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**Datasheet for the decision  
of 11 October 2006**

**Case Number:** T 0959/02 - 3.3.05

**Application Number:** 96939035.0

**Publication Number:** 0863842

**IPC:** C01B 15/10

**Language of the proceedings:** EN

**Title of invention:**

Coated sodium percarbonate particles, process for the  
production thereof and use thereof

**Patentee:**

Degussa AG

**Opponents:**

Kemira Kemi AB  
The Procter & Gamble Company

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 54, 56

**Keyword:**

"Novelty, inventive step (yes; after amendment)"

**Decisions cited:**

-

**Catchword:**

-



Case Number: T 0959/02 - 3.3.05

**D E C I S I O N**  
of the Technical Board of Appeal 3.3.05  
of 11 October 2006

**Appellant:**  
(Patent Proprietor)

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**Decision under appeal:**

**Decision of the Opposition Division of the  
European Patent Office posted 17 July 2002  
revoking European patent No. 0863842 pursuant  
to Article 102(1) EPC.**

**Composition of the Board:**

**Chairman:** M. Eberhard  
**Members:** H. Engl  
S. Hoffmann

## Summary of Facts and Submissions

- I. European patent EP-B1-0 863 842 was granted on the basis of European patent application 96 939 035.0, filed on 14 November 1996 with priority of 28 November 1995. The patent was revoked by decision of the opposition division posted on 17 July 2002 on the grounds of lack of inventive step and added subject matter. The decision was based on the main request and the auxiliary request, both filed during oral proceedings on 30 April 2002.
- II. The following documents were relied upon by the parties during the opposition proceedings:
- D1: DE A 24 17 572 ( = O<sub>1</sub>D<sub>1</sub> = O<sub>2</sub>D<sub>1</sub> )  
D2: WO A 95/15291  
D3: GB A 1 538 893  
D4: GB A 1 466 799 ( = O<sub>2</sub>D<sub>4</sub> )  
D5: GB A 1 300 855 ( = O<sub>1</sub>D<sub>2</sub> )  
D6: BE 760 508  
D7: GB A 1 581 465  
D8: FR A 2 076 430  
D9: H. Uhlemann, "Kontinuierliche Wirbelschicht -  
Sprühgranulation", Chem.-Ing.-Tech. 62 (1990),  
Nr. 10, pages 822 - 834 ( = O<sub>1</sub>D<sub>3</sub> )  
D10: WO A 95/06615 ( = O<sub>1</sub>D<sub>4</sub> )  
D11: WO A 96/14388  
V1: Test Report dated 27 February 2002  
V2: Supplement ("Ergänzung") to V1, dated 24 April  
2002
- III. The opposition division held that the subject matter of claim 1 in accordance with the main request lacked an

inventive step having regard to document D10 and the amount of sodium sulphate conventionally used to stabilize the detergent compositions, such as for example in D1. Claim 1 in accordance with the auxiliary request was rejected as infringing Article 123(2) and (3) EPC. Document D11 and Test Report V2 were disregarded by the opposition division as being late filed.

IV. An appeal was filed against this decision by the patentee (henceforth: the appellant) with letter of 17 September 2002. New claims were submitted as a main and an auxiliary request with the grounds of appeal filed with letter of 26 November 2002.

The independent claims 1, 3 and 6 of the main request read as follows:

1. Coated sodium percarbonate particles comprising
  - (i) a core substantially consisting of sodium percarbonate and
  - (ii) a coating layer enclosing this core and firmly adhering thereto consisting of sodium sulphate, which may be partially hydrated, which particles are characterized in that
    - (a) the core consists of sodium percarbonate produced by fluidised bed spray granulation wherein
      - (a1) a hydrogen peroxide solution and a soda solution are sprayed in a fluidised bed apparatus onto nuclei of sodium percarbonate and
      - (a2) water is simultaneously vaporised, and

- (b) the coating layer is obtainable by
  - (b1) spraying an aqueous sodium sulphate solution onto the uncoated particles of the sodium percarbonate fluidised bed spray granulate located in the fluidised bed and by
  - (b2) evaporating water while maintaining a fluidised bed temperature of 35 to 100°C, andin that the coating layer amounts to 0.5 to 25 wt.% of sodium sulphate, calculated without hydrate and relative to sodium percarbonate.

3. Process for the production of coated sodium percarbonate particles according to one of claims 1 or 2, characterised in that an aqueous sodium sulphate solution is sprayed onto particles of the sodium percarbonate fluidised bed granulate located in a fluidised bed while maintaining a fluidised bed temperature of 35 to 100 °C and water is vaporised.

6. Use of the coated sodium percarbonate particles of any one of claims 1 or 2 as a bleaching component in detergents, cleaning agents and bleaches, in particular detergents and bleaches containing silicate builders.

