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Datasheet for the decision of 13 December 2016

Case Number: T 0948/13 - 3.3.03

Application Number: 07254809.2

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Language of the proceedings: EN

Title of invention:
Phosphorous-containing organic polymer and compositions and processes including same

Applicant:
Rohm and Haas Company

Relevant legal provisions:
EPC Art. 84, 123(2)

Keyword:
Claims - clarity - main request and auxiliary requests 1 and 2 (no)
Amendments - allowable - auxiliary requests 3 to 6 (no)

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Case Number: T 0948/13 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 13 December 2016

Appellant: (Applicant)	Rohm and Haas Company 100 Independence Mall West Philadelphia, PA 19106-2399 (US)
Representative:	McLean, Craig Sutherland Patent Outsourcing Limited 1 King Street Bakewell, Derbyshire DE45 1DZ (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 16 November 2012 refusing European patent application No. 07254809.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	M. C. Gordon
Members:	D. Marquis
	R. Cramer

Summary of Facts and Submissions

I. The appeal lies from the decision of the examining division dated 5 November 2012 refusing European patent application number EP 07 254 809.2, publication number EP-A-1 932 862.

II. Claims 1 and 6 of the application as originally filed read as follows:

"1. An organic polymer comprising internal pendant phosphorous acid groups at a level of >0.25% phosphorus by weight based on the weight of said organic polymer, said phosphorus acid groups being separated from the backbone of said organic polymer by no more than 2 alkylene glycol units, said organic polymer having an acid number of from 100 to 1,000, and said organic polymer having a Mw of from 1,000 to 75,000; wherein said organic polymer has been formed by emulsion polymerization from at least one ethylenically unsaturated monomer."

"6. An aqueous composition comprising
an inorganic particle;
an organic polymer comprising phosphorous acid groups at a level of >0.25% phosphorus by weight based on the weight of said organic polymer, said organic polymer having an acid number of from 50 to 1,000, and said organic polymer having a Mw of from 1,000 to 75,000, wherein said organic polymer is present at a level of from 0.2 to 10% by weight based on the weight of said inorganic particle; and
an emulsion polymer comprising from 0.05% to 2% phosphorous, present as pendant phosphorous acid groups, by weight based on the weight of said emulsion polymer,

wherein said organic polymer is present at a level of from 0.1% to 50% by weight based on the total weights of said organic polymer and said emulsion polymer; wherein said inorganic particle in an aqueous medium has been first contacted with said organic polymer and subsequently said emulsion polymer has been added to form said aqueous composition."

III. The contested decision was based on a single set of claims (main request) filed on 11 July 2012. The examining division based its decision on a lack of clarity and lack of inventive step of claim 1. It was in particular considered that claim 1 lacked clarity because the organic polymer and emulsion polymer of claim 1 could be identical. Also, from the closest prior art D2, the application did not demonstrate that a problem had been solved in a non-obvious fashion. Consequently the application was refused.

IV. The applicant filed an appeal, submitting a new main request and auxiliary requests 1 and 2. Claim 1 of these requests read as follows:

Main request

"1. An aqueous composition comprising an inorganic particle; an organic polymer comprising internal pendant phosphorous acid groups at a level of > 0.25% phosphorus by weight based on the weight of said organic polymer, said phosphorus acid groups being separated from the backbone of said organic polymer by no more than 2 alkylene glycol units, said organic polymer having an acid number of from 100 to 1,000 (i.e. mg of KOH required to neutralize 1 g of solid polymer), and said organic polymer having a weight average molecular weight (Mw) of from 1,000 to 75,000

as determined by aqueous gel permeation chromatography measured vs. polyacrylic acid standards, wherein said organic polymer has been formed by emulsion polymerization from at least one ethylenically unsaturated monomer, wherein said organic polymer is present at a level of from 0.2 to 10% by weight based on the weight of said inorganic particle; and an emulsion polymer comprising from 0.05% to 2% phosphorous, present as pendant phosphorous acid groups, by weight based on the weight of said emulsion polymer, wherein said organic polymer is present at a level of from 0.1% to 50% by weight based on the total weights of said organic polymer and said emulsion polymer; wherein said inorganic particle in an aqueous medium has been first contacted with said organic polymer and subsequently said emulsion polymer has been added to form said aqueous composition; and wherein the pH of said aqueous composition is in the range of from 3 to 11."

