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Datasheet for the decision of 12 November 2013

Case Number: T 2419/10 - 3.3.03

Application Number: 00939450.3

Publication Number: 1189972

IPC: C08G73/02, D21H17/55, D21H17/56, D21H27/10, D21H27/08

Language of the proceedings: EN

Title of invention:
PROCESS FOR PREPARING REDUCED BYPRODUCT POLYAMINE-EPIHALOHYDRIN RESINS

Patent Proprietor:
HERCULES INCORPORATED

Opponent:
Akzo Nobel N.V.

Headword:

Relevant legal provisions:
EPC Art. 54, 83, 111(1), 123(2)
RPBA Art. 13(1)

Keyword:
Late-filed request - admitted (yes)
Amendments - added subject-matter (no)
Sufficiency of disclosure - (yes)
Novelty - (yes)
Appeal decision - remittal to the department of first instance (yes)

Decisions cited:
T 0805/93

Catchword:

Beschwerdekammern
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Case Number: T 2419/10 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 12 November 2013

Appellant: (Patent Proprietor)	HERCULES INCORPORATED 1313 N. Market Street Hercules Plaza Wilmington Delaware 19894 (US)
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Representative:	Van Deursen, Petrus Hubertus Akzo Nobel N.V. Intellectual Property Department P.O. Box 9300 6800 SB Arnhem (NL)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 29 September 2010 revoking European patent No. 1189972 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman: B. ter Laan
Members: O. Dury
C. Brandt

Summary of Facts and Submissions

I. The appeal by the patent proprietor lies against the decision of the opposition division posted on 29 September 2010 revoking European patent No. EP 1 189 972, based on application N°. 00 939 450.3, corresponding to the international application filed as PCT/US2000/015027 and published as WO 00/77076.

II. The application as filed contained 291 claims, of which claims 94, 95, 109, 115 and 126 read as follows:

"94. A process for rendering a polyamine-epihalohydrin resin storage stable, comprising:
treating a composition containing a polyamine-epihalohydrin resin which includes CPD-forming species with at least one agent under conditions to at least one of inhibit, reduce and remove the CPD-forming species to obtain a gelation storage stable reduced CPD-forming resin so that a composition containing the reduced CPD-forming polyamine-epihalohydrin resin, when stored at pH 1 for 24 hours at 50°C and measured at 24 hours, produces less than about 1000 ppm dry basis of CPD."

"95. The process according to claim 94, wherein the composition containing the reduced CPD-forming polyamine-epihalohydrin resin, when stored at pH 1 for 24 hours at 50°C and measured at 24 hours, produces less than about 250 ppm dry basis of CPD."

"109. The process according to claim 95, wherein the at least one agent comprises at least one basic agent."

"115. A process for preparing a paper product, comprising:

treating a composition containing a polyamine-epihalohydrin resin which includes CPD-forming species with at least one agent under conditions to at least one of inhibit, reduce and remove the CPD-forming species to obtain a gelation storage stable reduced CPD-forming resin, and forming a paper product with the reduced CPD-forming polyamine-epihalohydrin resin, so that a paper product, when corrected for adding at about a 1 wt% addition level of the reduced CPD-forming resin, contains less than about 250 ppb of CPD."

"126. The process according to claim 115, wherein the at least one agent comprises at least one basic agent."

III. The granted patent contained 15 claims, of which claims 1, 11 and 13 read as follows (additions are indicated in **bold**, deletions in ~~strikethrough~~ in claim 1 as compared to original claim 94 and in claim 13 as compared to original claim 115):

"1. A process for rendering a polyamine-epihalohydrin resin storage stable, comprising:
treating a composition containing a polyamine-epihalohydrin resin which includes **3-chloropropanediol (**CPD**)**-forming species, **wherein the resin comprises a resin formed in a polyaminopolyamide-epihalohydrin reaction having a molar ratio of epihalohydrin to secondary amine group of less than 1**, with at least one **basic** agent, **wherein the at least one basic agent raises the pH of the composition containing the polyamine-epihalohydrin resin to a pH of about 10 to 12**, under conditions to at least one of inhibit, reduce and remove the CPD-forming species to obtain a gelation storage stable reduced CPD-forming resin so that a composition containing the reduced CPD-forming polyamine-epihalohydrin resin, when stored at pH 1 for

24 hours at 50 °C and measured at 24 hours, produces less than about **250** ~~1000~~ ppm dry basis of CPD, **wherein the reduced CPD-forming resin is acid stabilized after base treatment.** "

"11. The process according to claim 1, wherein the reduced CPD-forming resin is acid stabilized in a pH range of from about 2.5 to 4."