V. The appellant subsequently modified the claims of the auxiliary request. Amended claims as a first auxiliary request were submitted with letter of 14 March 2003, while the previously filed first auxiliary request was made the second auxiliary request. A new test report V3

dated 10 March 2003 was submitted in order to demonstrate the superiority of a sodium sulphate coating with respect to ensilability while obtaining high oxygen stability.

- VI. The board issued a communication in which *inter alia* objections under Article 84 EPC (clarity) and Article 123(2) and (3) EPC were raised against the claims of auxiliary requests 1 and 2.

With letter of 11 September 2006, the appellant filed a new set of claims as first auxiliary request, the claims of the previous auxiliary requests 1 and 2 becoming respectively auxiliary requests 2 and 3.

- VII. Oral proceedings were held on 11 October 2006. The appellant filed amended claims as the main request. The claims of the main request differ from those of the main request filed with letter of 26 November 2002 (see point II above) only in that in line 1 of claim 1 the word "comprising" is replaced by "consisting of". A request filed in writing for reimbursement of the appeal fee on grounds of a substantial procedural violation was not maintained.

- VIII. The requests of the parties were as follows:

The appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the amended claims according to the main request filed during the oral proceedings or in the alternative, as a first auxiliary request, on the basis of the set of claims according to the first auxiliary request filed with letter of 11 September 2006, or, as

a second auxiliary request, on the basis of the set of amended claims filed with letter of 14 March 2003 as a first auxiliary request, or, as a third auxiliary request, on the basis of the set of claims filed with letter of 26 November 2002 as first auxiliary request.

Respondent 1 (opponent 1) and respondent 2 (opponent 2) requested that the appeal be dismissed.

IX. The arguments of the parties, insofar as they are relevant for the claims in accordance with the main request, may be summarized as follows:

For the appellant:

The claimed subject matter was novel with respect to document D10 because of two differences: Firstly, the claimed amount of the coating material of 0.5 to 25 wt.-% was not known from D10. Secondly, the document would not disclose sodium percarbonate particles coated directly on the core with a single layer of sodium sulphate. For grammatical and semantic reasons, the text in the paragraph bridging pages 11 and 12 of D10 would exclude this possibility. It would be inappropriate to change the text of a document in the knowledge of the claimed invention so as to encompass the claimed subject matter. The passage in question was ambiguous as to whether a single layer consisting of several components or several layers each consisting of one component was disclosed. In any event, the claimed embodiment could not be read into D10.

Having regard to D11, a multiple and novel selection among the various lists of possibilities disclosed in

D11 should be acknowledged. Moreover, D11 would not disclose feature (a1) of claim 1 of the main request, *i.e.*, the nuclei consisting of sodium percarbonate. The nuclei mentioned at page 16, line 3 of D11 were not specified and could be any suitable substance, for example sodium carbonate. D11 would also not unambiguously disclose that all coating layers are applied in a fluidised bed spray granulation process.

Starting from D1 as the closest prior art, the appellant defined the object of the invention as providing coated sodium percarbonate particles suitable for the manufacture of detergents and bleaching agents, having a good ensilability and at the same time exceptionally good oxygen stability. He argued that D10 would not qualify as closest prior art since it did not deal with the same technical problem as the patent in suit. On the other hand D1, which deals with the problem of oxygen retention, would not suggest sodium sulphate coatings for obtaining a good ensilability. None of the available prior art documents would deal with the problem of ensilability. In particular, D10 would not teach how to improve ensilability.

Regarding D1, the appellant argued that the skilled person would not take comparative example 7R as the most promising starting point for further improvements, but those examples which already exhibited high oxygen stability thanks to the mixed sodium sulphate / sodium carbonate coating applied to the core of crystalline sodium percarbonate. The claimed invention, however, was based on the finding that on a differently prepared core, a single coating of sodium sulphate not only produced a product as stable as the best example in D1,



but additionally freely flowable after 28 days of storage under simulated silo conditions. This surprising result was in contrast to the teaching of D1 and was not suggested by other prior art, in particular D10. The invention had, for the first time, offered the possibility of storing the large quantities of sodium percarbonate required in the industrial production of washing powder and the like in a silo.

Respondent 1:

Respondent 1 attacked the novelty of claim 1 of the main request on the basis of documents D10 and D11. It was stressed that D10 and D11 are directed not to the linguistic expert, but to the skilled person. The skilled person had no problem in identifying in D10 the proposed coating substances. These could clearly be applied in combination or singly. With respect to the coating amount, which was not explicitly disclosed in D10, the respondent argued that the document referred to the prior art and thus incorporated by way of reference the coating amounts which were usual in the relevant art. He pointed to D1, D3, D4 and D11, all disclosing coating amounts in the claimed range. Consequently, D10 would disclose all features of claim 1 of the main request, explicitly or implicitly.

Regarding D11, the respondent could not recognise the various lists from which the skilled person had to select product features. He saw a clear general teaching to produce particles of sodium percarbonate in a fluidised bed spray granulation process which were in situ coated with sodium sulphate in the claimed amount. Even if step d) of the procedure described in D11

(pages 15, 16) did not explicitly mention nuclei consisting of sodium percarbonate, such nuclei would inevitably be created in the process.

