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**Datasheet for the decision  
of 5 July 2018**

**Case Number:** T 0498/15 - 3.3.03

**Application Number:** 08707886.1

**Publication Number:** 2121770

**IPC:** C08F2/00, C08F20/06

**Language of the proceedings:** EN

**Title of invention:**

PRODUCTION OF SUPERABSORBENT POLYMERS

**Patent Proprietor:**

BASF SE

**Opponents:**

Nippon Shokubai Company Limited  
Evonik Degussa GmbH

**Headword:**

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

Inventive step - (no) (both requests)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**

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**Chambres de recours**

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Case Number: T 0498/15 - 3.3.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.03**  
**of 5 July 2018**

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**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 7 January 2015  
revoking European patent No. 2121770 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 of the patent proprietor lies from the decision of the opposition division posted on 7 January 2015 revoking European patent number 2 121 770.

II. The patent was granted with a set of 10 claims, whereby claim 1 read as follows:

"A process for production of superabsorbent polymers comprising

- (i) polymerizing a monomer solution, comprising at least one ethylenically unsaturated acid-functional monomer,
- (ii) conveying the formed polymer gel on an oscillating conveyor belt to a continuous through-circulation belt dryer and
- (iii) drying the polymer gel

wherein the belt speed of the conveyor belt is at least 0.4 m/s."

III. Two notices of opposition against the patent were filed in which revocation of the patent on the grounds of Article 100(a) EPC (lack of novelty, lack of inventive step) and Article 100(b) EPC was requested.

The following documents, *inter alia* were relied upon:

D1: EP-A-1 470 905

D3: "Modern Superabsorbent Polymer Technology",  
Buchholz, F.L, Graham, A.T. (ed) Wiley-VCH pages 69,  
72-84, 87-93, 97-103, 171,172

D17: "Bedienungsanleitung Bandtrockner Favor BT  
32/380", Firma Heinen, 1998

D21: Experimental report dated 5 December 2012 provided  
by Opponent 1 with letter of 24 May 2013.

IV. The decision of the opposition division was based on the claims of the patent as granted as main request, and an amended set of claims, filed with letter of 19 September 2014 in which claim 1 had been amended by specifying that the belt speed was at least 0.8 m/s.

According to the decision, D17 was not taken into account on the grounds that it had not been shown that either the document or the belt dryer disclosed therein had been made available to the public before the priority date of the patent in suit.

The requirements of novelty were met as none of the documents disclosed the speed of the conveyor belt.

Regarding inventive step, the closest prior art was represented by the teaching of D3, which disclosed all features except the minimum speed of the conveyor belt.

The examples of the patent were considered not to provide evidence of any technical effect associated with the lower limit of belt speed of 0.4 m/s as compared to 0.3 m/s. It was further held that D3 identified the speed of the conveyor belt as a relevant process parameter to be varied, making it obvious to adjust this. Similarly for the auxiliary request no effect was associated with the higher belt speed.

Accordingly an inventive step was not acknowledged and the patent was revoked.

V. The patent proprietor (appellant) lodged an appeal against the decision. With the statement of grounds of appeal the sets of claims as considered by the opposition division were maintained. An experimental

report was submitted.

- VI. Both opponents (respondents) replied to the appeal maintaining objections of lack of sufficiency of disclosure, lack of novelty and lack of inventive step.
- VII. The Board issued a summons to attend oral proceedings and a communication in which it was considered that the subject-matter of neither request met the requirements of Article 56 EPC.
- VIII. Oral proceedings took place before the Board on 5 July 2018 in the presence of the appellant and opponent 2, opponent 1 having indicated in a letter of 30 May 2018 that it would not attend.
- IX. The arguments of the appellant, insofar as relevant for this decision can be summarised as follows:

The problem addressed by the patent was to achieve an improved distribution of polymer particles on a drying belt. The examples of the patent showed that this problem was solved by employing a minimum speed of the oscillating conveyor belt.

Closest prior art D3 discussed (page 90, second complete paragraph) that in a through-belt dryer the speed of the belt and rate of loading determined the depth of the product. This passage referred to the feeding device as an oscillating belt or vibrating feeder. However D3 did not identify the speed of the belt feeder as a parameter to be adjusted. Nor did D1 which related to a similar apparatus and did not identify adjustment of the speed of the transport belt as a means to solve any problem, in particular that demonstrated by the examples of the patent. On that

basis an inventive step had to be acknowledged.