"13. A process for preparing a paper product, comprising:
treating a composition containing a polyamine-epihalohydrin resin which includes CPD-forming species, **wherein the resin comprises a resin formed in a polyaminopolyamide-epihalohydrin reaction having a molar ratio of epihalohydrin to secondary amine group of less than 1**, with at least one **basic** agent, **wherein the at least one basic agent raises the pH of the composition containing the polyamine-epihalohydrin resin to a pH of about 10 to 12**, under conditions to at least one of inhibit, reduce and remove the CPD-forming species to obtain a gelation storage stable reduced CPD-forming resin, acid-stabilizing the reduced CPD-forming resin, and forming a paper product with the reduced CPD-forming polyamine-epihalohydrin resin, so that a paper product, when corrected for adding at about a 1 wt% addition level of the reduced CPD-forming resin, contains less than about 250 ppb of CPD."

IV. Notice of opposition to the patent was filed on 21 December 2007, in which revocation of the patent in its entirety was requested on the grounds of Art. 100(a) EPC (both lack of novelty and lack of inventive step) and Art. 100(c) EPC.

In the decision under appeal reference was made, *inter alia*, to the following documents:

D1: US 4 929 309

D2: US 3 640 840

D15: Quantitative Organic Analysis via Functional Groups, 4th Ed., S. Siggia and J.G. Hanna, 1979, pages 567-572 (corresponding to document "A" specified on page 4, lines 1-2, of the decision)

The decision of the opposition division was based on a single request consisting of maintenance of the patent as granted. According to the decision, the admissibility of the ground of opposition according to Art. 100(b) EPC, although late-filed, had not been contested by the patent proprietor and was considered *prima facie* relevant. The requirements of Art. 100(b) and 100(c) EPC were satisfied, but the subject-matter of granted claim 1 was anticipated by example 2 of D1 read in combination with D2.

V. On 1 December 2010, the patent proprietor (appellant) lodged an appeal against the above decision. The prescribed fee was paid on the same day. In the statement of grounds of appeal filed on 9 February 2011, the appellant requested that the patent be maintained as granted and submitted

D22: Experimental Report of Mr. R. Riehle

VI. With letter of 12 October 2011 the respondent (opponent) requested the dismissal of the appeal and filed

D23: Declaration and experimental report by Mr. C. de Jong

D24: Declaration and experimental report by Mr. M.G. Simons.

VII. In a communication issued on 6 June 2013 accompanying the summons to oral proceedings to be held on 12 November 2013, the Board set out its preliminary view of the case and indicated that further submissions should be filed before 12 September 2013. Regarding Art. 123(2) EPC, the appellant was asked to indicate where the specific combinations of technical features being claimed were to be found in the application as filed.

VIII. With letter of 11 September 2013 the appellant submitted further arguments and filed

D25: Declaration and experimental report by Mr. D.L. Hopkins

It was further requested that the patent be maintained in amended form according to a single request replacing the request then pending and consisting of the following two claims (additions in **bold**, deletions in ~~strikethrough~~ as compared to original claims 94 and 115, respectively):

"1. A process for rendering a polyamine-epihalohydrin resin storage stable, comprising:
treating a composition containing a polyamine-epihalohydrin resin which includes **3-chloropropanediol (**CPD**)**-forming species, **wherein the resin comprises a resin formed in a polyaminopolyamide-epihalohydrin reaction having a molar ratio of epihalohydrin to secondary amine group of less than 1**, with at least one **basic** agent, **wherein the at least one basic agent raises the pH of the composition containing the**

polyamine-epihalohydrin resin to a pH of about 10 to 12, under conditions to at least one of inhibit, reduce and remove the CPD-forming species to obtain a gelation storage stable reduced CPD-forming resin so that a composition containing the reduced CPD-forming polyamine-epihalohydrin resin, when stored at pH 1 for 24 hours at 50°C and measured at 24 hours, produces less than about **250 ppm** dry basis of CPD, **wherein the reduced CPD-forming resin is stabilized after base treatment by adding an acid to reduce the pH to less than 6**."

