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**D E C I S I O N**  
**of 16 November 1999**

**Case Number:** T 0534/96 - 3.3.1

**Application Number:** 89202779.8

**Publication Number:** 0371528

**IPC:** C09D 167/00

**Language of the proceedings:** EN

**Title of invention:**

Triboelectrically processable powder coating

**Patentee:**

DSM N.V.

**Opponent:**

UCB, S.A.

Ciba Spezialitätenchemie Holding AG

**Headword:**

Powder coating/DSM

**Relevant legal provisions:**

EPC Art. 100(b), 123(2), (3)

**Keyword:**

"Sufficiency of disclosure (no) - no technical concept fit for generalisation - undue burden in carrying the invention throughout the whole area claimed - research program"

**Decisions cited:**

T 0789/89, T 0409/91, T 0435/91

**Catchword:**

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Boards of Appeal

Chambres de recours

Case Number: T 0534/96 - 3.3.1

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.1  
of 16 November 1999

**Appellant:** DSM N.V.  
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6411 TE Heerlen (NL)

**Representative:** -

**Respondent 1:** UCB, S.A.  
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**Representative:** Debled, Thierry  
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**Respondent 2:** Ciba Spezialitätenchemie Holding AG  
(Opponent 2) Klybeckstrasse 141  
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**Representative:** -

**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 17 April 1996  
revoking European patent No. 0 371 528 pursuant  
to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** A. J. Nuss  
**Members:** R. Freimuth  
R. T. Menapace



## Summary of Facts and Submissions

- I. The Appellant (Proprietor of the Patent) lodged an appeal on 7 June 1996 against the decision of the Opposition Division posted on 17 April 1996 revoking European patent No. 371 528 and filed on 27 July 1996 a written statement setting out the grounds of appeal.
- II. Notice of Opposition had been filed by the Respondent 1 (Opponent 1) and the Respondent 2 (Opponent 2), both requesting revocation of the patent in its entirety for lack of novelty and inventive step (Article 100(a) EPC), Respondent 1 additionally requesting revocation for insufficient disclosure of the invention (Article 100(b) EPC). The following documents were submitted *inter alia* in opposition proceedings:
- (1) Powder Coatings '85 Conference, Birmingham 1985, pages 8-1 to 8-19
  - (13) Powder Coatings (1985), pages 2 to 3
  - (35) DIN 55 990 (1980), part 8.
- III. The decision under appeal was based on four alternative sets of claims as amended during opposition proceedings, i.e. a main request and three auxiliary requests. The Opposition Division decided that the patent according to the then pending main and first auxiliary request did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art and that the patent did not involve an inventive step according to either request.

Having regard to the objection of insufficiency of disclosure pursuant to Article 100(b) EPC, the Opposition Division held that the limit on the reduction of the geltime of the claimed powder coating due to the addition of the additive as defined in claim 1 was a functional feature, which was the technical problem faced by the invention. The patent in suit comprised several examples disclosing successful additives, however, it had been shown that several additives exceeded the limit of the reduction of the geltime. The patent in suit lacked any guidance on how to reproduce its teaching within the whole scope claimed. Furthermore, the patent in suit was silent about the method for determining the geltime, although the geltime depended on several parameters, especially the temperature chosen in that method and on the amount of the additive incorporated in the powder coating. The search for suitable additives satisfying that functional feature imposed an undue burden of experimentation on the person skilled in the art exceeding normal routine work. Therefore, the patent in suit did not disclose a concept fit for generalisation and thus contravened the requirements of Article 83 EPC (cf. decision T 435/91, OJ EPO 1995, 188).

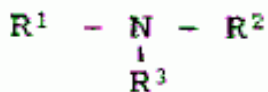
IV. In the letter submitted on 28 January 1997, the Appellant defended the maintenance of the patent in suit in amended form on the basis of a main request and an auxiliary request, both superseding all previous requests. The main request comprised a set of nine claims, claim 1 reading as follows:

"1. Triboelectrically processable powder coating based on a polyester-containing binding agent with 97-40 wt.%"

polyester and a curing agent, and a nitrogen-containing additive, characterized in that the nitrogen-containing additive is a sterically hindered tertiary amine or aminoalcohol which does not decrease the geltime of the coating more than 5/6 (compared to the geltime of the additive free system), and in that, bis-(1,2,2,6,6,-penta-methylpiperidyl)-(3',5',-di-tert-butyl-4-hydroxybenzyl)-butylmalonate (Tinuvin 144®), bis (1,2,2,6,6-pentamethyl-4-piperidinyl)-sebacate (Tinuvin 292®), and the oligomer of N-(2-hydroxyethyl)-2,2,6,6,-tetramethyl-4-piperidinol and succinic acid (Tinuvin 622®), are excluded as nitrogen-containing additive."