Auxiliary request 1

"1. An aqueous composition comprising an inorganic particle; an organic polymer comprising internal pendant phosphorous acid groups at a level of > 0.25% phosphorus by weight based on the weight of said organic polymer, said phosphorus acid groups being separated from the backbone of said organic polymer by no more than 2 alkylene glycol units, said organic polymer having an acid number of from 100 to 1,000 (i.e. mg of KOH required to neutralize 1 g of solid polymer), and said organic polymer having a weight average molecular weight (Mw) of from 2,000 to 20,000 as determined by aqueous gel permeation chromatography measured vs. polyacrylic acid standards, wherein said organic polymer has been formed by emulsion

polymerization from at least one ethylenically unsaturated monomer, wherein said organic polymer is present at a level of from 0.2 to 10% by weight based on the weight of said inorganic particle; and an emulsion polymer comprising from 0.05% to 2% phosphorous, present as pendant phosphorous acid groups, by weight based on the weight of said emulsion polymer, wherein said organic polymer is present at a level of from 0.1% to 50% by weight based on the total weights of said organic polymer and said emulsion polymer; wherein said inorganic particle in an aqueous medium has been first contacted with said organic polymer and subsequently said emulsion polymer has been added to form said aqueous composition; and wherein the pH of said aqueous composition is in the range of from 3 to 11."

Auxiliary request 2

"1. An aqueous composition comprising an inorganic particle; an organic polymer comprising internal pendant phosphorous acid groups at a level of > 0.25% phosphorus by weight based on the weight of said organic polymer, said phosphorus acid groups being separated from the backbone of said organic polymer by no more than 2 alkylene glycol units, said organic polymer having an acid number of from 100 to 1,000 (i.e. mg of KOH required to neutralize 1g of solid polymer), and said organic polymer having a weight average molecular weight (Mw) of from 2,000 to 20,000 as determined by aqueous gel permeation chromatography measured vs. polyacrylic acid standards, wherein said organic polymer has been formed by emulsion polymerization from at least one ethylenically unsaturated monomer, wherein said organic polymer is present at a level of from 0.2 to 10% by weight based

on the weight of said inorganic particle; and an emulsion polymer comprising from 0.05% to 2% phosphorous, present as pendant phosphorous acid groups, by weight based on the weight of said emulsion polymer, wherein said organic polymer is present at a level of from 0.1% to 50% by weight based on the total weights of said organic polymer and said emulsion polymer; wherein said inorganic particle in an aqueous medium has been first contacted with said organic polymer and subsequently said emulsion polymer has been added to form said aqueous composition; and wherein the pH of said aqueous composition is in the range of from 3 to 11."

V. In a communication pursuant to Article 15(1) RPBA the Board gave its preliminary opinion that deficiencies pursuant to Articles 84 and 56 EPC remained in the newly submitted claims.

VI. The appellant submitted with letter dated 2 December 2016 four further amended sets of claims forming the auxiliary requests 3 to 6. Claim 1 of these requests read as follows:

