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**Datasheet for the decision
of 21 December 2020**

Case Number: T 1285/18 - 3.3.03

Application Number: 04021552.7

Publication Number: 1516884

IPC: C08F20/06, C08F2/10, A61L15/60

Language of the proceedings: EN

Title of invention:
Water-absorbent resin having treated surface and process for
producing the same

Patent Proprietor:
NIPPON SHOKUBAI CO., LTD.

Opponent:
Evonik Operations GmbH

Relevant legal provisions:
EPC Art. 56, 100(b)

Keyword:
Sufficiency of disclosure - (no) - main request
Inventive step - (yes) - auxiliary request 1

Decisions cited:

T 0060/89, T 0409/91, T 0435/91, T 1404/05, T 0079/08,
T 0553/11



Beschwerdekammern

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Case Number: T 1285/18 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 21 December 2020

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 19 March 2018
revoking European patent No. 1516884 pursuant to
Article 101(3) (b) EPC.**

Composition of the Board:

Chairman D. Semino
Members: M. C. Gordon
C. Brandt

Summary of Facts and Submissions

I. The appeal lies against the decision of the opposition division posted on 19 March 2018 revoking European Patent number 1516884.

II. History of the case

This is the second appeal concerning the patent in suit.

In appeal T 1743/12 the Board held that the 8th auxiliary request before it met the requirements of added subject-matter and novelty. Other matters were not considered.

Claims 1 and 5 of said request read as follows:

"1. A process for producing a water-absorbent resin having a treated surface, which comprises a step of mixing a water-absorbent resin having an internal crosslinked structure and a crosslinked surface obtained by polymerizing a monomer containing acrylic acid and/or a salt thereof as a main component, and a complex containing a polyvalent metal atom as a central atom in the presence of an aqueous liquid; wherein the complex is at least one selected from the group consisting of zirconium acetate, zirconium propionate, zirconium acetylacetonate complex, sodium zirconium hexafluoride, potassium zirconium hexafluoride, ammonium zirconium carbonate, sodium zirconium carbonate, and potassium zirconium carbonate."

"5. A water-absorbent resin having a treated surface, wherein a polyvalent metal atom is present on a surface of a water-absorbent resin having an internal crosslinked structure and a crosslinked surface obtained by polymerizing a monomer containing acrylic acid and/or a salt thereof as a main component, wherein the extraction ratio of the polyvalent metal atom is 80% by mass or smaller, wherein the surface-crosslinking is surface-crosslinking performed with an organic secondary crosslinking agent."

An objection of lack of sufficiency of disclosure in respect of said claim 5 was raised during the oral proceedings before the Board. However the Board at that stage elected not to deal with this on the grounds that:

- this matter had not been addressed by the first instance, and
- only a non-binding opinion had been offered on this matter by the opposition division (section 8 of the reasons of T 1743/12).

III. The decision which gave rise to the present appeal was based on the aforementioned set of claims as the main request and four auxiliary requests designated 1a, 2a, 3 and 4, whereby only the main request and auxiliary request 1a are relevant for the present decision.

Auxiliary request 1a differed from the main request in that claim 5 was restricted to polyvalent metal salts containing Ti, Zr and Hf, the final part of the claim reading as follows:

"and wherein the polyvalent metal atom is at least one

kind of metal atom selected from the group consisting of Ti, Zr, and Hf."

According to the decision:

- The main request did not meet the requirements of sufficiency of disclosure. As shown by comparative examples 1, 4, 5 and 7 the specified extraction ratio of polyvalent metal atom of 80% by mass or smaller could not be obtained with aluminium as the polyvalent metal atom. This demonstrated that not substantially all embodiments of the invention according to claim 5 could be put into practice;