"2. A process for preparing a paper product, comprising:
treating a composition containing a polyamine-epihalohydrin resin which includes CPD-forming species, **wherein the resin comprises a resin formed in a polyaminopolyamide-epihalohydrin reaction having a molar ratio of epihalohydrin to secondary amine group of less than 1**, with at least one **basic** agent, **wherein the at least one basic agent raises the pH of the composition containing the polyamine-epihalohydrin resin to a pH of about 10 to 12**, under conditions to at least one of inhibit, reduce and remove the CPD-forming species to obtain a gelation storage stable reduced CPD-forming resin, **stabilizing the reduced CPD-forming resin by adding an acid to reduce the pH to less than 6**, and forming a paper product with the reduced CPD-forming polyamine-epihalohydrin resin, so that a paper product, when corrected for adding at about a 1 wt% addition level of the reduced CPD-forming resin, contains less than about 250 ppb of CPD."

IX. At the beginning of the oral proceedings held on 12 November 2013 the appellant submitted an auxiliary request which was, however, not maintained.

X. The appellant's arguments as relevant for the present decision may be summarised as follows:

Main request

Admissibility

a) The main request was filed two months before the oral proceedings. The amendments made did not change the scope of granted claims 1 and 13 in substance and could not have taken the respondent by surprise. For these reasons, the main request should be admitted to the proceedings.

Amendments

b) The subject-matter of claim 1 was derivable from the combination of claim 109 with the passages on page 9, line 21, to page 10, line 2 and page 27, lines 7-14, of the application as filed. Although treatment time and temperature indications were also given in those passages, the critical parameters for obtaining gelation storage stable resins were only the molar ratio of epihalohydrin to secondary amine group, the pH after treatment with a basic agent and the pH after acid treatment, which were specified in claim 1.

c) The subject-matter of claim 2 was derivable from claim 126 with the same passages of the application as filed as identified for claim 1.

d) Therefore the main request satisfied the requirements of Art. 123(2) EPC.

Sufficiency of disclosure

e) The molar ratio of epihalohydrin to secondary amine group was a definite property of the polymer defined in claim 1 and could be unambiguously determined by appropriately using various methods. Although NMR would now be the accepted method, both titration according to D15 and NMR would have been contemplated at the priority/filing date of the patent in suit. D25 showed that NMR and the titration method according to D15, the latter when adapted for high molecular weight polymers such as those defined in the present claims, led to the same result. The different results obtained by the respondent in D23 and D24 resulted from the use of too small a sample of resin in D23, against the teaching of D15. The skilled person would have been aware that the titration method of D15, which was exemplified using low molecular weight compounds, would have to be adapted for polymers having a high molecular weight, in particular by selecting appropriate solvents. Such an adaptation was normal practice and had not been performed in order to shift the result to that obtained by NMR.

Since the method used in D23 was flawed, the respondent had not shown that the the claimed processes could not be carried out.

f) Decision T 805/93 (of 20 February 1997; not published in OJ EPO) dealt with the determination method of viscosity, which was a more controversial parameter than the molar ratio of epihalohydrin to secondary amine group under discussion in the present case. Therefore, the

conclusion drawn in T 805/93 did not apply to the present case.

Novelty over D1

g) The appellant had repeated example 2 of D1 and had shown that the resin prepared therein was obtained using a molar ratio of epihalohydrin to secondary amine group of 1.4. As explained in the patent in suit and as illustrated in the letter of the appellant dated 12 September 2008 (section II), a reaction performed using such a molar ratio led to the production of a resin containing more CPD-forming species than a reaction performed using a molar ratio of less than 1 according to claim 1. Therefore, the resin prepared in example 2 of D1 was structurally different from that defined in operative claims 1-2, which was further reflected by the parameter of less than 250 ppm CPD production specified in claim 1.

