EPR). That could be derived from D13. D1 was silent as to the solution to that problem, namely using a dispersed phase having a weight average particle size of less than 1  $\mu\text{m}$ . D1 was also silent as to a number of requirements regarding the flexural modulus, the elongation at break, the charpy impact strength, shrinkage and sagging and processability which the insulating layer had to fulfil in the patent. Even if the problem was seen as the provision of an alternative, claim 1 was inventive because D1 did not show that these requirements had to be fulfilled. Since D5 disclosed materials for thin-wall packaging and food packaging, its teaching was not relevant to cable insulation layers as claimed. The same applied to D6-D8. Even if these documents disclosed a particle size

within the claimed range, they did not suggest the use of copolymers with such particle sizes for insulation layers as claimed.

The same reasoning applied when starting from the copolymer 2 of D1 with the further difference relating to the melting enthalpies of the components of the heterophasic polymer. There was no teaching in the art towards the claimed ranges of melting enthalpies. D1 actually taught a melting enthalpy of 0 J/g for the elastomeric component that was outside the claimed range. The claimed subject matter was therefore inventive over D1.

Admittance of the first and second auxiliary requests

The auxiliary requests were filed in response to the communication of the Board. The modifications performed were such that the claimed subject matter better corresponded to the examples provided in the patent in suit. They did not add any complexity to the case since claim 1 of these requests was based on dependent claims of the granted patent. The first and second auxiliary request should therefore be admitted into the proceedings.

- XV. The appellant requested that the decision under appeal be set aside and that the European patent No. 1619217 be revoked.
- XVI. The respondent requested that the appeal be dismissed and the patent be maintained as allowed by the opposition division (main request), alternatively, that the patent be maintained on the basis of any of the first and second auxiliary requests, filed with letter dated 14 November 2017.

## **Reasons for the Decision**

1. Admittance of evidence filed in appeal
  - 1.1 D23 to D32 and D34, whose admittance into the proceedings was contested by the respondent, were filed by the appellant with the statement setting out the grounds of appeal. These documents were meant to show that the melting enthalpies and particle size of the components contained in the commercial Hifax products (CA10A and CA12A) disclosed as copolymers 2 and 3 in D1 were according to the claimed subject matter. The documents were filed in response to the reasoning of the opposition division which found that the evidence to that effect provided in the first instance was insufficient (second and last paragraph on page 10, first, fourth and fifth paragraphs on page 11 of the contested decision). D23 to D32 and D34 were therefore timely filed by the appellant and their filing can be seen as a legitimate reaction to the decision. Under these circumstances, these documents are part of the appeal proceedings under Article 12(4) RPBA.
  - 1.2 D33 is a document according to Article 54(3) EPC that was first filed by the appellant with the statement setting out the grounds of appeal to object to the novelty of claim 1 as maintained by the opposition division. As all the requests in the proceedings however fail on the grounds of lack of inventive step in view of D1, there is no need for the Board to decide on the admittance of D33 into the proceedings.

- 1.3 Documents D35 to D39 were all filed after the oral proceedings before the Board had been arranged.
- 1.3.1 D35, D36 and D38 were filed by the respondent in order to show that the quality of the TEM images provided by the appellant was inadequate and could not have been used to provide a reasonable determination of the average particle size of heterophasic copolymers. That issue however was not new to the appeal proceedings since it had already been addressed by the opposition division in its contested decision (fifth paragraph of page 11). These documents could and should therefore have been filed with the reply to the statement of grounds of appeal and not only a month before the oral proceedings before the Board. Since there is no justification for the filing of these documents at such a late stage and their admission would have created a situation where the opposing party had to be given the opportunity to provide counter evidence, the Board finds it appropriate to exercise its discretion under Article 13(1) RPBA by not admitting these documents into the proceedings.
- 1.3.2 The same applies to the documents D37 and D39. D37 and D39 were filed in order to show that the composition of the commercially available product Adflex Q 200 F cited against the novelty of the claimed subject matter had undergone significant change over the years and that the differences observed in the tensile properties reported for the commercially available product Hifax CA10A in D3, D23 and D24 could be accounted for by a different moulding method of the specimen. These issues were also addressed in the third, fifth and in the last paragraph of page 10 of the decision under appeal. For the same reason as above, D37 and D39 are not admitted into the proceedings.