- Auxiliary request 1a did not meet the requirements of inventive step. Closest prior art D3 (WO-A-01/74913) related to a method of post-treatment of surface post-crosslinked water absorbent polymer based on polymerised pre-crosslinked carboxyl-containing monomers. Post-treatment was carried out with a solution of a salt of an at least trivalent cation. The subject-matter claimed was distinguished from D3 by the specific complexes employed. The evidence showed that this resulted in improvements in the retention ratio of saline flow conductivity (SFC). Thus the objective problem was to avoid gel blocking of the water absorbent polymers (section 6.9 of the decision). From D2 (US-A-4 043 952) it was known that surface treatment improves dispersability of absorbent compositions (paragraph 6.10 of the decision). The method of D2 provided additional (ionic) linkages at the surface resulting from surface treatment to further improve dispersibility (6.11 of the

decision). D2 showed that zirconium acetate gave excellent results. In addition, D2 was cited in D3 (page 2, third paragraph) and D3 stated that the surface treatment according to D2 resulted in improvement of the dispersibility in aqueous media and a more rapid absorption of liquid, thus providing the incentive to combine the disclosure of the two documents and rendering the claimed process obvious;

- The subject-matter of the remaining auxiliary requests 2a, 3 and 4 was likewise held to be obvious. The details of these findings are not relevant to the present decision.

Accordingly the patent was revoked.

- IV. The patent proprietor - now the appellant - filed with the statement of grounds of appeal 5 sets of claim which corresponded to the above indicated 5 sets of claims, however with the auxiliary requests renumbered 1-4 and with deletion of redundant claims where necessary.
- V. In the reply to the appeal the opponent (respondent) maintained objections of insufficiency of disclosure and lack of inventive step, relying on the same documents as considered by the opposition division.
- VI. The Board issued a summons to oral proceedings and on 7 July 2020 a communication setting out its preliminary views on the case. It was considered that the main request suffered from deficiencies in respect of sufficiency of disclosure. Regarding the question of inventive step in respect of the auxiliary requests one significant matter to be addressed was the relationship

between closest prior art D3 and the secondary document D2.

- VII. With letter of 31 July 2020 the respondent stated it would not be represented at the oral proceedings.
- VIII. Following a series of exchanges both in writing and by e-mail the date of the oral proceedings was changed by order of the Board dated 2 September 2020 from the originally foreseen 27 April 2021 to 21 December 2020.
- IX. With letter dated 23 September 2020 the respondent confirmed that it would not attend the oral proceedings on the newly set date.
- X. The appellant made two further written submissions, both dated 9 November 2020.
- XI. Oral proceedings were held before the Board on 21 December 2020. As announced, the respondent was not in attendance.
- XII. The arguments of the appellant can be summarised as follows:

(a) Main request - sufficiency of disclosure - claim 3

The question of whether a specific result - namely the extraction ratio of 80% or smaller with aluminium as the cation - was obtained was not a question of sufficiency of disclosure but represented the presence or absence of a technical effect and was instead relevant for the consideration of inventive step. The water absorbent resins treated with metal complexes based on aluminium were not included in the scope of the

claims for the very reason that the specified extraction ratio was not achieved. Since these compositions were not within the scope of the claims the question of sufficiency of disclosure, i.e. operability of the invention over the entire scope of the claim did not arise in respect thereof. Consequently there was no undue burden in carrying out the invention as the invention would be understood and construed by the skilled reader in the light of the disclosure of the patent, in particular the examples. Contrary to what had been stated by the Board in its provisional opinion, this approach did not constitute an attempt to impose a narrower interpretation on the claims, based on the content of the description, than that which would result from the wording thereof. On the contrary, the approach adopted by the appellant was based on the explicit wording of the claims. Any composition which did not exhibit the required extraction ratio did not fall within the scope of the claims. This in turn had the consequence that no question of sufficiency of disclosure could arise in respect of such non-claimed embodiments. It was appropriate to regard the extraction ratio in the nature of a functional feature which depended on the interaction between the polyvalent metal atom and the resin and thus *inter alia* reflected the nature of the resin, e.g. the extent of neutralisation and how this had been carried out. Although the comparative examples demonstrated that with the specific resin compositions exemplified the required extraction ratio was not obtained when aluminium was used as the polyvalent metal atom this did not necessarily mean that it was entirely impossible to obtain such products. For example with different resins to those shown in

the patent it might well be possible to attain the required extraction ratio.