Regarding inventive step, respondent 1 denied that the examples provided in the opposed patent and filed as test reports V1 - V3 would indicate a surprising effect of the claimed coating compared with a mixed coating or a multiple layer coating. Regarding the test report V3, he pointed out that important parameters influencing the flowability had been omitted in the test report and cited four additional documents to show that moisture content, particle size and particle size distribution of the sample are of importance when determining the flowability.

The claimed subject matter also lacked an inventive step having regard to D10 or D1. It differed from D1 only by the feature that the sodium percarbonate had been produced by fluidized bed spray granulation. The method of preparing sodium percarbonate particles by fluidized bed spray granulation was however known from documents D5, D9 or D10. In view of the advantages stated in the said documents it would have been obvious to replace the crystallized core of the sodium percarbonate of D1 by a sodium percarbonate obtained by fluidized bed spray granulation. The allegedly improved ensilability of such a product was thus no more than a bonus effect which could not support an inventive step.

Alternatively, starting from D10, respondent 1 redefined the technical problem as a mere optimisation of the coating amount of coated sodium percarbonate particles. The claimed range was obvious, because a

coating amount of 0.5 to 20 wt.% was already known from D1 which dealt with the problem of improving the stability of sodium percarbonate. The skilled person would have reproduced the examples of D1 and would have observed that a sodium sulphate coating does not stick, thereby arriving at the claimed product.

Respondent 2:

Respondent 2 also argued on lack of novelty of the subject matter of claim 1 according to the main request, in view of either of D10 and D11. He stressed that the disclosure of a document should be read in a sensible manner and construction of the convoluted sentences in D10 (pages 11, 12) and D11 (page 12) should be done with a technical mind. Since the possibility of using only one coating layer was clearly sensible and sodium sulphate was clearly suggested for the purpose of increasing the storage stability of sodium percarbonate, all the skilled person had to do was to apply the usual amount of coating. The skilled person had no other choice than to work in the claimed range, because as a technical fact at amounts of below 0.5 wt.-% no complete coating could be obtained, whereas amounts above 25 wt. % would be wasted.

On the effects of the claimed invention, respondent 2 argued that the ensilability property would be easily observable on the product. For granular detergents the properties of flowability and stability would always be in need of optimisation. D10 pointed toward the possibility of using sodium sulphate for improving stability and D1 would teach that ensilability is relatively good when using sodium sulphate as a

coating. Therefore, starting from D10 as the closest prior art, an inventive step could not be seen in view of D1. The skilled person would also have arrived in an obvious manner at the claimed product on the basis of D10 and common general knowledge. Starting from D10, the skilled person would have tried the five possible coatings disclosed therein for improving the stability. The coating amounts belonged to common general knowledge and he would have thus used 3 - 5 wt.-% in the routine experimentations.

Starting from D1, there was no inventive step in view of the teaching of D5, disclosing a process of preparing sodium percarbonate by fluidised bed spray granulation as well as the advantages of the products so prepared, or in view of D10. In the respondent's submission, this new process was already accepted in the industry at the relevant date of the opposed patent. The skilled person would not, therefore, have focused his interest on older documents discussing sodium percarbonate prepared by the crystallisation route.

### **Reasons for the Decision**

1. The appeal is admissible.
2. *Admissibility of the main request*

The main request with a new claim 1, wherein in line 1 the word "comprising" is replaced by "consisting of", was filed by the appellant at the beginning of the oral proceedings. The respondents objected to this late

filing of amended claims. The board decided to admit the late filed request for the following reasons.

Firstly, the respondents admitted that the amendment in question had already been discussed during the oral proceedings before the opposition division. It could not, thus, come as a complete surprise to them. Secondly, the amendment was filed in response to the question, raised by the board during oral proceedings, as to how claim 1 of the main request should be constructed, in particular, whether or not the term "comprising" read in the context of claim 1 excludes further layers. According to the submissions of the respondent 2, the claim as amended only defines in more precise terms what had already been understood by the parties, namely that the coated sodium percarbonate particles of the invention carry a coating of sodium sulphate, i.e., they consist of a core and a sodium sulphate coating layer.

Under these circumstances, the fact alone that the amendment could have been filed earlier does not in the board's view justify rejecting the request as inadmissible.

3. *Amendments*

The features of claim 1 of the main request are based on the original application documents, published as WO A 97/19890, in the following manner:

items (i), (a), (b), (b1) and (b2) are based on original claim 1;

item (ii) is based on original claim 1 and the description, page 6, lines 23 - 25;  
item (a1) is based on the description, page 5, lines 28 to page 6, line 3;  
item (a2) is based on the description, page 6, line 3; the coating layer amounts stated in claim 1 are based on the description, page 7, lines 9-11.

