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Datasheet for the decision of 22 October 2013

Case Number: T 2063/12 - 3.3.05

Application Number: 02022709.6

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IPC: C04B24/32, C04B24/26, // C04B103/40

Language of the proceedings: EN

Title of invention:
Cement dispersant, its production process, and cement composition using the cement dispersant

Applicant:
NIPPON SHOKUBAI CO., LTD.

Headword:

Relevant legal provisions:
EPC Art. 84

Keyword:
Clarity (all requests): no

Decisions cited:
T 0002/80, T 0032/82, T 1129/97, T 0541/09, T 2006/09

Catchword:

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Case Number: T 2063/12 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 22 October 2013

Appellant: (Applicant)	NIPPON SHOKUBAI CO., LTD. 1-1, Koraibashi 4-chome Chuo-ku Osaka-shi, Osaka 541-0043 (JP)
Representative:	Henkel, Breuer & Partner Patentanwälte Maximiliansplatz 21 80333 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 28 March 2012 refusing European patent application No. 02022709.6 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman: G. Raths
Members: G. Glod
D. Prietzel-Funk

Summary of Facts and Submissions

I. The present appeal lies from the decision of the examining division to refuse European patent application EP 02 022 709.6 with the title "cement dispersion, its production process, and cement composition using the cement dispersion" posted on 28 March 2012.

II. The examining division considered that claim 1 of the main request discussed during oral proceedings before the examining division did not meet the requirements of Article 123(2) EPC. The auxiliary request filed during these oral proceedings was not admitted into the proceedings since it did not overcome the objections previously raised.

III. The applicant (hereafter: the appellant) filed an appeal and submitted together with the grounds of appeal (letter dated 6 August 2012) a new main and five auxiliary requests.

IV. Together with the summons to oral proceedings, the Board gave a provisional non-binding opinion and raised objections under Articles 83, 84 and 123(2) EPC. In addition, it was pointed out that it needed to be discussed whether the skilled person knew how to determine the area proportion over the whole scope of the claim.

V. Oral proceedings were held on 22 October 2013 in the absence of the appellant. The appellant had not informed the Board about its non-appearance.

VI. The appellant's arguments concerning Articles 83, 84 and 123(2) EPC submitted in writing can be summarised as follows:

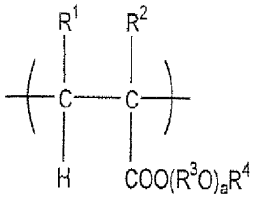
The amendments to new claims 1 and 3 of the main request found a basis on page 21, lines 2 to 12. The cement dispersant according to the present invention and the process for producing this cement dispersant according to the present invention were closely linked with each other so that any disclosure in connection with the cement dispersant equally applied to its production process and vice versa. An amendment had to be directly and unambiguously derivable for a person skilled in the art from the application as a whole.

The examining division's assumption that the polymer (P1) and the polymer (P2) showed two distinct peaks in a gel permeation chromatography (GPC) chart was rather hypothetical. Even if one considered this hypothetical scenario of two distinct peaks for the polymers P1 and P2, the area proportion as defined in claim 1 of the main request could nevertheless be determined by a person skilled in the art. In case of several heights labelled "1/2H", the skilled person would understand that the height located next to the top peak represented the height to be taken into consideration when determining the area proportion.

VII. Independent claim 1 of the new **main request** reads as follows:

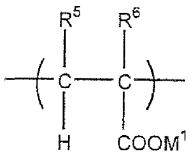
"*1. A cement dispersant, comprising a water-soluble polymer (P) as a main component, said water-soluble polymer (P) having a weight-average molecular weight of 30,000 to 150,000 and being constituted by a polymer (P1) part and a polymer (P2) part,*

said polymer (P1) part constitutes 60 to 99 mass% of said water-soluble polymer (P) and said polymer (P1) has a weight-average molecular weight of 10,000 to 500,000 and said polymer (P2) part constitutes 1 to 40 mass% of said water-soluble polymer (P) and said polymer (P2) has a weight average-molecular weight of not lower than 100,000 and a higher weight-average molecular weight than the polymer (P1); said polymer (P1) and polymer (P2) are respectively a polycarboxylic polymer (P-1) comprising: a polyoxyalkylene esteric constitutional unit (I) of the following general formula (1):



(1)

wherein: R^1 and R^2, being identical with or different from each other, represent a hydrogen atom or a methyl group; R^3O, being identical with or different from each other, represents an oxyalkylene group having 2 to 4 carbon atoms; "a" represents a molar-number-average degree of addition polymerization of the oxyalkylene group and is a number of 20 to 200; and R^4 represents a hydrogen atom or a hydrocarbon group having 1 to 3 carbon atoms; and a carboxylic constitutional unit (II) of the following general formula (2):