The case law on "undue burden", invoked by the respondent, related to a different situation, namely that where the disclosure of a patent and its claims covered a broad, indeterminate number of alternatives all of which had to be checked for whether they gave rise to the required technical effect with no supporting guidance. The situation in the present case was very different since only a limited number of polyvalent metal atoms would be taken into consideration by the skilled person. A significant number of the metal atoms of the periodic table, for example those which were radioactive, would be disregarded *a priori*. Thus there was a limited extent of experimentation to be carried out which was far from the situation constituting an "undue burden".

In view of this the requirement of sufficiency of disclosure was met.

(b) Auxiliary request 1 - inventive step

The position of the decision regarding identity of the closest prior art (D3), distinguishing feature (nature of the polyvalent metal atom complex), technical effect and objective problem was followed.

Regarding the status and relevance of D2, this taught a process of surface crosslinking of a non-surface-crosslinked resin and not, in contrast to D3 and the patent in suit, a process of additional or further surface treatment of a resin which had

already been subjected to both internal and surface crosslinking.

Consequently there was no reason for the skilled person to consider D2 in combination with D3 in the manner as proposed by the opposition division and the respondent. On the contrary, D2 would only be considered in such a context on the basis of *ex post facto* considerations.

The argument of the respondent that there was no reason to consider that the process of D2 could not be applied to the resin of D3 represented an incorrect approach. It was, on the contrary, necessary to demonstrate that there would have been an obvious reason to apply the teaching of D2 to the process of D3. This had not been shown.

In view of this the presence of an inventive step had to be acknowledged.

XIII. The arguments of the respondent can be summarised as follows:

(a) Main request - sufficiency of disclosure - claim 3

Claim 3 defined generally a "polyvalent metal atom". Thus the claims encompassed water absorbing resins wherein aluminium was present on the surface. The examples however showed that in this case the specified extraction ratio of 80% or less could not be attained. Thus, with reference to T 435/91 and T 409/91 the patent did not place the skilled person in a position to achieve the required result within the whole ambit of the claim

- on the contrary there was an undue burden in doing so.

The position of the appellant that this was rather a matter of inventive step could not be followed. The submissions in the statement of grounds of appeal seemingly related to water absorbent resins with extraction ratios above 80%. These were not part of the subject-matter claimed meaning that the question of sufficiency of disclosure did not arise in respect thereof.

The argument of the appellant that claim 3 would not encompass aluminium as polyvalent cation since this did not permit the required extraction ratio to be obtained appeared to rely on the premise that the scope of "polyvalent metal atom" was in some manner defined or restricted by the limitation on the extraction ratio. Such a restrictive interpretation of the claim in the light of the (comparative) examples of the patent was not allowable.

On the contrary, the description of the patent - paragraph 58 - explicitly stated that aluminium could be employed as the polyvalent metal atom and further stated that trivalent metal atoms in general were favourable.

Therefore the requirement of sufficiency of disclosure was not met.

In support of its arguments the respondent invoked several decisions, a number of which are dealt with in the following Reasons.

(b) Inventive step

The position of the opposition division with respect to the identity of the closest prior art, the distinguishing feature and the technical effect was followed.

The solution to the problem, namely the use of zirconium salts as the polyvalent metal atom complex was rendered obvious by the disclosure of D2 which taught advantages in terms of dispersibility arising from the use of such salts for the surface treatment of absorbent resins.