Claims 2 - 6 correspond to original claims 3 - 7, respectively.

The language "consisting of" in line 1 of claim 1 finds a basis in page 12, lines 3 - 5; and in example B1, disclosing sodium percarbonate particles coated with sodium sulphate as the sole coating layer.

The subject matter of claim 1 of the main request does not extend beyond the scope of protection conferred by the claims as granted, because it combines - *inter alia* - all the features of granted claims 1 and 2.

The requirements of Article 123(2) and (3) EPC are therefore met.

#### 4. *Clarity*

Respondent 2 has objected that the exchange of "comprising" by "consisting of" would introduce a discrepancy with the expression "substantially consisting of" in feature (i) of the claim. The board does not share the respondent's opinion that the proposed amendment contradicts feature (i) of claim 1, because the amendment concerns the definition of the

particles which consist of a core and a coating layer, whereas the expression "substantially consisting of" concerns the core.

5. *Novelty*

Documents D10 and D11 have been cited by the respondents as novelty-destroying for the subject matter of claim 1 of the main request.

- 5.1 D10 discloses a process and apparatus for producing sodium percarbonate by fluidised-bed spray granulation by spraying an aqueous solution of sodium carbonate and a hydrogen peroxide solution on sodium percarbonate seeds having a smaller particle size than those of the sodium percarbonate to be obtained, and evaporating the water. The process and apparatus are characterised in that the two solutions are sprayed by means of a three-substance pulverization nozzle with external mixing of the solutions (see abstract, claim 1). D10 thus discloses sodium percarbonate particles prepared by fluidised bed spray granulation in accordance with features (a1) and (a2) of claim 1 of the main request.

The sodium percarbonate so obtained may be coated immediately after its production in "a manner known per se" (*"in an sich bekannter Weise"*), in order to improve its stability (page 13, last line to page 14, line 7). The kind of coating to be applied is further specified on pages 11, line 25 to page 12, line 5 which in the German original text reads as follows:

*"Als Nachbehandlung kommen insbesondere Verfahren zum Aufbringen einer Umhüllung auf die Partikel"*

*zwecks Erhöhung der Lagerstabilität infrage. Eine solche Nachbehandlung beruht vorzugsweise darauf, dass eine oder mehrere Hüllkomponenten, wie z.B. Borverbindungen, Soda, Natriumsulfat, Magnesiumsulfat und Wasserglas, enthaltende Lösungen in einer Wirbelschicht auf das zuvor hergestellte granulatförmige Natriumpercarbonat unter gleichzeitigem Verdampfen von Wasser und Ausbildung einer festhaftenden Hüllschicht aufgebracht wird."*

In the submission of both respondents, the cited passage would disclose features (ii), (b1) and (b2) of claim 1 of the main request. The respondents further argued that the claimed amount of coating material of 0.5 to 25 wt. %, relative to sodium percarbonate, would implicitly be disclosed in D10, since the skilled person would inevitably work in the claimed range. In support of this argument, the respondents made reference at the oral proceedings to D1 (page 3, lines 5 - 8), D3 (page 2, lines 11, 12) and to D4 (page 2, lines 4, 5) each disclosing a coating amount of 0.5 to 20 wt.%; and to D11 (page 8, lines 16 - 28), disclosing a coating amount of 1 - 12 wt.-%.

According to respondent 1, the temperature of the fluidised bed maintained during water evaporation at 35 to 100 °C (feature (b2)) was dictated by technical necessity to operate the fluidized bed between the temperature of formation of the sodium sulphate decahydrate and the decomposition temperature of sodium percarbonate. It was thus also implicitly disclosed in D10. This was not denied by the appellant.



From the above, the respondents conclude that D10 would disclose all the features of claim 1 of the main request, explicitly or implicitly.

For document D10 to be novelty destroying, a coating layer enclosing the core of sodium percarbonate and firmly adhering thereto consisting of sodium sulphate, should be directly and unambiguously derivable from the document. Claim 1 of the main request furthermore requires this sodium sulphate layer to be the only coating layer, since the claimed coated sodium percarbonate particles consist of the core (feature (i)) and the coating (feature (ii)).

In the board's opinion, the above combination of features of the coating is not disclosed in D10. Although the cited passage bridging pages 11 and 12 recites five specific coating substances (boron compounds, soda, sodium sulphate, magnesium sulphate and water glass), there is no clear teaching that each of them could be used singly. It is noted that the coating substances are to be applied as solutions ("*Lösungen*"), which hints at a plurality of coating compounds. Furthermore, it is by no means clear that the term "*eine oder mehrere*" ("one or more") refers to the following noun "*Hüllkomponenten*"; from a grammatical point of view, it could as well refer to the noun "*Lösungen*", again indicative of either more than one coating or more than one coating layer. The board observes that "*Hüllkomponenten ... enthaltende Lösungen*", read without the qualifier "*eine oder mehrere*", cannot be interpreted as a teaching to apply a single coating substance. The disclosure of D10 is thus ambiguous in this respect and novelty of the

claimed subject matter must be conceded on this ground alone.