It was adequate to define as the sole process parameter in the claim the speed of the conveyor belt, because the conditions which would prevail in such processes were subject to very little variation, being to a significant extent determined and constrained by the equipment employed. These constraints applied to parameters such as the geometry and size of the belts, the materials, the temperature, the radius of the end rollers, the angle and rate of oscillation. In particular the speed of such belts was conventionally limited to the range 0.1-0.6 m/s, as demonstrated by D17, which document could be taken as indicative of the construction and operating parameters of band dryers at the relevant time, independently of whether it was considered to represent prior art. This meant that at least the speed as defined in the auxiliary request had to be seen as non-obvious.

In this connection, whilst the examples provided by opponent 1 in D21 seemingly showed that other factors affected the separation of polymer from the belt, these examples employed in part artificial conditions.

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

D3 represented the closest prior art, the distinguishing feature being the speed of the conveyor belt.

The feeder belt speed as the sole technical feature was not adequate to define the solution to any problem. Many other factors influenced the extent to which the polymer would separate from the feeder, as shown by



experimental report D21. The conditions employed in D21 were not unrealistic and furthermore were within the - very broad - scope of the operative claims. The evidence submitted by the appellant with the statement of grounds of appeal left many question unanswered in terms of the polymer used, and the construction and operating parameters of the conveyor apparatus.

Even accepting that there would was some effect associated with the belt speed, this was a matter of obviousness and identifying the appropriate speed and indeed all the other operating conditions of the belt was a question of routine optimisation. This emerged from the teachings of D3 and D1. An inventive step should therefore not be acknowledged.

- XI. The appellant requested that the decision under appeal be set aside and that the oppositions be rejected, i.e. the patent maintained as granted. Alternatively it was requested that the decision be set aside and the patent maintained in amended form on the basis of the auxiliary request filed with the statement of grounds of appeal.
- XII. Respondent I (in writing) and respondent II requested that the appeal be dismissed.

### **Reasons for the Decision**

1. Status of D17

D17 is an operating manual for a belt dryer and associate equipment (e.g. feeder). The only date on the document is "1998".

Whilst the appellant, in line with the decision under appeal, considered this not to be comprised in the

state of the art, opponent 2 maintained the position that the document did form part of the state of the art but did not provide any argument why the decision of the opposition division was incorrect in this respect.

Nevertheless the appellant relied on the disclosure of D17 as providing an indication of the operating parameters of band dryers at the relevant time, i.e. around the priority date of the patent in suit.

In the light of the submissions of the parties the Board can identify no reason to overturn the findings of the decision under appeal regarding the status of D17 as prior art. Nevertheless, the Board can also identify no reason not to allow D17 to be relied upon as indicated by the appellant i.e. as a reflection of the technology prevailing at the priority date of the patent in suit.

Accordingly the disclosure of D17 is taken into account to the extent that it is seen as a form of reference document.

2. Novelty

The Board does not see any reason to overturn the part of the decision of the opposition division concerning novelty. There is however no need for the Board to elaborate any further on the issue of novelty in view of the conclusion of the analysis of inventive step (see below) acknowledging the absence of a disclosure of the speed of the conveyor belt.

3. Inventive step

### 3.1 The patent in suit

The patent is directed to a process for the production of a superabsorbent polymer in which the formed polymer gel is conveyed on an oscillating conveyor belt to a continuous through-circulation belt dryer (paragraph [0001], claim 1). The process is characterised by the belt speed of the conveyor (at least 0.4 m/s according to the main request and at least 0.8 m/s according to the auxiliary request).