Therefore, example 2 of D1 did not anticipate the subject-matter of claims 1-2.

XI. The respondent's arguments as relevant for the present decision may be summarised as follows:

Main request

Admissibility

a) No justification had been provided why the main request, which was late-filed, could not have been filed earlier. The main request constituted a fresh case, which had not been examined by the

opposition division. It should not be admitted to the proceedings.

Amendments

b) The specific combination of claimed features could be arrived at only by combining different passages of the application as filed and by arbitrarily selecting various embodiments for the ranges of molar ratio of epihalohydrin to secondary amine group (less preferred), the pH obtained after treatment with a basic agent (most preferred) and pH after acid treatment (less preferred). The processes claimed were also not limited in terms of the temperature and the treatment time of the treatment with a basic agent. Therefore, the subject-matter of each of claims 1 and 2 was not directly and unambiguously derivable from the application as filed.

Sufficiency of disclosure

c) No method was indicated in the patent in suit for determining the molar ratio of epihalohydrin to secondary amine group, which was an essential feature of the process claimed. In that respect, various methods would have been available in the literature, including the titration method and NMR, which had both been cited by the appellant (D15; D22). However, it had been shown in D23 (titration) and D24 (NMR) that those methods led to significantly different results. The explanations given by the appellant to refute D23 were purely speculative, as was the alleged necessary adaptation of D15. There was also no evidence on file that the skilled person would

have been aware that the titration method of D15 had to be adapted when applied to polymers according to present claims 1-2 and that the necessary adaptation could have been done relying only on common knowledge. D25 showed that the skilled person had to test several solvents in order to have the result of the titration method coincide with NMR.

Under these circumstances, the skilled person had not been provided with sufficient information in order reliably to carry out the process according to claim 1.

d) In decision T 805/93 it had been concluded that if the determination of a parameter that was the only characterising feature of the claim over the prior art was not unambiguously defined, the claim complied neither with Art. 84 EPC nor with Art. 83 EPC. The same conclusion applied here.

e) Therefore, the requirements of Art. 83 EPC were not met.

Novelty over D1

f) In the repetition of example 2 of D1 made by the appellant, the molar ratio of epihalohydrin to secondary amine group of the resin was determined using NMR. However, the patent in suit did not indicate that NMR had to be used in that respect. Since different methods led to different results, as discussed in respect of sufficiency, the repetition of the appellant was not sufficient to show that the process of example 2 of D1 did not

anticipate present claim 1.

g) Therefore, the subject-matter claimed was not novel over example 2 of D1.

XII. The appellant (patent proprietor) requested that the decision under appeal be set aside and that the patent be maintained in amended form according to the request of two claims filed with letter of 11 September 2013.

The respondent (opponent) requested that the appeal be dismissed.

XIII. The Board announced its decision at the end of the oral proceedings.

Reasons for the Decision

1. The appeal is admissible.

Main request

2. Admissibility

2.1 The admission to the proceedings of the single pending request, which was filed in reply to the communication of the Board accompanying the summons to oral proceedings, is subject to the Board's discretion (Art. 13(1) RPBA).

2.2 Claims 1 and 2 of the sole pending request correspond to granted claims 1 and 13, respectively, which were previously pending, amended by replacing the expression

"is acid stabilized after base treatment" by "is stabilized after base treatment by adding an acid to reduce the pH to less than 6".

Considering the indications on page 1 of the appellant's submission dated 11 September 2013 regarding the support in the application as filed for the subject-matter now being claimed, the main request constitutes a *bona fide* reply to the issue of Art. 123(2) EPC identified in the communication of the Board. Furthermore, the main request was filed within the deadline set in the communication of the Board.