A second difference concerns the allegedly implicit disclosure of the coating amount. Respondent 1 cited D1, D3, D4 and D11 (the latter being post-published) as evidence for its submission. However, calculations made by the appellant on the basis of examples (tests) nrs. 13 and 15 of D2 (page 4, line 36 to page 5, line 17) tend to show that the effective coating amount applied on the sodium percarbonate particles in test 13 is 25.4 %, based on the weight of the sodium percarbonate, and thus outside the claimed range. This figure is derived from the oxygen content reported for the sodium percarbonate before and after coating, assuming the oxygen content of 14.1 % for the uncoated sodium percarbonate to be the same in tests 13 and 15. However, respondent 1 disagreed with this calculation. It declared itself as not having information on whether in fact the same sodium percarbonate starting material was used in example 13 and in example 15 of D2.

What is more important, however, is that in the board's opinion the cited patent literature is unsuitable to demonstrate common general knowledge before the priority date of the patent in suit. In accordance with D10 (page 13, last line to page 14, line 7), the coating is applied "*in an sich bekannter Weise*" ("in a manner known *per se*"). D1, D3 and D4 indeed disclose coating amounts falling within the claimed range; however, this patent literature cannot be considered as illustrating common general knowledge in a technical field like the present one. If the said coating amount does not belong to common general knowledge, but is

only known *per se* from D1, D3 or D4, then D10 **alone** cannot be novelty-destroying to the claimed combination of features.

Respondent 2 has argued that the skilled person's aim is to obtain a complete coating. It would be a technical fact that below 0.5 wt.% no complete coating could be obtained; this would be confirmed by D1 (page 3, lines 8, 9). On the other hand, the skilled person would not waste material by applying more than what is needed. Therefore, he had no choice other than to work in the claimed range.

The board is not convinced by these arguments. The respondent did not support his allegations by evidence other than D1, which however does not illustrate common general knowledge. Also, as discussed above, D2 would at least point at the possibility of using higher amounts of coating.

The board is thus not convinced that the skilled person would automatically work the invention disclosed in D10 in the claimed range of coating amounts.

The subject matter of claim 1 is therefore novel having regard to D10.

- 5.2 Document D11 has the filing date of 19 October 1995 and was published on 17 May 1996, i.e., after the priority date of the patent in suit. It designates all the contracting states designated in the patent in suit. The requirements of Article 158(2) EPC are met. Consequently, D11 is part of the state of the art under the provisions of Article 54(3)(4) EPC.

D11 concerns washing, bleaching and cleaning agent compositions containing coated alkali metal percarbonate particles. In accordance with preferred embodiments, a sodium percarbonate core prepared by fluidised bed spray granulation is coated with one or more layers of compounds selected from soda, sodium bicarbonate, alkali and alkaline earth metal salts of mineral acids, in particular sodium and magnesium sulphates, alkali and alkaline earth metal silicates, alkali metal borates and perborates. The amount of the coating(s) is less than 25 wt.%, preferably 1 to 15 wt.%, based on the sodium percarbonate core (see abstract; claims 1, 2, 4 and 5; and description, page 7, line 24 - page 8, line 28).

The working examples 1 - 3 of D11 disclose sodium percarbonate particles coated with a mixture of  $MgSO_4$  and  $Na_2CO_3$ .

The board considers the passage on page 7, lines 27 - 35 as disclosing a coating of one of the compounds selected from soda, sodium bicarbonate, alkali and alkaline earth metal salts of mineral acids, in particular sodium and magnesium sulphates, alkali and alkaline earth metal silicates, alkali metal borates and perborates on a core of sodium percarbonate. To arrive at the claimed subject matter the skilled person would thus have to choose sodium sulphate from the said list of compounds in combination with the process features a1, b1 and b2.

However, as rightfully pointed out by the appellant, the question arises whether the coating(s) mentioned on

page 7 of the description or in claim 5 of D11 is (are) necessarily applied in the manner claimed in features (a1), (b1) and (b2) of claim 1 of the main request, i.e., spraying a solution of hydrogen peroxide and a soda solution in a fluidised bed apparatus onto nuclei of sodium percarbonate, spraying an aqueous sodium sulphate solution onto the uncoated particles of the sodium percarbonate fluidised bed spray granulate in a fluidised bed and evaporating the water while maintaining a fluidised bed temperature of 35 to 100 °C.