The argument of the appellant that D3 related to the further - secondary - treatment of resins which had already been subjected to surface crosslinking, whereas D2 addressed the initial treatment of non-surface-crosslinked polymers, i.e. the primary treatment with the result that the teachings of D3 and D2 would not be combined, was disputed. It was not correct that the skilled person would not have contemplated applying the treatment of D2 to a resin which had already been subjected to surface crosslinking. At most the position of the appellant was based on the premise that the skilled person would have expected that applying the treatment of D2 to the resins of D3 would not give rise to any beneficial effect. However no grounds in support of this premise had been advanced by the appellant and furthermore none were apparent in view of the teaching of D3. On the contrary, D3 taught that specifically in the case of products which had already undergone surface crosslinking, properties such as gel blocking and absorption under pressure could be improved by treatment with polyvalent

cations. D3 taught that the effects of these two treatment steps were cumulative. D3 contained an explicit reference to D2 and at page 12, lower paragraph, discussed the use of aluminium cations as well as zirconium cations and acetate anions. Hence it could not be argued that the skilled person on consideration of the teachings of D3 could not have expected that treatment of the surface crosslinked polymers thereof with, for example the process of D2 employing zirconium acetate which according to D2 was taught to result in an improvement in gel blocking would not lead to a corresponding further improvement in the polymer properties of the already surface-crosslinked resins of D3.

The same considerations applied to the resins of claim 3. Furthermore, as stated in the decision (paragraph 7) no technical effect was shown to be associated with the extraction ratio. In particular, it was not shown that the improved SFC values of the Zr treated polymers were due to the reduced extraction ratio and were not simply a consequence of the improved hydrophilicity of the tetravalent zirconium cations as compared to the trivalent aluminium cations.

On that basis an inventive step was not present.

- XIV. The appellant requested that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of the main request, or, in the alternative, that the patent be maintained on the basis of one of the sets of claims according to auxiliary requests 1 to 4, all requests as submitted with the statement of grounds of appeal.

- XV. The respondent requested in writing that the appeal be dismissed

Reasons for the Decision

1. Main request - Sufficiency of disclosure - claim 3
- 1.1 Claim 3 (corresponding to claim 5 of the main request on which the decision was based) is directed to a water absorbent resin having an extraction ratio of polyvalent metal atom of 80% or less.

The nature of the metal atom is not defined and thus the claim imposes no limitations thereon.

According to paragraph 58 of the patent the polyvalent metal may be *inter alia* aluminium. The requirement in terms of the extraction ratio is addressed also in paragraphs 98 and 105 for polyvalent metal atoms in general with no limitations in respect of particular metals.

- 1.2 The evidence of comparative examples 1, 4, 5 and 7 as summarised in table 7 of the patent is that when aluminium is employed as the polyvalent metal atom said extraction ratio is not achieved (in this respect it is accepted - and has not been disputed between the parties - that the value given for comparative example 1 is incorrect and should read "100", not "10").

Example 1 and comparative example 1 differ from each other solely in the nature of the polyvalent metal atom (ammonium zirconium carbonate and aluminium sulphate

tetradecahydrate respectively), suggesting that said example is considered to be comparative due to the nature of the metal compound. The same applies for the example pairs comparative example 4/example 2, comparative example 5/example 4 and comparative example 7/example 7.

- 1.3 There is thus clearly a discrepancy between the definition of the invention in the description and claims and what is shown by the examples.
- 1.4 However the patent contains no recognition of or explanation for the reason for the failure of the indicated comparative examples to meet the requirement of the extraction ratio. An analogous situation was considered in the case underlying decision T 79/08 of 28 October 2010, sections 5.12 and 5.13 of the reasons, leading to a finding of insufficiency of disclosure.
- 1.5 The appellant takes the position that the failure to achieve a particular technical effect is a matter of inventive step (reported in section XII, above, reference can also be made to the statement of grounds of appeal section 3, 3rd paragraph and submissions at the oral proceedings) and that compositions containing aluminium as the polyvalent metal would for this reason not fall under the scope of the claim.
- 1.6 However to arrive at the conclusion and outcome urged by the appellant would require the skilled person independently and in the absence of any corresponding indication in the patent, to analyse and seek to develop an understanding of the reasons for the discrepancy between, on the one hand, what the claims define and what the description teaches to be the invention and, on the other hand, the evidence of the