Main request

2. Novelty

2.1 D1 relates to coating layers for cables based on heterogeneous copolymers with a propylene-based thermoplastic phase and an ethylene-based elastomeric phase copolymerized with an  $\alpha$ -olefin, said heterogeneous copolymer being essentially free of crystallinity deriving from polyethylene sequences (claim 1).

2.2 D1 discloses in particular insulating coating layers that are based on the commercially available heterogeneous copolymers Hifax CA10A (Copolymer 2) and Hifax CA12A (Copolymer 3) (page 13, lines 9-13 and Table 2). These heterogeneous copolymers are relevant to the claimed subject matter, since they are composed of a propylene-based thermoplastic phase corresponding to the propylene matrix (1) of claim 1 of the main request and an ethylene-based elastomeric phase copolymerized with propylene corresponding to the propylene copolymer (2) of that same claim (D1, page 12, lines 12-16). The enthalpies of fusion of these two phases for each copolymer are reported in Table 1 of D1. These enthalpies of fusion were however obtained under different conditions in D1 and in the patent in suit, by considering the area of the DSC curve below and above 130°C in D1 (page 5, lines 1 to 6) whereas it was determined in the temperature ranges of 100 to 130°C and 135 to 170 °C in the patent in suit (claim 1). Since the enthalpy of fusion derived from the DSC analysis varies significantly with that temperature range, it can therefore not be concluded on

the basis Table 1 of D1 alone whether the enthalpies of fusion of the copolymers 2 and 3 fall under the claimed ranges. Also, D1 does not disclose the weight average particle size of the elastomeric phase of copolymers 2 and 3.

#### Melting enthalpies

- 2.3 An attempt was made to derive the enthalpies of fusion in the ranges of 100 to 130°C and 135 to 170 °C corresponding to the ranges of claim 1 from complementary DSC analysis performed on commercially available products alleged to correspond to copolymer 2 or from the DSC curves provided in D1 in the case of copolymer 3.
- 2.4 Regarding copolymer 2 of D1, it was contended that since claim 1 did not require the melting enthalpies of the two phases to be measured on the heterogeneous copolymer, the melting enthalpies could also be measured on each phase individually after separation from the heterogeneous polymer. To that extent, the DSC analysis provided in D27 and D28 was performed on the two separated phases of a commercially available Hifax CA10A copolymer. Since the melting enthalpies of each phase taken in isolation were within the claimed ranges (8.29 J/g between 100 and 130°C and 47.995 J/g between 135 and 170°C), it was argued that Hifax CA10A was according to claim 1 of the main request.
- 2.5 The argument of the appellant is based on an interpretation of the claimed subject matter according to which the melting enthalpies defining the heterophasic polymer would be intrinsic properties of the individual components taken in isolation rather than correspond to properties of the components as part

of the heterophasic polymer. That interpretation would however contradict the wording of claim 1 which defines each of the two components by their function and properties as part of the heterogeneous polymer. Indeed, component (1) is defined as a matrix, a function it can only fulfil within the heterophasic polymer and component (2) is defined by the weight average particle size it displays in that same matrix. Under these circumstances, the characterization of the components (1) and (2) of claim 1 by their intrinsic enthalpies, ignoring the context of the heterophasic polymer would not make technical sense, all the more as the melting enthalpies of both components can be measured by differential scanning spectroscopy (DSC) on the heterophasic polymer, as it was done in the examples of the patent in suit (paragraph 55 and Tables I and II) and in D1, as can be derived from the passage on page 11, line 25 to page 12, line 7. For these reasons, the Board finds that the wording of claim 1 is unambiguous and refers to the melting enthalpies of the components (1) and (2) within the heterophasic polymer. As a result, the argument of the appellant based on the determination of the melting enthalpies from the isolated polymer components of Hifax CA10A fails. Considering Hifax CA10A as a whole, the appellant provided in D25 a determination of the melting enthalpies corresponding to the temperature ranges of 100 to 130°C and 135 to 170°C. Setting aside the question of whether the product analysed in D25 actually represents copolymer 2 of D1, it is already readily apparent from D25 that the melting enthalpy obtained between 135 and 170°C (12.647 J/g) is not in the claimed range of 25 to 70 J/g and thus it could in any case not be concluded from D25 that the copolymer 2 has melting enthalpies according to claim 1 of the main request.