Auxiliary request 3

"1. An aqueous composition comprising an inorganic particle; an organic polymer comprising internal pendant phosphorous acid groups at a level of 0.5% to 5% phosphorus by weight based on the weight of said organic polymer, said phosphorus acid groups being separated from the backbone of said organic polymer by no more than 2 alkylene glycol units, said organic polymer having an acid number of from 100 to 1,000 (i.e. mg of KOH required to neutralize 1 g of solid polymer), and said organic polymer having a weight

average molecular weight (Mw) of from 1,000 to 75,000 as determined by aqueous gel permeation chromatography measured vs. polyacrylic acid standards, wherein said organic polymer has been formed by emulsion polymerization from at least one ethylenically unsaturated monomer, wherein said organic polymer is present at a level of from 0.2 to 10% by weight based on the weight of said inorganic particle; and an emulsion polymer comprising from 0.15% to 0.45% phosphorous, present as pendant phosphorous acid groups, by weight based on the weight of said emulsion polymer, wherein said organic polymer is present at a level of from 0.1 % to 50% by weight based on the total weights of said organic polymer and said emulsion polymer; wherein said inorganic particle in an aqueous medium has been first contacted with said organic polymer and subsequently said emulsion polymer has been added to form said aqueous composition; and wherein the pH of said aqueous composition is in the range of from 3 to 11."

Auxiliary request 4

"1. An aqueous composition comprising an inorganic particle; an organic polymer comprising internal pendant phosphorous acid groups at a level of 0.5% to 5% phosphorus by weight based on the weight of said organic polymer, said phosphorus acid groups being separated from the backbone of said organic polymer by no more than 2 alkylene glycol units, said organic polymer having an acid number of from 100 to 1,000 (i.e. mg of KOH required to neutralize 1 g of solid polymer), and said organic polymer having a weight average molecular weight (Mw) of from 2,000 to 20,000 as determined by aqueous gel permeation chromatography measured vs. polyacrylic acid standards, wherein said

organic polymer has been formed by emulsion polymerization from at least one ethylenically unsaturated monomer, wherein said organic polymer is present at a level of from 0.2 to 10% by weight based on the weight of said inorganic particle; and an emulsion polymer comprising from 0.15% to 0.45% phosphorous, present as pendant phosphorous acid groups, by weight based on the weight of said emulsion polymer, wherein said organic polymer is present at a level of from 0.1 % to 50% by weight based on the total weights of said organic polymer and said emulsion polymer; wherein said inorganic particle in an aqueous medium has been first contacted with said organic polymer and subsequently said emulsion polymer has been added to form said aqueous composition; and wherein the pH of said aqueous composition is in the range of from 3 to 11."

Auxiliary request 5

"1. An aqueous composition comprising an inorganic particle; an organic polymer comprising internal pendant phosphorous acid groups at a level of 0.5% to 5% phosphorus by weight based on the weight of said organic polymer, said phosphorus acid groups being separated from the backbone of said organic polymer by no more than 2 alkylene glycol units, said organic polymer having an acid number of from 100 to 1,000 (i.e. mg of KOH required to neutralize 1 g of solid polymer), and said organic polymer having a weight average molecular weight (Mw) of from 2,000 to 20,000 as determined by aqueous gel permeation chromatography measured vs. polyacrylic acid standards, wherein said organic polymer has been formed by emulsion polymerization from at least one ethylenically unsaturated monomer, wherein said organic polymer is

present at a level of from 0.2 to 10% by weight based on the weight of said inorganic particle; and an emulsion polymer comprising from 0.15% to 0.45% phosphorous, present as pendant phosphorous acid groups, by weight based on the weight of said emulsion polymer, wherein said organic polymer is present at a level of from 0.1% to 50% by weight based on the total weights of said organic polymer and said emulsion polymer; wherein said inorganic particle in an aqueous medium has been first contacted with said organic polymer and subsequently said emulsion polymer has been added to form said aqueous composition; and wherein the pH of said aqueous composition is in the range of from 3 to 11."