2.3 The amendment made by the appellant restricts the nature of the acid treatment step specified in granted claims 1 and 13. A similar feature was already present in granted claim 11, which had not been objected to, in particular not during the opposition proceedings or in the written phase of the appeal. Therefore, the amendment cannot be seen as being more complex than the claims as granted. Furthermore, it was not shown that granted claims 1 and 13 had been amended to such an extent that the respondent would not have been in a position to deal with these claims at the oral proceedings. Under these circumstances, the main request cannot be considered to constitute a fresh case, as argued by the respondent.

2.4 For these reasons, the main request was admitted to the proceedings.

3. Amendments

3.1 Claim 1 corresponds to claim 109 as originally filed with the following amendments:

(a) the resin comprises a resin formed in a polyaminopolyamide-epihalohydrin reaction having a molar ratio of epihalohydrin to secondary amine group of less than 1;
(b) the basic agent raises the pH of the composition containing the polyamine-epihalohydrin resin to a pH of about 10 to 12;
(c) acid stabilisation takes place after base treatment to reduce the pH to less than 6.

3.1.1 Whereas the application as filed is directed to various processes for treating a composition containing a polyamine-epihalohydrin resin that includes 3-chloropropanediol (CPD)-forming species (with an acidic agent, a basic agent and/or an enzymatic agent), operative claim 1 deals specifically with processes directed to the treatment of the resin with a basic agent. These processes are briefly disclosed in the "Summary of the invention" section (page 9, line 21, to page 10, line 2) and in more detail in the "Detailed description of the invention" section (page 25, line 11, to page 28, line 13) of the application as filed.

3.1.2 According to page 9, lines 21-26, the resin to be treated with a basic agent can comprise a resin formed in a polyamide-epihalohydrin reaction having a molar ratio of epihalohydrin to secondary amine group of less than 1, more preferably less than 0.975, even more preferably of 0.5 to 0.975, most preferably 0.8 to 0.975. In the sentence immediately following that statement, it is further indicated that the basic agent is used to raise the pH of the composition containing the polyamine-epihalohydrin resin to a pH of at least 8, more preferably at least 9, more preferably at least 10, preferably less than 12.5, with a preferred pH range of 10 to 12 (page 9, lines 26-29, of the

application as filed). Finally, at the end of the same paragraph, it is indicated that "the reduced CPD-forming resin can be acid stabilised, such as to a pH from about 2.5 to 4" (page 10, lines 1-2).

3.1.3 The information regarding the molar ratio of epihalohydrin to secondary amine group and the pH after treatment with the basic agent is further confirmed in the more detailed description of the process given on page 25, lines 12-15, and in the passage from page 25, line 31, to page 26, line 1, of the application as filed.

Concerning the pH range after addition of the acid, the passage of the "Detailed description of the invention" section shows that the range of "2.5 to 4" disclosed in the "Summary of the invention" section corresponds to the most preferred embodiment and that storage stable resins are already obtained when an acid is added so as to reduce the pH to less than 6 (page 27, lines 7-14).

The criticality of the molar ratio of epihalohydrin to secondary amine group for the base treatment is explained in detail in the paragraph bridging pages 25-26 of the application as filed. Similarly, the acid treatment is also disclosed as being essential in order to render the resin storage stable (page 27, lines 7-11 and 19-21, of the application as filed).

Although some indication of treatment time and temperature to be used is also disclosed in the passages identified above, there is no indication that those features are in any way critical for the treatment process defined in operative claim 1, contrary to the features molar ratio of epihalohydrin to secondary amine group, pH range after addition of

the basic agent and pH range after addition of the acid.

3.1.4 The processes encompassed by the application as filed can be used to treat various polyamine-epihalohydrin resins, including the polyaminopolyamide-epihalohydrin resins now being specified in operative claim 1 (page 11, lines 5-11, of the application as filed). These polyaminopolyamide-epihalohydrin resins are further consistently disclosed throughout the application as filed as being particularly preferred (see e.g. page 5, lines 5-11; page 6, lines 6-7 and 19-20; page 7, lines 4-22; page 8, lines 30-32; page 11, line 21; examples), independently of the type of treatment process.