(2)

wherein R^5 and R^6, being identical with or different from each other, represent a hydrogen atom or a methyl group; and M^1 represents a hydrogen atom, a monovalent metal, a divalent metal, ammonium, or an organic amine;

wherein the mass ratio between the constitutional units constituting the polycarboxylic polymer (P-1) is in the range of constitutional unit (I) / constitutional unit (II) / constitutional unit (V) = (50 to 99)/(50 to 1)/(0 to 49), the total of the constitutional units being 100 mass%, wherein said constitutional unit (V) is derived from a monomer (e), which is copolymerizable with at least one of the other monomers; said cement dispersant displaying an area proportion in the range of 13 to 60% wherein the area proportion is defined by a measurement process including the following steps (1) to (9) of:

(1) measuring a weight-average molecular weight of the water-soluble polymer (P) by gel permeation chromatography (GPC);

(2) detecting a height (H) of the top peak of the resultant GPC chart;

(3) representing a value of a weight-average molecular weight indicating a height (1/2H) of 1/2 of the height of the top peak on the higher molecular weight side of the top peak by M_A;

(4) measuring an area (A_0) of a higher molecular weight side portion than the weight-average molecular weight M_A of the resultant GPC chart;

(5) representing a value of a weight-average molecular weight indicating a height (1/2H) of 1/2 of the height of the top peak on the lower molecular weight side of the top peak by M_B;

(6) measuring an area (B_0) of a lower molecular weight side portion than the weight-average molecular weight M_B of the resultant GPC chart;

(7) defining an area ratio A of the higher molecular weight side portion as $A = (A_0 \times 100)/(A_0 + B_0)$;

(8) defining an area ratio B of the lower molecular weight side portion as $B = (B_0 \times 100)/(A_0 + B_0)$; and

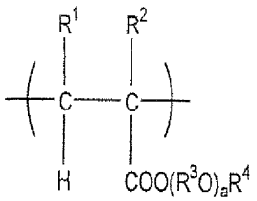
(9) defining a value (A – B), given by subtracting the area ratio B of the lower molecular weight side portion from the area ratio A of the higher molecular weight side portion, as the area proportion (%)."

Claim 1 of **auxiliary request 1** differs from claim 1 of the main request in that the following passage has been added at the end of claim 1 of the main request:

"said cement dispersant further displaying a value of not less than 15% in side proportion A_1 of the area of the higher molecular weight side portion of the total area (T) of the GPC chart ($A_1 = (A_0 \times 100)/T$)."

Claim 1 of **auxiliary request 2** reads as follows:

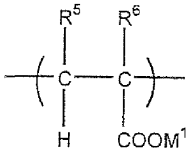
"*1. A process for producing a cement dispersant, which is a process for producing a cement dispersant including a water-soluble polymer (P) as a main component, said water-soluble polymer (P) having a weight-average molecular weight of 30,000 to 150,000 and being constituted by a polymer (P1) part and a polymer (P2) part,*
said polymer (P1) and polymer (P2) are respectively a polycarboxylic polymer (P-1) comprising: a polyoxyalkylene esteric constitutional unit (I) of the following general formula (1):



(1)

wherein: R^1 and R^2, being identical with or different from each other, represent a hydrogen atom or a methyl group; R^3O, being identical with or different from each

other, represents an oxyalkylene group having 2 to 4 carbon atoms; "a" represents a molar-number-average degree of addition polymerization of the oxyalkylene group and is a number of 20 to 200; and R^4 represents a hydrogen atom or a hydrocarbon group having 1 to 3 carbon atoms; and a carboxylic constitutional unit (II) of the following general formula (2):



(2)

wherein R^5 and R^6, being identical with or different from each other, represent a hydrogen atom or a methyl group; and M^1 represents a hydrogen atom, a monovalent metal, a divalent metal, ammonium, or an organic amine; wherein the mass ratio between the constitutional units constituting the polycarboxylic polymer (P-1) is in the range of constitutional unit (I) / constitutional unit (II) / constitutional unit (V) = (50 to 99)/(50 to 1)/ (0 to 49), the total of the constitutional units being 100 mass%, wherein said constitutional unit (V) is derived from a monomer (e), which is copolymerizable with at least one of the other monomers;
with the process being characterized by comprising the step of polymerizing a monomer component, formable into the water-soluble polymer (P) by polymerization, in the presence of a polymerization initiator and a chain transfer agent; wherein the polymerizing step includes the steps of:
a main-polymer production step of polymerizing a part of the monomer component, thereby producing said polymer (P1) constituting 60 to 99 mass% of the water-soluble polymer (P) and having a weight-average molecular weight of 10,000 to 500,000; and
a step of producing a polymer for adjustment of higher molecular components, which is a step of polymerizing a

part of the monomer component, thereby producing said polymer (P2) constituting 1 to 40 mass% of the water-soluble polymer (P) and having a weight average-molecular weight of not lower than 100,000 and having a higher weight-average molecular weight than the polymer (P1) as obtained in the main-polymer production step, wherein in the step of producing a polymer for adjustment of the higher molecular components the mol% of the chain transfer agent relative to the monomer component is smaller compared to the mol% amount of the chain transfer agent used in the main-polymer production step."