The auxiliary request comprised a set of eight claims, claim 1 reading as follows:

"1. Triboelectrically processable powder coating based on a polyester-containing binding agent with 97-40 wt.% polyester and a curing agent, and a nitrogen-containing additive, characterized in that the nitrogen-containing additive is a sterically hindered tertiary amine having the formula



where R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> are alkyl groups or aryl groups and where at least one of the R<sup>1</sup>, R<sup>2</sup> and R<sup>3</sup> groups is a branched alkyl group with at least 3 carbon atoms; and which does not decrease the geltime of the coating more than 5/6 (compared to the geltime of the additive free system)."

V. The **Appellant** submitted that the claimed invention was

sufficiently disclosed and that the subject-matter claimed was novel and involved an inventive step.

He argued that the method for determining the geltime of a powder coating was a routine test and specified in the DIN-norm (35). Moreover, the patent in suit disclosed a clear concept fit for generalisation in teaching the incorporation as an additive of a sterically hindered tertiary amine or amino alcohol excluding those acting as strong catalysts. That was the reason for indicating the functional feature in claim 1 of decreasing the geltime of the powder coating not more than 5/6. While conceding that several parameters influenced the geltime of the powder coating claimed, the Appellant argued that it was not difficult for a person skilled in the art to vary those parameters in order to select suitable sterically hindered tertiary amine. It should be noted that the decision T 435/91 (*loc cit.*) addressed in the decision under appeal was rather the exception than the rule - many patents with functional claims had been granted. That decision was not pertinent in the present case since it dealt with three additives "cooperating" together, whereas the claimed powder coatings referred to a single additive.

The Appellant submitted on 28 January 1997 two fresh sets of experiments, the first set to show the catalytic effect of several steric hindered amines in comparison with triethylamine and the second set to show different types of sterically hindered amines to be suitable additives in order to demonstrate that the patent did indeed teach a concept fit for generalisation.



- VI. The **Respondent 1**, after having made submissions as to the substance withdrew his opposition on 15 September 1997. So did the **Respondent 2**, after having made submissions as to the substance, on 3 July 1997.
- VII. Oral proceedings were held on 16 November 1999.
- VIII. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of a set of nine claims (main request) or on the basis of eight claims (auxiliary request), both sets submitted on 28 January 1997.
- IX. At the end of the oral proceedings the decision of the Board was given orally.

### **Reasons for the Decision**

1. The appeal is admissible.
2. *Parties to the appeal*

The declarations to withdraw their oppositions made by Respondents 1 and 2 are to be treated as a withdrawal of all their pending requests and as a withdrawal from the appeal proceedings. Thus, they cease to be a party to appeal proceedings as far as the substantive issues are concerned (see decision T 789/89, OJ EPO 1994, 482, points 2.3 and 2.6 of the reasons).

*Main request*

3. *Amendments (Article 123(2) and (3) EPC)*

Independent claim 1 as amended is derived from combining claim 1 and dependent claim 7 of the patent in suit as granted (cf. page 1, lines 24 to 26 of the application as filed). The amount of polyester as defined in claim 1 as amended, which is contained in the binding agent, finds support on page 3, line 17 of the application as filed. The mandatory presence of a curing agent in the powder coating is backed up by the disclosure on page 4, line 14 of the application as filed. The disclaimer in claim 1 as amended excludes the presence of three particular compounds as nitrogen-containing additive, which reflects the novelty-destroying disclosure of documents (1) and (13). According to the established jurisprudence of the Boards of Appeal, the exclusion of this subject-matter, which already belongs to the state of the art, does not contravene Article 123(2) EPC, even though that matter is not derivable from the application as filed.

Therefore all the amendments to claim 1 as granted comply with the requirements of Article 123(2) EPC.

Those amendments of claim 1 as granted bring about a restriction of the scope of the claims, and therefore of the protection conferred thereby, which is in keeping with the requirements of Article 123(3) EPC.

4. *Insufficiency of disclosure of the invention (Article 100(b) EPC)*

The main issue to be decided in this appeal is whether or not the decision under appeal was right to find that

the patent in suit did not disclose the claimed invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. The Appellant objected in particular to the finding of the Opposition Division that the subject-matter of claim 1 as a whole could not be carried out by a person skilled in the art because the additive comprised in the powder coating was defined by its function.