examples and correspondingly to reinterpret or "remodel" the explicit wording of the claims to exclude subject-matter which is within the wording thereof and, indeed disclosed by the description as forming part of the subject-matter of the invention. In this connection reference can be made to the findings of decision T 553/11 of 19 March 2013, Catchword and section 2.3.3 of the reasons that if a patent proprietor wishes to argue for a narrow scope of the claim this should be based on the wording of the claim, not on something appearing only in the description. Indeed, as held in T 1404/05 of 24 May 2007, Catchword and sections 3.1-3.7 of the reasons, which decision is cited in T 553/11, if one construction of a claim is not sufficiently described to be carried out the claim is open to objection pursuant to Article 100(b) EPC. The description cannot be invoked to impose a more restrictive scope of the claim than results from its wording.

- 1.7 Thus the appellant is placing the onus on the skilled person/third parties to carry out their own appraisal of the patent and in effect to redefine the invention in the light of this analysis, even if the result is inconsistent with what the patent itself states to be the invention and the claims define, and thus to go beyond the explicit teaching of the patent in the absence of any form of guidance. This constitutes an undue burden for the skilled person seeking to put the claimed invention into practice (T 409/91, OJ EPO 1994, 653 and T 435/91, OJ EPO 1995, 188). Hereby it is to be recalled that the same level of skill is to be applied when the questions of sufficiency of disclosure and inventive step are considered (T 60/89, OJ EPO 1992, 268, reasons 3.2.5).

1.8 At the oral proceedings before the Board the appellant submitted that, even if the examples in the patent employing aluminium based metal complexes did not achieve the required extraction ratio, potentially there may nevertheless exist (other) resins which when treated with aluminium complexes do exhibit the required extraction ratio. This submission of the appellant confirms that at least the effect of the claim, even if not initially intended, is in some indefinite and speculative manner, to extend protection to subject-matter which not only is not disclosed in the patent but, based on the available evidence, was not even feasible or available to the skilled person at the priority date of the patent. This argument, far from supporting the case of the appellant, serves to underline in a stark manner the insufficiency of the disclosure and the teaching provided in respect of the subject-matter of claim 3 of the main request.

1.9 Thus in the view of the Board the urged reconciliation of the evident disparity between the general teaching of the patent and the claims on the one hand and the evidence of the examples on the other and the corresponding reinterpretation of the disclosure of the patent would require a degree of insight approaching that required for inventive step, demonstrating the lack of sufficiency of disclosure.

In conclusion, the Board can identify no reason to depart from the findings of the decision under appeal with respect to the question of sufficiency of disclosure of claim 3 of the main request.

1.10 The main request is therefore refused.

2. Auxiliary request 1

2.1 Sufficiency of disclosure

Claim 3 corresponds to claim 3 of the main request however, as noted above, with the additional wording specifying and limiting the nature of the polyvalent metal atom.

Due to this limitation to particular metal atoms there was no objection of lack of sufficiency of disclosure raised by the respondent. The Board also considers that by means of this amendment the objection which led to refusal of the main request has been overcome and sees no reason to discuss the issue in any further detail.

2.2 Inventive step

There is consensus between the parties that:

- Closest prior art for the process of claim 1 of auxiliary request 1 is D3 (decision, section 6.1; statement of grounds of appeal, section 4, 2nd paragraph; rejoinder, section 2.1.2.1);
- The distinguishing feature is the defined polyvalent metal complexes (decision, section 6.4; statement of grounds of appeal, section 4, second paragraph; rejoinder section 2.1.2.1)
- The technical effect is an improvement in the liquid permeability under load and the improvement of this property is seen as the technical problem, the solution being the employment of the particular polyvalent metal complexes (decision section 6.9; the statement of

grounds of appeal does not address this aspect directly but it is apparent that this is not challenged as was confirmed by the position taken at the oral proceedings; rejoinder section 2.1.2.1).

The Board can identify no grounds for taking a different position on any of these matters.

2.3 Thus the only matter which remains to be decided is that of obviousness. Reference in this respect was made only to D2 both in the decision and in the submissions of the respondent.