Auxiliary request 6

"1. A process for forming an aqueous composition comprising:
a) providing an inorganic particle;
b) contacting said inorganic particle in an aqueous medium with an organic polymer comprising internal pendant phosphorous acid groups at a level of 0.5% to 5% phosphorus by weight based on the weight of said organic polymer, said phosphorus acid groups being separated from the backbone of said organic polymer by no more than 2 alkylene glycol units, said organic polymer having an acid number of from 50 100 [sic] to 1,000 (i.e. mg of KOH required to neutralize 1 g of solid polymer), and said organic polymer having a weight average molecular weight (Mw) of from 2,000 to 20,000 as determined by aqueous gel permeation chromatography measured vs. polyacrylic acid standards, wherein said organic polymer has been formed by emulsion polymerization from at least one ethylenically unsaturated monomer; wherein said organic polymer is

present at a level of from 0.2 to 10% by weight based on the weight of said inorganic particle; and
c) subsequently adding an emulsion polymer comprising from 0.15% to 0.45% pendant phosphorous acid groups by weight based on the weight of said emulsion polymer, wherein said organic polymer is present from 0.1% to 50% of said composition based on the total weights of said organic polymer and said emulsion polymer; and wherein the pH of said aqueous composition is in the range of from 3 to 11."

VII. Oral proceedings were held on 13 December 2016. At the conclusion of the oral proceedings the board announced its decision.

VIII. The arguments of the appellant, insofar as relevant for this decision, can be summarised as follows:

Main request, Auxiliary requests 1 and 2 - Article 84 EPC

The wording of claim 1 of the main request made it clear that the claimed composition had to contain an organic polymer and an emulsion polymer. These two types of polymers could not be identical as they had different purposes. A skilled person analysing a composition according to claim 1 based on these two polymers was able to determine which polymer was the organic polymer and which one was the emulsion polymer. That was equally true for claim 1 of the auxiliary requests 1 and 2. The main request and the auxiliary requests 1 and 2 all fulfilled the requirements of Article 84 EPC.

Auxiliary requests 3 to 6 - Article 123(2) EPC

Claim 1 of these requests resulted from combinations of features that were disclosed as preferred in the description of the application as filed. The amendments performed in claim 1 of the auxiliary requests were therefore allowable.

IX. The appellant (applicant) requested that the decision of the examining division be set aside and that a patent be granted on the basis of the set of claims filed on 11 July 2012 and resubmitted with the statement of grounds of appeal(main request), or on the basis of either of auxiliary requests 1 and 2 as filed with the statement of grounds of appeal, or on the basis of one of auxiliary requests 3 to 6 filed with letter of 2 December 2016.

Reasons for the Decision

Main request and auxiliary requests 1 and 2

1. Article 84 EPC

1.1 Claim 1 of the main request defines a composition comprising at least three components:

- inorganic particles
- an organic polymer wherein said organic polymer is present at a level of from 0.2 to 10% by weight based on the weight of said inorganic particle and said organic polymer is present at a level of from 0.1% to 50% by weight based on the total weights of said organic polymer and said emulsion polymer;
- an emulsion polymer

1.2 The range for the amount in organic polymer is defined relative to the amount of inorganic particles present in the composition of claim 1 (i.e. 0.2 to 10% by weight) and relative to the total weights of the organic polymer and the emulsion polymer (i.e. 0.1% to 50% by weight based on the total weights of said organic polymer and said emulsion polymer). As the ranges defining the amount of organic polymer present in the composition is defined relative to the amount of emulsion polymer, it is paramount for the clarity of claim 1 that both organic polymer and emulsion polymer be distinguishable from one another.

1.3 The first polymer is an organic polymer further defined in claim 1 as
i) comprising internal pendant phosphorous acid groups at a level of >0.25% phosphorus by weight based on the weight of said organic polymer,
ii) said phosphorus acid groups being separated from the backbone of said organic polymer by no more than 2 alkylene glycol units,
iii) having an acid number of from 100 to 1,000,
iv) having a weight average molecular weight (Mw) of from 1,000 to 75,000 and
v) wherein said organic polymer has been formed by emulsion polymerization from at least one ethylenically unsaturated monomer.

1.4 The second polymer is an emulsion polymer further defined in claim 1 as comprising from 0.05% to 2% phosphorous, present as pendant phosphorous acid groups, by weight based on the weight of said emulsion polymer.