The aim of the patent is to ensure an even distribution of the polymer on the drying belt (paragraphs [0007], [0011]). Various properties of the polymer are discussed, in particular the degree of neutralisation and water content, whereby it has been found that the level of stickiness - which causes uneven distribution on the drying belt - is influenced by the degree of neutralisation (paragraphs [0014]-[0017]). According to paragraph [0018] a high belt speed leads to uniform release of the sticky polymer from the conveyor belt and thus a uniform distribution on the drying belt. Various properties of the belt, i.e. the material from which it is made, mechanical and chemical resistance, coating, length, width, inclination, feed height, thickness of gel to be dried on the dryer belt and speed and dimensions of the drying belt are discussed in paragraphs [0020]-[0029]. In paragraph [0030] it is stated that in a preferred embodiment the conveyor belt is coated with a surfactant. The only of these many considerations reflected in the claims is the belt speed.

The polymers to be so handled are discussed starting at paragraph [0031] with respect to type and proportions of monomers, crosslinkers and other optional

components. Again none of these considerations, or those in the earlier section paragraphs [0014]-[0017] are reflected in the claims.

- 3.2 It is a matter of consensus between the parties that the closest prior art is represented by D3.

This document - extracts of a text book - sets out on page 73, figure 3.1 in general the steps involved in preparing a superabsorbent gel including polymerisation, gel preparation and drying. Page 87, section 3.2.5 discusses drying in more detail, referring at page 88, line 3 to through-circulation dryers. For loading the particles onto the belt dryer, reference is made to use of an oscillating belt type product distributor - see page 89, figure 3.6a and page 90, second complete paragraph starting at the 4th line. The latter passage reports that the belt speed (of the dryer) and rate at which the product is loaded to the dryer (i.e. influenced by the speed of the conveyor system) determine the depth of product on the drying belt. The final part of the paragraph refers to the use of spreaders or rakes to level and distribute uniformly the product on the drying belt.

- 3.3 Distinguishing feature

Common to D1 and D3 is an absence of any quantitative disclosure of the speed of the conveyor belt. A value of at least 0.4 m/s for claim 1 of the main request and 0.8 m/s for claim 1 of the auxiliary request constitutes therefore the distinguishing feature.

### 3.4 Technical effect

The examples of the patent and those submitted with the statement of grounds of appeal show that at higher belt speeds, in particular above the threshold of 0.4 m/s separation of the product from the belt is improved. However it is conspicuous to the Board that neither the examples of the patent, nor those subsequently submitted provide a complete description of the experiments that were actually carried out. Thus in the patent it is only stated generally that acrylic acid, a non-identified crosslinker, non-identified polymerisation initiators and water, with no indication of relative quantities thereof were employed. However water content and degree of neutralisation are reported.

The report submitted with the statement of grounds of appeal appears to provide a complete description of the preparation of the polymer, but does not report the final water content or degree of neutralisation of the polymer, both of which properties are identified in the patent in suit as being of significance for release of the polymer from the belt (see above reference to paragraphs [0014]-[0017] of the patent).

Regarding the subsequent treatment, both the patent in suit and the report provided with the statement of grounds of appeal indicate only the speed of the belt. No information is given about belt width, angle or speed of oscillation, radius of end roller, material from which the belt is made, temperature of the belt or other parameters.

It is thus obscure exactly what information may be derived and what conclusions can be drawn from the

examples of the patent in suit and those provided with the statement of grounds of appeal with regard to the significance of belt speed in general since, as indicated, a number of relevant factors are not reported.

The data of the experimental report (D21) provided by opponent 1, which report, it is noted, provides a complete description of the preparation of the polymers, shows that the extent of release of polymer from a conveyor belt depends *inter alia* on the material from which the belt is made (experiments 1, 2) and whether the belt is heated (experiments 2, 3) under otherwise identical conditions one of which is a belt speed of 0.6 m/s, i.e. intermediate between the minimum values of the main and auxiliary requests.

Although the appellant disputed that these examples reflected realistic conditions, no evidence was submitted to support this position, or otherwise to explain to what extent the conditions employed by the respondent were "artificial". Indeed, according to paragraphs [0020]-[0025] of the patent, the belt can be made from a number of different materials with various coatings including silicone rubber, polyester (paragraph [0022]) which correspond to the types of materials employed in D21. Hence the Board can identify no reason to dismiss the evidence provided by D21. In any case the examples of D21 comply with the (very sparse) requirements of the claim regarding the nature of the oscillating belt conveyor. Even disregarding those examples of D21 which employ heating of the belt, which measure is not indicated even generally in the patent in suit, the evidence of D21 is nevertheless suitable to establish that the belt speed is not the only or even the principal determinant of the degree of

separation of polymer from the belt.