2.6 Figure 4 of D1 shows the DSC curve of copolymer 3 (page 10, lines 13 and 14). An integration of the areas of that DSC curve over the temperature ranges of 100 to 130°C and 135 to 170°C was provided by the appellant in D30. Considering the relative proportions of these areas and the total enthalpy of copolymer 3 derivable from Table 1 of D1, the appellant calculated the melting enthalpies corresponding to the elastomeric phase (about 6 J/g in the range from 100 to 130°C) and the thermoplastic phase (about 32 J/g in the range from 135 to 170°C) of copolymer 3. These values fall under the claimed ranges of 0.5 to 75 J/g at a temperature range from 100 to 130°C for the propylene copolymer (2) and 25 to 70 J/g at a temperature range from 135 to 170°C for the propylene matrix (1) of the main request. That conclusion was not disputed by the respondent and so there is no reason for the Board to doubt that the melting enthalpies of the copolymer 3 of D1 are according to claim 1 of the main request.

#### Weight average particle size

2.7 The appellant contended that the microphotographic images of commercially available products Hifax CA10A (TEM image in D2) and Hifax CA12A (SEM image in D29) showed that the weight average particle size of the ethylene-based elastomeric phase of the copolymers 2 and 3 of D1 was less than 1 µm. It was however acknowledged at the oral proceedings before the Board that the images provided in D2 and D29 and the direct determination of the particle size provided did not show the weight average particle size but at most the number average particle size of particles. Since it was not disputed that the number average particle size generally differs from the weight average particle and

as no further evidence showing that the weight average particle size of the particles shown in D2 and D29 was less than 1  $\mu\text{m}$  was provided, the argument of the appellant based on D2 and D29 fails. Under these circumstances, it cannot be concluded that the elastomeric phase of copolymers 2 and 3 of D1 has a weight average particle size of less than 1  $\mu\text{m}$ .

2.8 The Board concludes that claim 1 of the main request is novel over the disclosure of D1 related to copolymers 2 and 3. In view of the findings of the Board regarding the lack of inventive step of claim 1 of the main request, there is no need for the Board to decide on the novelty of claim 1 in view of other documents on file.

### 3. Inventive step

3.1 With regard to inventive step, the parties agreed that, as in the contested decision of the opposition division, D1 represented the closest prior art. The Board sees no reason to deviate from this choice.

3.2 Document D1 relates to heterogeneous copolymers comprising a propylene-based thermoplastic phase and an ethylene-based elastomeric phase copolymerized with an  $\alpha$ -olefin (claim 1) that are analogous to the heterophasic polymer composition of the patent in suit. The use of such a heterogeneous copolymer in D1 is said to provide a flexible recyclable coating with excellent mechanical properties in terms of breaking load and elongation at break, improved mechanical performance levels under hot conditions as well as suitable for coating low-voltage, medium-voltage and high-voltage electrical cables (page 5, line 22 to page 6, line 2). In particular, the passage on page 13,

lines 9 to 13 mentions that the copolymers 1 and 2, which are shown in Table 2 to display low tan-delta and relative permittivity values, can be used in insulating coating for cables. The passage on page 12, lines 12-16 of D1 discloses that the heterogeneous copolymers of D1, including copolymer 2 comprises a propylene phase and a second phase containing propylene and ethylene units. That copolymer is analogous to the heterophasic polymer composition (A) of the patent. It is however readily apparent from the data contained in Table 1 of D1 that the melting enthalpies of copolymer 2 do not correspond to the ranges of claim 1 of the main request and that the weight average particle size of the ethylene containing phase is not disclosed.

3.3 Although, in terms of technical features, copolymer 3 of D1 could be seen as the closest example to the presently claimed compositions since it was not disputed that its melting enthalpies were according to claim 1 of the main request (see novelty analysis, in particular points 2.3 to 2.6), the skilled person would not take as a starting point a comparative example, which by its nature is not representative of the solutions proposed in the document. It is therefore not the copolymer 3 of D1 which represents the closest prior art but rather the copolymer 2.

3.4 Claim 1 of the main request defines ranges for the melting enthalpies of the two phases of the heterophasic polymer that are defined in different terms as the melting enthalpies of copolymer 2 of D1 and the weight average particle size of the propylene copolymer (2) corresponding to the ethylene-based elastomeric phase copolymerized with propylene in D1 is less than 1  $\mu\text{m}$ , while it is not specified in the copolymers of D1.