- 4.1 It is the established jurisprudence of the Boards of Appeal that the requirements of sufficiency of disclosure are only met if the invention as defined in the independent claim can be performed by a person skilled in the art in the **whole area claimed** without undue burden, using common general knowledge and having regard to further information given in the patent in suit (see decisions T 409/91, OJ 1994, 653, point 3.5 of the reasons; T 435/91, loc cit., point 2.2.1 of the reasons). That principle applies to any invention irrespective of the way in which it is defined, be it by way of a functional feature or not. The peculiarity of the functional definition of a technical feature resides in the fact that it is defined by means of its effect. That mode of definition comprises an indefinite and abstract host of possible alternatives, which is not objectionable as long as they all are available and achieve the desired result. Therefore, it has to be established whether or not the patent in suit discloses a technical concept fit for generalisation which makes available to the person skilled in the art the host of variants encompassed by the functional definition of a technical feature in that claim.

4.2 In the present case, the patent in suit aims at overcoming the problem of undesired catalytic activity of the tertiary amine additive comprised in the powder coating (see page 2, lines 3 to 14). The means provided to achieve this aim are indicated in claim 1 which is directed to a powder coating wherein the additive is a sterically hindered tertiary amine or aminoalcohol which does not decrease the geltime of the coating more than 5/6 (compared to the geltime of the additive free system). The latter feature of not reducing the geltime beyond the specified limit, which confines the catalytic activity of the additive, is a functional feature since it reflects the aim of the patent in suit to prevent any undesirable catalytic activity of the additive.

4.3 The definition of the additive in claim 1 contains in fact two parts: the result to be achieved and, in addition, the indication of a structural requirement to be met in order to obtain the result, i.e. a sterical hindrance of the tertiary amine or aminoalcohol. However, that structural definition comprises a practically unlimited number of individual additives since, apart from the sterical hindrance of the tertiary amine, their structure remains completely undefined and, thus, embraces **any** conceivable structural variation. Therefore, the structural definition of the additive in claim 1 covers any chemical compound once it comprises a sterically hindered tertiary amine group. The Appellant supported that finding in submitting in his letter on 28 January 1997 that the structural definition of the additive encompasses "many different types of sterically hindered tertiary amines". He exemplified those "types"

in his second test report, submitted on the same date, as having different functionalities, e.g. halide, carboxylic acid ester, vinyl, alkyl, aromatic, amide/imide and diamine groups.

The Appellant conceded during oral proceedings before the Board that not all the conceivable chemical compounds which comply with the structural definition given in claim 1 would necessarily satisfy at the same time the functional feature of not reducing the geltime beyond the specified limit. Therefore, the above structural definition of the additive comprises a host of possible chemical compounds which may or may not lead to the required limited reduction of the geltime.

In order to pick from that host those chemical compounds which satisfy the above functional feature for being a suitable additive, the person skilled in the art is confronted, however, with the uncontested fact that the reduction of the geltime is affected by a number of variables unrelated to the structure of the additive. In that respect Annex 3 to the minutes of the oral proceedings before the Opposition Division provides a table listing those variables affecting the geltime.

- 4.3.1 Firstly, the reduction of the geltime as defined in claim 1 is affected by the individual powder coating **system** used to determine the geltime. The functional group of the binding agent and the curing agent, both reacting together when forming the gel, may vary substantially. Functional groups of the polyester-containing binding agent are for example carboxylic acid or hydroxyl groups. The Appellant submitted during

the oral proceedings before the Board that even further functional groups on the polyester, e.g. epoxy or anhydride groups, may be envisaged. The curing agent may vary substantially as well; the table in the said annex 3 lists essentially different types thereof, e.g. epoxy, triglycidylisocyanurate, hydroxyalkylamide, glycoluril, blocked diisocyanate. That list is indeed not exhaustive.

4.3.2 Secondly, the reduction of the geltime as defined in claim 1 is affected by the **structure** of the binding agent and of the curing agent used to determine the geltime. Whether this structure is for example aromatic or aliphatic has a substantial impact on their reactivity and, thus, on the geltime measured.