1.5 The question that had to be answered was whether the definition given in claim 1 for the first and second

polymers overlapped.

1.5.1 The most general definition provided in claim 1 is that of the second polymer or the emulsion polymer. Since an emulsion polymer can also be organic, there exists polymers that can be both an emulsion polymer and an organic polymer.

1.5.2 As to the amount of phosphorous set out in claim 1, a polymer comprising between 0.25% and 2% of phosphorous (present as pendant phosphorous acid groups based on the weight of the polymer) would simultaneously fall under the definition of the first polymer (>0.25% phosphorus) and the second polymer (0.05% to 2% phosphorous).

1.5.3 It is also immediately apparent that the definition given for the second polymer is so broad that the requirements ii) to iv) listed above may also be fulfilled by the second polymer.

1.5.4 Finally, since the organic polymer and the emulsion polymer according to claim 1 can both be produced by emulsion polymerization of ethylenically unsaturated monomers, as indicated on page 5, second paragraph of the description, the requirement v) listed above requiring that the first polymer be formed by emulsion polymerization from at least one ethylenically unsaturated monomer can also be satisfied by the second polymer.

1.6 The definitions provided for the first and second polymers in claim 1 do not mutually exclude one another so that there exists a number of polymers that could equally be seen as the first or the second polymer in the claimed composition. It was argued that the skilled

reader understood that the claimed compositions required the presence of two different polymers. That was however not in dispute. It is precisely when the claimed compositions contain two different polymers that claim 1 lacks clarity since the claim sets out distinct requirements as to the amounts of organic and emulsion polymers.

1.6.1 As seen above, the wording of claim 1 does not exclude compositions containing two distinct polymers individually fulfilling the definitions given for the first and the second polymer at the same time. Thus, either of these polymers, say A and B, could be arbitrarily seen as representing the organic polymer or the emulsion polymer. Should A be seen as the organic polymer and B as the emulsion polymer, the composition containing 100 parts of an inorganic particle, 1 part of A (organic polymer) and 2 parts of B (emulsion polymer) would be according to claim 1 since the amount in organic polymer would be 1% by weight (i.e. between 0.2 and 10% by weight) based on the weight of the inorganic particle and its calculated amount based on the total weights of said organic polymer and said emulsion polymer would be 33% by weight (between 0.1 and 50% by weight).

1.6.2 By contrast, considering the same composition wherein A would be seen as the emulsion polymer and B as the organic polymer, the composition containing 100 parts of an inorganic particle, 1 part of A (emulsion polymer) and 2 parts of B (organic polymer) would contain 2% by weight (i.e. between 0.2 and 10% by weight) of the organic polymer based on the weight of the inorganic particle but that composition would not be according to claim 1 anymore because the calculated amount of organic polymer based on the total weights of

said organic polymer and said emulsion polymer would be 66% by weight, which is outside the claimed range of between 0.1 and 50% by weight. Thus, depending on the arbitrary choice of which of the polymers A or B is seen as the emulsion/organic polymer, a composition having the same components in the same amounts would or would not fall under the scope of claim 1 of the main request.

1.7 The fact that the wording of claim 1 does not provide a clear distinction between the organic polymer and the emulsion polymer results in a lack of clarity of claim 1 inasmuch as claim 1 limits the amounts in organic and emulsion polymers present in the composition. Claim 1 of the main request therefore lacks clarity for those compositions which contain an emulsion polymer that also fulfils the definition given for the organic polymer.

1.8 In auxiliary requests 1 and 2, claim 1 was merely amended in that the range of molecular weight of the organic polymer was limited from 1,000 to 75,000 to 2,000 to 20,000. The limitation of the molecular weight of the organic polymer does not provide a characterizing feature over the emulsion polymer since an emulsion polymer having a molecular weight within the amended range is still within the ambit of claim 1 of both requests. Auxiliary requests 1 and 2 therefore share the fate of the main request since claim 1 of these two requests is also based on the same definition of the organic and emulsion polymers.