- 3.5 While the description mentions that the heterophasic compositions of the patent may display other properties relating to the flexural modulus (paragraph 40), the elongation at break (paragraph 41) and the Charpy impact strength (paragraph 42) of the compositions or the shrinkage and sagging of the produced cables (paragraph 52), the patent does not indicate that the compositions of claim 1 must fulfill any requirement in that regard to provide insulating layers for cables. In fact, the properties mentioned by the respondent are all defined in general terms and by way of preferred ranges in the patent in suit. In any case, since none of these properties is mentioned in claim 1, they cannot constitute distinguishing features with regard to the insulating layers for cables disclosed in D1.
- 3.6 The examples and comparative examples of the patent in suit show several copolymer compositions defined by their base polymers, melting enthalpies, weight average particle size and optionally the presence of a modifier (Tables I and II). Example 3 and comparative examples 1 and 2 which contain the same base polymer (base polymer 3) were seen by the respondent to be the most relevant examples in order to establish the presence of an effect associated with either the melting enthalpies or the weight average particle size as defined in claim 1 of the main request. However, these compositions differ significantly from one another, in particular since they contain different modifiers, as shown in example 3 (modifier 5, a low density polyethylene) and comparative example 1 (modifier 6, a linear low density polyethylene) and in comparative example 2 (no modifier). Since the patent teaches that polyethylene modifiers alter the mechanical properties of the compositions (paragraph 34), it cannot be ascertained

whether any effect related to the mechanical properties of these compositions, as shown in Table II, originates from the claimed characterizing features or from the additional differing components of the composition.

3.7 Furthermore, base polymer 3 present in these examples is only identified in Table I as comprising a random propylene copolymer as polymer matrix (1) without indication of any other polymer contained in that matrix. It can therefore also not be ascertained whether base polymer 3 is according to claim 1 of the main request. It was argued that the random propylene copolymer of the base polymer 3 additionally comprised a small amount of co-crystallizable ethylene-propylene-rubber (EPR) on the basis of D13. D13 is a scientific article relating to the characterization of modified polypropylene by scanning electron microscopy. It is indicated in the introduction of D13 on page 1152 that ethylene-propylene-rubber (EPR) may generally be added in polypropylene as a modifier to form a three phase system. It cannot be derived therefrom that that general information is in any way related to the patent in suit and in particular to the base polymer 3 of its examples. It can therefore not be concluded that base polymer 3 is a composition according to claim 1 of the main request.

3.8 Therefore, with regard to the evaluation of the technical effects or advantages of the claimed insulation layers with respect to the one disclosed in D1, the examples of the patent do not provide a comparison with the closest prior art D1. Also, no evidence was provided that shows that the choice of the propylene matrix (1) and propylene copolymer (2) in view of their melting enthalpies and the weight average particle size has as such an effect over the insulation



layers of D1. In that respect, it cannot be concluded that the insulating layers according to claim 1 of the main request display improved mechanical properties by comparison to those of D1. Under these circumstances, the problem solved can only be seen in the provision of further insulation layers for cables.

3.9 As the problem is simply the provision of further insulation layers for cables, the skilled person would make any arbitrary choice within the teaching of D1 without exercising any inventive activity, including choices relating to the components of the heterogeneous polymer composition by way of their melting enthalpies or particle size.

3.9.1 With regard to the melting enthalpies, the teaching of D1 is to use heterogeneous copolymers essentially free of crystallinity deriving from polyethylenic sequences which in quantitative terms means that the melting enthalpy, referred to as enthalpy of fusion in D1, of peaks below 130°C can be up to 3 J/g (page 4, line 26 to page 5, line 6) and that these heterogeneous copolymers lead to flexible coatings with excellent mechanical properties (page 5, lines 22 to 25). In the case of the copolymer 2 the values of melting enthalpy reported in Table 1 are 23.8 J/g for the polypropylene phase corresponding to the matrix component (1) of the patent and 0 J/g for the elastomeric ethylene copolymer phase corresponding to component (2) of the patent. The skilled person of D1 would therefore consider components with melting enthalpies varying around these values and up to 3 J/g for the elastomeric ethylene copolymer phase to be within the teaching of D1. Even if the melting enthalpies according to the patent and to D1 were obtained under different conditions, it is

readily apparent from the values disclosed that they are of the same order of magnitude.