Claim 1 of **auxiliary request 3** is identical to claim 1 of the second auxiliary request which, however, contains more claims.

Claim 1 of **auxiliary request 4** differs from claim 1 of auxiliary request 2 in that the definition of the area proportion present in claim 1 of the main request has now been introduced into the process claim.

Auxiliary request 5 contains in independent claim 1 the reformulation of independent claim 1 of auxiliary request 1 as a use claim:

" *1. A use of a water soluble polymer (P) as a cement dispersant, said water-soluble polymer (P) having.....*"

VIII. Requests:

The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request or, alternatively, on the basis of one of the first to fifth auxiliary requests, all

requests submitted with the statement of grounds of appeal (letter of 6 August 2012).

Reasons for the Decision

Article 84 EPC

1.1 Main request

Claim 1 relates to a cement dispersant that displays an area proportion in the range of 13 to 60%. The measurement process for determining the area proportion is given in claim 1 and is based on gel permeation chromatography (GPC).

It is known to the skilled person that the outcome of such GPC measurements is highly dependent on the sample concentration, calibration standard, eluent and column used (see for example T 541/09, reasons 4.3.2). This means that different results will be obtained dependent on the measurement conditions used. No GPC measurement conditions are indicated in claim 1. This implies that the area proportion defined in claim 1 may vary dependent on how the GPC is run. Therefore the scope of claim 1 is not clearly defined.

It is true that some indications concerning the GPC measurement conditions are given on page 28 of the description, but said conditions are not part of claim 1. However, according to Article 84 EPC, the claims must define the matter for which protection is sought. A consequence thereof is that the claims must be clear in themselves when read by the person skilled in the art, without any reference to the content of the

description (see T 2/80, reasons 2; T 1129/97, reasons 2.1.2; T 2006/09, reasons 4.). Therefore, it cannot be argued that said measurement conditions are implicitly the ones that should always be used when trying to determine the area proportion of the dispersant according to claim 1.

The Board concludes that claim 1 of the main request is not clearly defined. The requirements of Article 84 EPC are not fulfilled. Said request must fail.

1.2 Auxiliary request 1

The area proportion definition including the measurement process based on GPC is still present in product claim 1, so that the objections in regard of the main request still apply.

Consequently, auxiliary request 1 also fails.

1.3 Auxiliary request 2

Claim 1 of this request relates to a process for producing a cement dispersant. The cement dispersant that should be obtained by the process is not defined any more by the area proportion.

According to established case law, a claim must indicate all the essential features of an invention. All the features which are necessary for solving the technical problem with which the application is concerned have to be regarded as essential features (see T 32/82, Reasons 15).

In the present case, the object of the invention is to provide a cement dispersant that is excellent in

initial dispersibility and in flow retainability of the cement (see page 2, lines 18 to 20). This is achieved by using a polymer having a proper molecular weight distribution (see page 2, lines 20 and 21; page 27, lines 21 to 23 and Tables 1 and 2). The proper molecular weight distribution is reflected by the correct area proportion (see page 2, last paragraph; page 18, second paragraph; Tables 1 and 2). Therefore, the Board is of the opinion that the area proportion in the range of 13 to 60% is an essential feature of the invention.

It cannot be argued that the process of claim 1 will inevitably lead to a polymer having the area proportion in the range of 13 to 60%, since the process steps are very broadly defined. It is true that a step for producing a polymer for adjustment of higher molecular components is included in the process, but there is no indication to what extent the adjustment of higher molecular components should be done. A quantitative reference point is missing.

The Board is of the opinion that the process according to claim 1 does not always lead to a polymer having the required molecular weight distribution. The appellant has not provided any evidence to the contrary.

Consequently, the Board concludes that claim 1 lacks an essential feature and does not fulfill the requirements of Article 84 EPC. Auxiliary request 2 must fail.

1.4 Auxiliary request 3

Claim 1 of this request is identical to claim 1 of the second auxiliary request so that the objections raised in regard of claim 1 of auxiliary request 2 apply

mutatis mutandis here. Auxiliary request 3 must also fail.

1.5 Auxiliary request 4

Process claim 1 defines again the cement dispersant, that should be produced by the process, by the area proportion including the measurement process based on GPC. Since the execution of the process steps given at the end of claim 1 does not inevitably lead to a polymer having the area proportion in the range of 13 to 60%, the objections brought forward in regard of claim 1 of the main request still apply to claim 1 of this request.

Auxiliary request 4 must fail.

1.6 Auxiliary request 5

Claim 1 relates to the use of a water-soluble polymer as a cement dispersant, wherein the cement dispersant is again defined by the area proportion including the measurement process based on GPC.

Consequently, the objections raised in regard of claim 1 of the main request still apply here. Auxiliary request 5 must fail.

1.7 As a result, none of the requests fulfills the requirements of Article 84 EPC. Consequently, the Board's objections under Articles 83 and 123(2) EPC raised in the communication under Article 15(1) RPBA do not need to be further taken into consideration.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

C. Vodz G. Raths

Decision electronically authenticated