1.9 The Board therefore concludes that the main request and the auxiliary requests 1 and 2 do not fulfill the requirements of Article 84 EPC.

Auxiliary requests 3 to 6

2. Article 123(2) EPC

2.1 Claim 1 of auxiliary request 3 is based on claim 7 as originally filed which disclosed the aqueous composition comprising an inorganic particle, the organic polymer and the emulsion polymer. In addition to the features of claim 7 as originally filed, claim 1 of auxiliary request 3 limits the amounts of phosphorous in the organic polymer (from ">0.25%" to "0.5% to 5%") as well as in the emulsion polymer (from "0.05% to 2%" to "0.15% to 0.45%") and it introduces the requirement that the pH of the aqueous composition is in the range of 3 to 11.

2.2 The limitation pertaining to the amount of phosphorous in the organic polymer is based on the most preferred range disclosed in the last paragraph on page 3. That of the emulsion polymer is also based on the most preferred range disclosed on the first paragraph of page 5. The requirement relating to the pH of the aqueous composition is based on the most general range disclosed in the last but one paragraph on page 13. The other features of claim 1 that are defined by numerical ranges (acid number, molecular weight and amount in organic polymer relative to the amount of inorganic particles in the composition as well as the amount in organic polymer relative to the emulsion polymer) are all based on the most general ranges of these features as disclosed in the original application.

2.3 The subject-matter of claim 1 of auxiliary request 3 has therefore been generated by combining a number of numerical ranges for various aspects of the composition, the selection of which ranges, in

combination, is neither disclosed as such nor otherwise suggested in the application as originally filed. For example, the numerical ranges relating to the features describing the acidic properties of the claimed aqueous composition (amount of phosphorous acid groups of the organic polymer, the acid number of the organic polymer and the pH of the aqueous composition) belong to different levels of preference in the application. The aqueous composition resulting from these modifications is nowhere disclosed as such in the application as filed, nor is the specific combination of these numerical ranges as specified in claim 1 otherwise derivable - implicitly or explicitly - from the application as originally filed. The amendments resulting in claim 1 of auxiliary request 3 contravene the requirements of Article 123(2) EPC.

2.4 Claim 1 of auxiliary requests 4 and 5 corresponds to claim 1 of auxiliary request 3 for which the numerical range defining the molecular weight of the organic polymer has been limited from 1,000 to 75,000 to 2,000 to 20,000. That range corresponds to the most preferred ranges of molecular weight as disclosed in the first paragraph of page 4 of the application as filed. Limiting the range of molecular weight of the organic polymer does not overcome the objection in respect of Article 123(2) EPC against claim 1 of auxiliary request 3 since, for the same reasons as in the case of auxiliary request 3, there is no disclosure nor pointer in the application as filed towards the combination of numerical ranges now defining the scope of claim 1 of auxiliary requests 4 and 5.

2.5 Claim 1 of auxiliary request 6 pertains to a process for forming an aqueous composition that finds a general basis in claim 9 of the application as originally filed

and for which i) the numerical ranges relating to the amount of phosphorous groups on the organic polymer, ii) its range of molecular weight, iii) the amount of phosphorous groups on the emulsion polymer and iv) the pH of the resulting aqueous composition have been limited to ranges as were claimed in auxiliary requests 4 and 5. For the same reasons as those given above in point 2.4, the application as originally filed does not provide a basis for the combination of the specific selection of ranges claimed. That applies equally to the process claim which forms part of auxiliary request 6. That requests shares the same fate as the auxiliary requests 4 and 5.

2.6 None of the auxiliary requests 3 to 6 satisfies the requirements of Article 123(2) EPC.

Order

For these reasons it is decided that:

The appeal is dismissed

The Registrar: The Chairman:

B. ter Heijden M. C. Gordon

Decision electronically authenticated