In D11, page 16, item e), under the heading "*Beispiele*" ("*Examples*") (see heading on page 14) a process for coating particles of sodium percarbonate in a fluidised bed apparatus by spraying aqueous solutions of coating agents, maintaining the temperature of the bed at 50 to 60 °C and drying at 80 to 90 °C is disclosed. The first coating solution is a solution of  $MgSO_4$ , followed by a solution containing a mixture of  $Na_2CO_3$  and sodium silicate. The board, however, is of the opinion that this specific teaching is not necessarily to be read with the general disclosure on page 7, lines 27 - 35, for the following reasons. Firstly, it is presented as a part of the preparation of the working examples 1 - 3. Secondly, item e) specifically concerns the preparation of two coatings of  $MgSO_4$  and  $Na_2CO_3$  / sodium silicate, respectively. The process described cannot, therefore, lead to the preparation of a single coating consisting of sodium sulphate without modification. In other words, it cannot be considered a general teaching which applies to the document as a whole, and in particular to the general discussion on page 7, lines 27 - 35.

Concerning feature (a1), it was debated during oral proceedings whether D11 discloses a process of manufacture of the sodium percarbonate core using nuclei consisting of sodium percarbonate in accordance with step (a1) of claim 1. The appellant argued that the nuclei would inevitably be found in the claimed end product and could thus affect novelty. The board observes that the nuclei referred to at page 16, line 3 of D11 are unspecified, hence not necessarily made of sodium percarbonate, since the respondents have admitted that nuclei other than sodium percarbonate could in principle be used in the method. Respondent 1 has argued that in the process disclosed in D11 inevitably some of the sprayed sodium carbonate and hydrogen peroxide droplets would form nuclei of sodium percarbonate. However, this allegation has not been supported by evidence. A further point raised by respondent 1 concerned pages 15 and 16, item d) of D11, stating that the preparation of the uncoated sodium percarbonate is carried out in accordance with German patent application P 43 29 205.4. Said German patent application is the priority document of D10. Document D10 mentions the recirculation of very fine material of the fluidized bed as nuclei (page 10, lines 10 - 15). However, the board has no proof that what is disclosed at said page 10, lines 10 - 15 of D10 is also described in P 43 29 205.4.

The board cannot, therefore, see an unambiguous disclosure of all the claimed features in combination, in particular of combined features (ii), (a1), (b1) and (b2). Novelty of claim 1 of the main request having regard to D11 is thus accepted.

5.3 No other documents have been cited for novelty. The board is also satisfied that none of the remaining documents on file constitutes a novelty bar for the claimed subject matter.

In particular, the subject matter of claim 1 of the main request is novel having regard to D1, comparative example 7R. The product of this example contains a coating of sodium sulphate, but the core of sodium percarbonate is not explicitly described as having been prepared in a fluidised bed spray granulation process.

## 6. *Inventive step*

### 6.1 Closest prior art

In accordance with the established case law the closest prior art is usually a document having the same purpose or aiming at the same objective as the claimed invention and having the most relevant technical features in common with the invention. Having this in mind, among the documents proposed by the parties, the board considers D1 to represent the closest prior art. In fact, D1 is concerned with the problem of oxygen stability of persalts of alkali metals used in washing or bleaching agents, in particular of granules having a core of sodium percarbonate and one or more coating(s). It contains a comparison of different kinds of coatings as to their efficiency in stabilizing the sodium percarbonate core. This is part of the problem addressed by the patent in suit. In contrast, D10 (proposed by the respondents as the closest piece of prior art) deals with the problem of improving the injection of process fluids in the fluidized bed spray

granulation process for making sodium percarbonate, in particular of avoiding the clogging of the injection nozzles. The solution proposed in D10 consists in the use of a single three - substance pulverization nozzle with external mixing of the solution (see abstract; page 3, line 9 - page 5, line 13. The technical problem of document D10 is thus very distinct from the one underlying the patent in suit so that D10 cannot be considered as representing the closest prior art.

D1 discloses particulate alkali metal percarbonates having a coating layer consisting of a mixed compound obtained by crystallization of sodium carbonate with another mineral acid salt, such as sodium bicarbonate and/or sodium sulphate (see description, page 2, paragraphs 3 and 4; claim 1, 10, 13, and 14). Preferred coatings consist of a mixture of sodium carbonate and sodium sulphate or sodium bicarbonate and sodium carbonate (examples 3, 4, 5, 8). The coating is applied by spraying aqueous solutions of sodium carbonate and sodium bicarbonate or sodium sulphate onto sodium percarbonate particles suspended in a fluidized bed at a temperature not exceeding about 80 °C (page 4, last paragraph, page 5, first paragraph) and in an amount of from 0.5 to 20 wt.%, relative to the core (page 3, second full paragraph). The manufacture of the sodium percarbonate particles is not disclosed in D1 and may hence be any method known in the art (see for instance D5, page 1, lines 13 - 19, disclosing a process for making sodium percarbonate by mixing sodium carbonate, as a solid or as a suspension or solution in water, with an aqueous solution of hydrogen peroxide, cooling the reaction mixture to crystallize the percarbonate and separating the latter from the reaction mixture).