There is thus no basis for the Board to conclude that the sole feature of the claim relating to the belt i.e. the speed, gives rise - in isolation of any other feature - to a technical effect. In other words, there is no basis for a technical effect to be acknowledged for the whole breadth of the claim.

### 3.5 Objective technical problem

Consequently the objective technical problem to be solved compared to the closest prior art D3 can be formulated only as the provision of a further process for the production of a superabsorbent, which problem was solved by specifying the belt speed of the conveyor.

### 3.6 Obviousness

D1 in paragraph [0051] discusses the drying of a particulate superabsorbent involving the step of transferring the product via an oscillating transverse feeder to a dryer and states that the speed of the belt can be arbitrarily selected to suit the "average particle" [sic] of the product and the amount thereof shred per unit time. This statement is in the context of the material exiting the shredder, which indicates that the phrase "speed of the belt" refers to that of the conveyor device, not the subsequent dryer. Such an arrangement is employed in example 1 and discussed in paragraph [0065] of D1.

Similarly D3 at page 90, second complete paragraph, discusses loading a drying belt from an oscillating belt feeder (figure 3.6a of the document). It is stated

that the belt speed and rate at which the product is loaded to the dryer determines the depth of the product on the (drying) belt. This document also gives an indication that the belt speed of the conveyor is one of the factors to be adjusted in such processes since the speed of the conveyor will, in association with other factors such as the rate of loading the conveyor belt and the speed of the drying belt, directly affect the rate at which product is deposited and the distribution of the product on the drying belt. Thus even if not explicitly stated, D3 also contains a clear implicit indication that the belt speed of the conveyor is a process factor to be adjusted.

It is thus apparent from D1 and D3 that the speed of the oscillating conveyor belt is a process parameter which is routinely to be adjusted, meaning that the specification of this, in particular in the light of the absence of any other of the relevant parameters (see above), is an obvious solution to the problem set out above.

The conclusion that (arbitrary) definition of the speed of the conveyor belt is an obvious solution to the formulated technical problem cannot be overcome by the argument of the appellant, referring in particular to the non-prepublished D17 that the construction and dimensions of such equipment is subject to only small variation with the consequence that the specification only of the speed of the conveyor belt can be considered as a meaningful feature, or that conventionally such belts would have a speed of 0.1-0.6 m/s. This argument presupposes that what is reported in the single document D17, from a single supplier of such equipment, and referring to a specific apparatus is in some way to be understood as representative of all such



devices. This argument is however not credible and has not been supported by any other evidence. It is emphasised that D17 does not have the nature of a textbook or a review of technologies and hence cannot be taken as representative of what is routinely or conventionally done in the relevant technical field. Alternatively this argument could, in favour of the appellant, be interpreted as implying that all oscillating belt feeders - due to some universally prevailing and unchangeable mechanical, physical and/or chemical constraints - are inherently and necessarily limited to a very small set of design and operating parameters or conditions with limited variation. No evidence has been provided to support such a postulate which in any case would be barely credible in view of the wide range of water absorbent polymers, properties thereof and scales on which they are made, and the discussions in the above cited passages of D1, D3 and the patent in suit referring to the various factors to be adjusted in such devices.

Since the claim specifies none of the other features or parameters of the apparatus and it has not been rendered credible that these are indirectly or implicitly specified, this argument of the appellant is not persuasive.

Furthermore it has not been shown - and is not supported by the available evidence - that the parameters of the conveyor belt as defined in the claim are unconventional or divergent from what is conventionally done in the field.

It is therefore concluded that the sole technical feature of the oscillating belt conveyor defined in the claims is an arbitrary restriction of - in isolation of

other parameters - technically doubtful significance, and which at most would in any case relate to a parameter which is to be routinely adjusted in designing and setting up such a device.

The arbitrary definition of a feature with no associated technical significance or effect is an inherently obvious route to providing a further process, meaning that the subject-matter of both requests does not meet the requirements of Article 56 EPC.

## **Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:



I. Aperribay

D. Semino

Decision electronically authenticated