3.1.5 For those reasons, the process according to operative claim 1 is derivable from the combination of original claim 109 with the passage from page 9, line 21, to page 10, line 2, taking into account the teaching of the application as filed as a whole. That passage in particular gives a specific basis for the combination of features in relation to the nature of the resin, the basic agent treatment, the pH range after basic treatment and the pH range after addition of the acid specified in operative claim 1. It was neither shown nor argued that the specific combination of features now being defined in operative claim 1 would in any way be special, in the sense that the subject-matter now being defined in claim 1 provides a technical contribution compared to the application as filed, e.g. that it results in improvements or additional effects for which the application as filed provides no basis. Under these circumstances, the amendments made do not generate a different invention compared to the application as filed. For these reasons, the subject-

matter of claim 1 is considered, in the present case, not to extend beyond the content of the application as filed.

3.2 Considering that claim 2 corresponds to claim 126 as originally filed with the same amendments (a)-(c) as identified in respect of claim 1 (section 3.1), the conclusion regarding claim 1 is also valid for claim 2.

3.3 Therefore, the requirements of Art. 123(2) EPC are met.

4. Sufficiency of disclosure

4.1 In order to meet the requirements of Art. 83 EPC, an invention has to be disclosed in a manner sufficiently clear and complete for it to be carried out by the skilled person without undue burden on the basis of the information provided in the patent specification, which means in the present case carrying out processes according to granted claims 1 and 2.

4.2 The process of operative claim 1 refers to the ratio of epihalohydrin to secondary amines of a polyaminopolyamide resin. However, the patent in suit gives no information regarding the method of determination of the amount of secondary amines in the polyaminopolyamide resin. In that respect, the parties indicated that at least two methods had been available at the priority date of the patent in suit, namely titration according to D15 or NMR. D15 was cited in the appellant's letter of 8 June 2010; NMR was used in the appellant's experimental report D22.

4.2.1 In the experimental report D25 the appellant/patent proprietor showed that the titration method according to D15 had to be adapted when it was applied to

polymeric compounds as defined in operative claim 1. It was in particular explained that the solvents mentioned in D15 had to be modified in order to adapt the titration method of low molecular weight compounds of D15 to the high molecular weight amines defined in operative claim 1 (D25: section 7). In section 8 of D25, the appellant further showed that various solvents had to be investigated before an appropriate solvent could be properly selected, since some of the solvents (alcoholic solvents) provided "inconsistent results" (D25: paragraph above Table II). The conclusion of the appellant that the solvent of D15 had to be adapted is confirmed by the respondent's experimental report D23, where it was found that either the solvent or the working conditions of D15 had to be optimised (D23: Table 3).

There is no reference to D15 in the patent in suit, and there is also no information in D15 regarding the selection of the solvents to be used. The appellant's conclusion that D15 taught that the choice of both the reaction media and the titration solvent could be adapted (D25: section 7, pages 567-568) is, thus, not supported by the facts and cannot be followed. Therefore, there is no evidence on file that the skilled person would have known that an adapted titration method according to D15 had to be used, nor what kind of adaptation had to be made in order to determine reliably the molar ratio of epihalohydrin to secondary amine group of a resin as defined in operative claim 1.

Therefore, although it may be concluded that at least one determination method for the amount of secondary amine group of a polyaminopolyamide specified in operative claim 1 was available at the priority date of

the patent in suit and would have been considered suitable by the skilled person, that method did not enable the skilled person to determine unambiguously the amount of secondary amine group specified in operative claim 1.

4.2.2 A comparison of D23 and D24 further shows that different determination methods (titration and NMR, respectively) led to significantly different results. According to D23 and D24, a sample of a batch of one specific polymer exhibited an amount of secondary amine group of 1.45 (titration) or 2.22 (NMR), the titration method thus leading to an underestimation of the amount of secondary amine groups.

4.2.3 To conclude, D22 to D25 show that the feature "secondary amine group of a polyaminopolyamide resin" specified in claim 1 cannot be unambiguously determined.

4.3 Under these circumstances, the question arises whether the ambiguity in the method of determination of the amounts of secondary amine group effectively leads to insufficient disclosure. In that respect, the question is whether that ambiguity is not in fact a matter of clarity according to Art. 84 EPC, which is not a ground of opposition and which cannot be addressed in the present case since the parameter molar ratio of epihalohydrin to secondary amine group was already present, in the same context, in granted claim 1.