2.3.1 D2 discloses surface crosslinking of absorbent resins in order to improve dispersibility (introduction, column 2, lines 22ff, in particular lines 47-50). This is carried out by crosslinking the surface with a composition which ionically complexes the exposed surfaces of the absorbent. This is considered to prevent formation of a surface gel which would otherwise inhibit passage of moisture into the body of the absorbent (passage bridging columns 2 and 3 and column 10, lines 31-46). According to claim 1 and column 10, lines 5-24 the treatment is carried out by providing a dispersion of the water absorbent composition, a polyvalent metal cation and a dispersing medium with treatment at temperatures in the range -40°C to 150°C. Among the polyvalent metal compounds employed for treatment is zirconium acetate (table 1).

2.3.2 As correctly observed by the respondent and noted in the decision, D2 is referred to in D3 (page 2, second full paragraph) as disclosing a process for surface treatment of absorbent resins.

2.4 Whilst both D3 and the patent relate to surface post-treatment of a polymer which has already been subjected to both internal and surface crosslinking, D2 relates to a first step of surface crosslinking, i.e. treatment of a polymer which has been subjected to no previous surface crosslinking treatment.

The Board correspondingly considers that the reference to D2 in D3 is to be understood in the context of elucidating one possibility for the primary/initial surface treatment as argued by the appellant and in particular with reference to the purpose and context of the crosslinking as identified in D3 by reference to D2. Thus D3 states that the treatment of D2 is carried out to improve dispersibility which is a different matter to the objective technical problem, i.e. improvement of liquid permeability under load as also mentioned in paragraph 11 of the patent. The Board concurs with the submission of the appellant that the process of the patent relates to an additional treatment of a polymer of which the surface has already been subjected to crosslinking whereas D2, as noted in D3, relates to an initial step of surface crosslinking. Thus, it can be agreed that the skilled person seeking to modify the post-crosslinking process of D3 would have no reason to consider D2 for the reason that this relates to an earlier part of the process, namely the initial surface crosslinking.

The respondent takes the position that D2 and D3 would be combined and that the skilled person would indeed consider applying the process of D2 to a polymer which had already been subjected to some kind of surface crosslinking step and further that the skilled person would have had no reason to assume that the benefits reported in D2 to arise from the surface treatment

would not be obtained in the case of applying the treatment to a polymer which had already been subjected to a surface crosslinking treatment.

However the respondent has omitted to address the matter of what D2 actually discloses or the meaning of the reference to D2 in D3 and how this is to be understood.

Furthermore the respondent applies the wrong criterion. Instead of presenting arguments as to why it might be obvious to apply the treatment of D2 to the pre-crosslinked polymers in order to solve the objective technical problem, the respondent reverses the argument, seeking indications not to do this and in so doing furthermore disregards the actual formulation of the problem. This approach is at odds with the correct application of the problem/solution approach.

The relevant question is indeed the opposite one, namely whether it would be obvious to apply the treatment process of D2 to the - internally and surface crosslinked - polymers of D3 in order to solve the undisputed objective technical problem and not whether it would be expected that even if this had been done, no benefit would be obtained.

The respondent has however provided no arguments to this effect. Nor is the Board aware of any reason why this might be the case.

The conclusion is therefore that there is no teaching in the prior art which would render the claimed solution to the objective technical problem obvious. The process of claim 1 of auxiliary request 1 meets therefore the requirement of inventive step.

2.5 The foregoing is also relevant for claim 3 of auxiliary request 1 insofar as this relies on the product-by process feature and is characterised by the specific polyvalent metal complexes.

As the result of the analysis is the presence of an inventive step already in view of the specific polyvalent metal complexes, there is no need to discuss whether the feature related to the extraction ratio provides a further difference and further advantages.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division with the order to maintain the patent in amended form on the basis of claims 1 to 5 according to auxiliary request 1 filed with the statement setting out the grounds of appeal and after any necessary consequential amendment of the description.

The Registrar:

The Chairman:



B. ter Heijden

D. Semino

Decision electronically authenticated