Enzyme free washing powder formulations comprising sodium percarbonate particles having said mixed sodium carbonate / sodium sulphate or sodium bicarbonate / sodium carbonate coatings are shown in D1 to provide increased stability of the sodium percarbonate against oxygen loss, when stored in a shelf test for 4 to 12 weeks at 28 °C and 70 % relative humidity, or at 35 °C and 80 % relative humidity, compared with uncoated sodium percarbonate (see Tables III and IV).

D1 also discloses in Table III, as comparative example 7R, a sodium percarbonate coated with 5 wt. % of sodium sulphate. This product does not exhibit the required stability against loss of active oxygen after 4 and 8 weeks (see Table III). Another comparative example 6R concerns sodium percarbonate coated with sodium carbonate.

Therefore the product of claim 1 of the main request differs from the coated product of D1 *inter alia* in that the sodium percarbonate particles are produced in a fluidised bed spray granulation process (feature (a) of claim 1) and in that the coating is different (feature (ii)). The parties agreed that a sodium percarbonate particle prepared, for instance, by a crystallization process would be distinguishable from a sodium percarbonate particle prepared by a fluidized bed spray granulation process.

With respect to comparative example 7R of D1 - which exhibits the worst oxygen stability -, the claimed subject matter differs by feature (a) of claim 1.

## 6.2 Technical problem and solution

Starting from D1, the technical problem of the patent in suit is to provide coated sodium percarbonate particles having at the same time a good oxygen stability and a good ensilability.

The claimed solution consists in coated sodium percarbonate particles as defined in claim 1 which differ from those of D1 at least in that the sodium percarbonate particles made by a fluidised bed granulation process carry a single coating consisting of sodium sulphate, which may be partially hydrated.

The two different properties stated above, namely good oxygen stability and good ensilability, are demonstrated in the examples and comparative examples in the opposed patent and in additional test reports filed during opposition and appeal procedures.

Inventive example B1 (Table 1 of the opposed patent) exhibits an oxygen retention after 4 and 8 weeks of 95 and 88 %, respectively. The ensilability was determined using the Jenike method over a period of 28 days which involves the determination of the fcc value (flowability index), as indicated in the description, page 5, lines 20 - 27; (method described in detail in: "Silo - Handbuch", Peter Martens (Ed.), Ernst & Sons, Berlin, 1988, pages 41 - 57; [cited by respondent 1]). Sample B1 had a Jenike fcc value of 7.9 after 1, 7 and 28 days of storage, which indicates a "ready flowing" product and thus a good ensilability; see patent in suit, page 5, lines 35 - 38 and 50 - 53. Similar favourable results are obtained in accordance with

example B4, submitted as Ov-124cc by the appellant in Test report V3.

Coated sodium percarbonate products prepared with a coating in accordance with D1 ( $\text{Na}_2\text{SO}_4$  /  $\text{Na}_2\text{CO}_3$ ) and denoted as example VB9 in test report V1 show an fcc value after 35 days of 3.9 ("cohesive", according to the patent in suit, page 5, lines 35 - 38), in contrast to a flowability of 11.5 for inventive example B2 (of report V1), the oxygen stability being the same in both samples.

Another comparison may be made between samples Ov-133cc (with a coating according to D1) and Ov-124cc (B4; according to the invention) of the test report V3. Again, oxygen retention is good in both samples, but flowability (ensilability) - which is initially high for both samples - decreases significantly more after 28 days for the comparative sample which becomes very cohesive and non - flowing whereas the sample according to the invention remains free - flowing. Furthermore, Table 2 of the patent in suit shows that with a crystallised sodium percarbonate core coated with a layer of sodium sulphate, the oxygen stability is relatively low.

Respondent 1 has argued that important parameters influencing the flowability, such as moisture content, particles size and particle size distribution of the sample, had been omitted in the test report V3. This argument is, however, not relevant, since according to the appellant these parameters have been kept constant throughout the experiments so that the conclusions drawn remain valid.

The board is therefore satisfied that the products claimed in accordance with claim 1 of the main request exhibit a combination of good oxygen retention and good ensilability and thus that the problem stated above has indeed been solved by the features of claim 1.

- 6.3 The respondents have argued that the claimed invention would be obvious having regard to a combination of documents D1 and D10. The state of the art at the priority date of the opposed patent would have moved from sodium percarbonate prepared by crystallisation to granules prepared by a fluidized bed spray granulation process, such as disclosed in D10. The skilled person would have found himself in a one - way street situation leading to the claimed subject matter simply by replacing the sodium percarbonate core of D1 by a product produced by a more modern and advantageous process. In doing so, he would have routinely repeated all of the examples of D1, including the comparative example 7R, disclosing a sodium sulphate coating. He would easily have discovered that such a product having a pure sodium sulphate coating had non-baking property. Respondent 1 noted that measurement of oxygen stability requires keeping the product for long periods (up to 4 weeks), during which any baking or non - baking of the product would have been routinely noticed.