4.3.1 In order to carry out the process according to operative claim 1, the skilled person has to be able

(a) to select the resin to be treated;

(b) to treat the resin in order to satisfy the defined requirement regarding the storage stability (less

than 250 ppm dry basis of CPD release under the conditions defined in claim 1).

Similarly, in order to carry out the process of claim 2, the skilled person has to be able

(a) to select the resin to be treated and

(b) to form a paper product that contains less than 250 ppb of CPD.

4.3.2 Regarding the selection of the resin to be treated, that resin is defined in operative claims 1 and 2 using the product-by-process formulation "a resin formed in a polyaminopolyamide-epihalohydrin reaction having a molar ratio of epihalohydrin to secondary amine group of less than 1".

According to the wording of the claims, the molar ratio of epihalohydrin to secondary amine group, i.e. the amount of secondary amine group, refers to the reaction mixture rather than to the product obtained by reacting epihalohydrin with the polyaminopolyamide. That reading is in line with page 26, lines 2-5, of the application as filed (last sentence of paragraph [0105] of the patent in suit). This conclusion, which was addressed during the oral proceedings before the Board, was not disputed by the parties.

The question to be answered is therefore whether or not the skilled person is in a position to select reliably a resin as defined in operative claim 1, taking into account the ambiguity shown above in the determination of the secondary amine group.

4.3.3 Experimental reports D23 and D25 show that if the titration method of D15 is not adapted, it leads to an underestimation of the secondary amine group of the

polyaminopolyamide resin (see point 4.2.1 above). Therefore, even if the skilled person were to use the method of D15 without properly adapting it, he would still have selected a polyaminopolyamide satisfying the criteria defined in operative claim 1 as formed in a polyaminopolyamide-epihalohydrin reaction having a molar ratio of epihalohydrin to secondary amine group of less than 1. Indeed, if the requirement of a molar ratio of epihalohydrin to secondary amine group is satisfied with an underestimated value of the secondary amine group parameter, it is also met with the correctly determined amount, which is larger.

In D25, the appellant further showed that when the method of D15 is properly adapted, it leads to the same result as obtained by NMR. Therefore, it is credible that, at the priority date of the patent in suit, the skilled person would have been in a position to select appropriately the resin on which to carry out the process according to operative claim 1.

4.3.4 Regarding the CPD-release parameter specified in claim 1, there is no evidence on file showing that the ambiguity in the determination method of the secondary amine group of the polyaminopolyamide resin would influence the determination of the parameter specified in claim 1 "less than 250 ppm CPD to be released upon storage" to the extent that the skilled person could not carry out the process.

The same is valid regarding the CPD parameter mentioned in claim 2.

4.3.5 Therefore, in the present case, it was not shown either that the ambiguity in the method of determination of the molar ratio epihalohydrin : secondary amine was

such that the resin to be treated could not be appropriately selected or that it would not allow the skilled person to treat such a resin so as to satisfy the requirements defined in operative claims 1 or 2. Hence, the ambiguity of the determination method of the secondary amine groups is not such that it amounts to a lack of sufficiency.

4.4 In decision T 805/93 it was considered that the lack of information on how the viscosity limit specified in the claims, which was the only characterising feature, was to be determined was such that the skilled person was not in a position to carry out the invention. That conclusion does not apply to the present case (see points 4.1 to 4.3 above). Moreover, in the present case the molar ratio of epihalohydrin to secondary amine group did not constitute the only characterising feature compared to D1 (see sections 5.4 and 5.5 below). Therefore, T 805/93 does not apply.

4.5 Under these circumstances, the requirements of Art. 83 EPC are met.

5. Novelty

5.1 The single novelty objection submitted by the respondent in the present appeal proceedings is in respect of example 2 of D1.