4.3.3 Thirdly, the reduction of the geltime as defined in claim 1 is affected by the **concentration** of the additive in the powder coating used to determine the geltime. The former Respondent 2 evidenced this fact in Table II/2 of his test report submitted on 26 January 1996 in opposition proceedings: tert.-

butyldiethanolamine, which is an additive within the structural definition given in claim 1, shows a reduction of the geltime of the powder coating within the range of 1/2 to 95/100 dependent on the concentration of the additive therein varying from 1 wt.-% to 0.012 wt.-%; the latter value of that reduction satisfies the functional feature as defined in claim 1, whereas the former does not.

4.3.4 Fourthly, the reduction of the geltime as defined in claim 1 is affected by the **temperature** used in the method to determine the geltime. The former

Respondent 2 evidenced this fact in Table II/3 of his test report submitted on 26 January 1996 in opposition proceedings: tert.-butyldiethanolamine, which is an additive within the structural definition given in claim 1, shows a reduction of the geltime of the powder coating within the range of 60/100 to 73/100 dependent on the temperature used to determine the geltime varying from 170°C to 220°C.

- 4.4 It follows from the above, that there is no necessary correlation between the structural definition of the additive and the further functional requirement in claim 1 not to reduce the geltime beyond the specified limit. Therefore, the reduction of the geltime as defined in claim 1 necessarily varies unsystematically and unpredictably without any conclusive interdependency with the exact structure of the additive. Neither the common general knowledge nor the patent in suit provides any technical guidance according to which a person skilled in the art could identify the suitable individual additives without undue effort. The person skilled in the art trying to trace out additives meeting the functional definition set out in claim 1, does not have at his disposal any information leading necessarily and directly towards success through the evaluation of initial failures. Thus, the functional definition of the additive given in claim 1 is no more than an invitation to perform a **research program** in order to find the suitable additives (cf. decision T 435/91, point 2.2.1, last paragraph of the reasons).

For those reasons, in the Board's judgement, the invention as defined in independent claim 1 cannot be

performed by a person skilled in the art within the whole area claimed without undue burden, which pursuant to Article 100(b) EPC prejudices the maintenance of the patent.

- 4.5 The Board accepts that the person skilled in the art is acquainted with methods for determining the geltime which is a conventional parameter in the technical field of powder coatings. In that respect the Appellant pointed to the DIN-norm (35) which specifies in detail the modus operandi for determining the geltime, apart from the temperature to be used in that method. Thus, it appears to be possible for a person skilled in the art to determine the geltime of a powder coating.

However, the Appellant's conclusion that given the ability of a person skilled in the art to determine the geltime of a powder coating, the claimed invention cannot be objected to on the basis of Article 100(b) EPC is not valid. The decisive fact in the present case is that the person skilled in the art, whilst being able to measure the geltime, cannot carry out the invention without undue burden within the whole area claimed, since the functional definition of the additive in claim 1 merely invites him to perform a research program due to the lack of any technical guidance comprised in the patent in suit (cf. points 4.1. to 4.4 above).

5. In these circumstances, the Appellant's main request must fail as the patent in suit does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art pursuant to Article 100(b) EPC.



*Auxiliary request*

6. *Amendments (Article 123(2) and (3) EPC)*

Claim 1 according to the auxiliary request differs from that of the main request exclusively in combining the latter additionally with the subject-matter of claim 2 as granted, which renders the disclaimer in claim 1 according to the main request superfluous. This amendment is in accordance with the requirements of Article 123(2) and (3) EPC since it restricts the scope of the claims as granted and is backed up by claim 2 of the application as filed.

7. *Insufficiency of disclosure of the invention  
(Article 100(b) EPC)*

The definition of the additive in claim 1 according to the auxiliary request differs from that according to the main request exclusively in that the structural definition of the additive, i.e. the sterically hindrance of the tertiary amine, has been condensed in a chemical formula, while retaining the functional definition of that additive of not reducing the geltime beyond the specified limit. The structural definition still comprises a countless number of individual compounds not all of them being suitable additives as set out in point 4 above; with respect to that functional feature, the patent in suit is silent about any guidance according to which a skilled person could identify suitable additives without starting a research program. Therefore, the objections raised against claim 1 of the main request, which are based on the functional feature retained in claim 1 of the auxiliary

request, still apply to that claim of the auxiliary request resulting necessarily in the same conclusion that the invention as defined in independent claim 1 cannot be performed by a person skilled in the art within the whole area claimed without undue burden.

8. In these circumstances, the Appellant's auxiliary request must fail too for lack of sufficient disclosure pursuant to Article 100(b) EPC.

### **Order**

#### **For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:

E. Görgmaier

A. Nuss