3.9.2 The teaching relating to melting enthalpies in the patent in suit is on the same level as that of D1. It relates to the the incorporation of a comonomer in the propylene matrix (1) in order to lower its crystallinity and melting enthalpy (paragraphs 28 and 29), the use of a propylene copolymer (2) having a melting enthalpy of below 10 J/g in order to provide layers with impact strength and flexibility (paragraph 31) and the provision of melting enthalpy ranges for both the propylene matrix (1) and the propylene copolymer (2) as they are defined in claim 1 (paragraph 39). As a result, it can be concluded that the skilled person working within the disclosure of D1 and seeking further insulation layers for cables would also consider working within the ranges of melting enthalpy of claim 1 of the main request.

3.9.3 As to the weight average particle size, D1 does not provide a specific teaching in that regard. The control of the average particle size of the elastomer phase in the heterophasic propylene polymer compositions is however generally known in the art as exemplified by D5 (claim 1), D6 (conclusions on page 44) and D7 (last paragraph, page 246) and the average particle size disclosed in these documents is analogous to the range of particle sizes considered in the patent in suit (D5, claim 1: 0-2  $\mu\text{m}$ ; D6, last paragraph of page 43: 0.5-1.0  $\mu\text{m}$ ; D7, last sentence of page 246: about 0.4  $\mu\text{m}$ ). While it is clear that the particle size considered in these documents is not necessarily a weight average particle size and the compositions disclosed in these documents may to some extent differ from those of the patent, these documents are

nevertheless relevant since they indicate that small particles with sizes of the same order of magnitude than those of the patent were commonly known. Also, it has not been established that the definition of the particle size as weight average particle size is of particular significance for the properties of the claimed insulating layers as compared to any other definition of the particle size as disclosed in the cited prior art. The selection of ethylene-based elastomeric copolymers having a weight average particle size of less than 1  $\mu\text{m}$  as part of the heterogeneous copolymer in D1 is on this basis considered by the Board to correspond to one of the choices the skilled person is expected to make without any inventive activity to solve the problem of providing further insulation layers for cables.

- 3.10 It is therefore concluded that claim 1 of the main request does not involve an inventive step.
  
- 4. Admittance of the first and second auxiliary requests
  - 4.1 The first and second auxiliary requests were filed one month before the oral proceedings and more than two months after the communication conveying the preliminary opinion of the Board on that case. No reason was provided at filing as to why these requests were filed in replacement of auxiliary requests that had been filed with the reply to the statement of grounds of appeal.
  
  - 4.2 It was argued at the oral proceedings before the Board that the first and second auxiliary requests had been filed in order to provide a main claim 1 that would reflect the examples of the patent in suit and in

particular its example 3, that point having been addressed in the communication of the Board.

4.3 The question relating to the relevance of the examples and comparative examples of the patent in suit, including the calling into question of the base polymer of example 3 and the representativeness of the comparative examples in view of D1 was not first introduced by the Board in its communication, it was already a salient point of the discussion relating to inventive step provided with the statement of grounds of appeal (pages 9 to 11, points 1 to 5). The Board is therefore of the opinion that the communication of the Board did not raise the question of whether the claims reflected the examples of the patent in suit for the first time and did not raise new and separate objections against claim 1 of the main request that would have caused and justified the filing of the first and second auxiliary requests. On the contrary, since that issue was clearly known to the parties all along the appeal proceedings, these requests could and should have been filed with the reply to the statement of grounds of appeal and not just one month before the oral proceedings before the Board. On that basis, there was no reason to file new requests at that stage.

4.4 Besides, the late filing of the first and second auxiliary requests is such that the amendment performed in claim 1 of both requests, by further defining the claimed composition by a combination of features relating to the presence of a polyethylene (B) and the limitation of the polypropylene matrix (1) to a random propylene copolymer, creates a new situation in view of the discussion of inventive step that had not been considered before in the appeal phase.

4.5 The Board finds therefore that the complexity of the new subject matter submitted, the current state of the proceedings and the need for procedural economy all speak against the admittance of the first and second auxiliary requests into the proceedings (Article 13(1) RPBA). In addition, the Board also finds that the amendments performed in both auxiliary requests would either be irrelevant for the issue of inventive step (so that their admittance would have no impact on the outcome of the case) or raise new issues regarding inventive step which have not been debated before so as to put the Board and the appellant in the position not to be able to deal with them without adjournment of the oral proceedings (Article 13(3) RPBA). On that basis, the first and second auxiliary requests are not admitted in to the proceedings (Article 13 RPBA).

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. European patent No. 1619217 is revoked.

The Registrar:

The Chairman:



B. ter Heijden

D. Semino

Decision electronically authenticated