5.2 Example 2 of D1 discloses the reaction of 97.5 g of epichlorohydrin with 395 g of a 50% strength aqueous solution of a polyamidoamine prepared according to lines 35-51 (*sic*) of D2. The polyaminopolyamide-epichlorohydrin resin so obtained is first treated with a basic agent (NaOH) in order to obtain a pH of 10. After the desired viscosity is reached, that treatment

is followed by an acid treatment (benzenesulphonic acid) to a pH of 2.3. D2 further discloses in column 4, lines 48-51, that the 50% aqueous solution of polyaminopolyamide-epichlorohydrin resin obtained had "an equivalent weight of 340".

Since D2 does not define the meaning of "an equivalent weight", it could either be directed to the total amount of amines (as argued by the appellant) or only to the secondary amines (as argued by the opponent and as held in the contested decision).

5.3 The appellant showed in D22, which is a repetition of example 2 of D1, that the "equivalent weight of 340" disclosed in D2 represented the total amine content, the secondary amine equivalent weight being 526 as determined by NMR. Consequently, the molar ratio of epihalohydrin to secondary amine group used to prepare the resin of example 2 of D1 is calculated as being 1.4:1.

The argument of the respondent to refute D22 is based on the ambiguity in the determination of the secondary amines. However, as concluded in section 4.2.1, if the titration method according to D15 is not adapted properly, it leads to an underestimation (as compared to NMR) of the amount of secondary amine, i.e. the amount of secondary amine group would be found to be smaller than 526. Consequently the ratio epihaloydrin : secondary amine would even be larger than 1.4 (as determined by NMR in D22). Therefore, even if D15 were to be used without optimising the selection of the solvent(s), the molar ratio of epihalohydrin to secondary amine group used to prepare the resin of example 2 of D1 would still be outside the range

specified in operative claim 1. Therefore, the argument of the respondent cannot be followed.

5.4 The subject-matter of claim 1 requires the treatment of a composition containing a polyamine-epihalohydrin resin wherein the "resin comprises a resin formed in a polyaminopolyamide-epihalohydrin reaction having a molar ratio of epihalohydrin to secondary amine group of less than 1". That wording defines the resin to be treated in the form of a product-by-process. As explained in paragraph [0106] of the patent in suit and in more detail on pages 2-3 of the letter of the appellant dated 12 September 2008, using a molar ratio of epihalohydrin to secondary amine group of less than 1 reduces the amount of CPD-forming species, i.e. reduces the quantity of CPD esters formed. Although that explanation allows the conclusion that the amount of CPD esters formed in example 2 of D1 is higher than if a molar ratio lower than 1 had been used, it is not sufficient to demonstrate that the resin does not comprise a resin that could have been formed "in a polyaminopolyamide-epihalohydrin reaction having a molar ratio of epihalohydrin to secondary amine group of less than 1". The argument of the appellant that the resin *per se* would be structurally different is not supported by any evidence or facts.

5.5 Operative claim 1 requires the treated resin to produce less than about 250 ppm dry basis of CPD when stored at pH 1 for 24 hours at 50°C and measured at 24 hours.

There is no evidence on file that the resin prepared in example 2 of D1 satisfies that requirement. Considering that the molar ratio of epihalohydrin to secondary amine group used to prepare the polyaminopolyamide-epihalohydrin resin has a direct impact on the amount

of CPD-forming species formed (CPD esters), as explained above, there is no reason to expect that the composition of example 2 of D1 would meet that criterion.

5.6 Under these circumstances, example 2 of D1 does not directly and unambiguously disclose a process as defined in operative claim 1.

5.7 No further objections were made in respect of D1, and the Board sees no reason to depart from that view. The conclusion for claim 1 is in particular also valid regarding operative claim 2, which contains the same definition of the resin and is related to a different parameter related to CPD, which was not shown to be anticipated by D1.

5.8 Therefore, D1 does not anticipate the subject-matter of the main request.

6. Considering that further issues, such as novelty over documents other than D1 and inventive step, have not been either addressed in the contested decision or in the appeal proceedings, the case is remitted to the department of first instance for further prosecution (Art. 111(1) EPC).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance for further prosecution on the basis of the main request (claims 1 and 2) filed with letter of 11 September 2013.

The Registrar: The Chairman:

E. Goergmaier B. ter Laan

Decision electronically authenticated