The board is not convinced that the skilled person would find the solution to the problem underlying the opposed patent in D10. Document D10 is silent on the aspect of ensilability. In this connection the board interprets the term "*Lagerstabilität*" ("*storage stability*") in D10 (page 11, line 28) as referring to

"oxygen stability during storage", because the coating components recited immediately thereafter are known in the art (e.g. from D1) to improve oxygen stability. There is no hint in D10 and in the prior art that such coatings would also be beneficial for reducing agglomeration and /or baking during storage in a silo. Therefore, the skilled person would associate "*Lagerstabilität*" only with "oxygen stability" during storage, not with "ensilability". As the appellant has convincingly pointed out, the physical conditions, in particular the pressure, to which a product is subjected during storage in a silo are very different from those during ordinary shelve storage of a packaged product. This is reflected by the fact that the test methods for determining oxygen stability of a packaged product and for determining the ensilability (according to Jenike) are quite different.

As regards oxygen stability, D10 merely recites a number of coating materials which are to be applied to the sodium percarbonate particles "*in a manner known per se*" (see the paragraph bridging pages 13 and 14). This is described in D10 as a further, optional, step in the process of manufacturing sodium percarbonate granules in a fluidised bed process in order to improve the storage stability of uncoated sodium percarbonate. D10 does not disclose a self-contained teaching which coating component(s) confer(s) the best oxygen stability to the particulate sodium percarbonate. D10 is rather concerned, as pointed out before, with the problem of avoiding the clogging of the injection nozzles in the fluidized bed spray granulation process for making sodium percarbonate and proposes a special single three - substance pulverization nozzle with

external mixing of the solution. The technical problem of document D10 is thus completely different from the one underlying the patent in suit.

But even assuming in favour of the respondents that it would be obvious to combine documents D1 and D10, such combination would not lead to the claimed invention, for the following reasons.

As discussed before, D1 teaches coatings consisting of a mixture of sodium carbonate and another mineral acid salt, such as sodium bicarbonate and/or sodium sulphate. It is in the board's view not plausible to assume that the skilled person aiming at obtaining coated sodium percarbonate products having a good oxygen stability and a good ensilability would disregard this teaching in favour of embodiment 7R (single coating of sodium sulphate), an example which is explicitly designated as comparative and whose oxygen stability is the worst of all the examples in D1. The respondent's approach to choose example 7R of D1 as a starting point seems to be based on hindsight and must therefore fail.

If, however, the skilled person started from the mixed sodium carbonate / sodium sulphate coatings proposed in D1, and even if he were to use the fluidized bed spray granulation process disclosed in D10 for making the sodium percarbonate core, he would not arrive at the claimed subject matter, but at a differently coated product.

The same analysis applies to a possible combination of documents D1 and D5 (or D9). D5 discloses a fluidised - bed spray granulation process for the production of

sodium percarbonate of the formula  $2\text{Na}_2\text{CO}_3 \cdot 3\text{H}_2\text{O}$  in the form of abrasion - resistant granules (claim 1). The advantages of said process and of the product so obtained over the conventional crystallisation process and product are explained at page 3, lines 41 - 66 and include higher purity (no NaCl in the product) and yield, higher content of active oxygen and more favourable granulometry and abrasion resistance. D9, a review on fluidised bed spray granulation, reports at page 832, right hand column, chapter 11, that granules so produced are abrasion - resistant, contain little dust and have a high apparent density. It would have been, in the respondents' views, obvious to replace the sodium percarbonate core particles of D1 by the product disclosed in D5 in view of these advantages, while still maintaining the oxygen stability conferred by the coatings proposed in D1. The board considers, however, that in order to achieve this aim the skilled person would choose the best coating materials disclosed in D1, *i.e.*, the mixed sodium carbonate / sodium sulphate coatings. He would thus not arrive at the claimed subject matter.

Respondent 2 argued starting from D10 as the closest prior art. The fluidised bed spray granulation process of said document would have been usual in the art at the priority date of the opposed patent, not the older crystallization process. In the respondent's argumentation, the skilled person would have simply tried out all of the coating materials proposed in D10, using the amounts of coating usual in the art, and evaluated the results. In so doing, he would inevitably also have tested the sodium sulphate coating, and would thus have arrived at the claimed invention.

The board cannot follow this argument, because D10, as indicated above, deals with a completely different technical problem and is thus an unsuitable starting point in view of the object of the opposed patent. But even assuming, for the sake of argument and in favour of the respondent, that D10 would be the closest prior art, the claimed subject matter would not result from D10 alone, for the following reasons.

Starting from D10, respondent 1 defined the problem of the patent in suit as determining the amount of coating material required to provide a good oxygen stability. This formulation of the problem contains, however, pointers to the claimed solution and is thus not acceptable. In the board's opinion, starting from D10, the technical problem can be formulated as the one defined in point 6.2. above.

It is true that, in order to improve the stability of the sodium percarbonate, D10 mentions the possibility of applying a coating onto the granules. How exactly the coating is to be carried out is not explained in detail in D10, but "a manner known *per se*" is referred to. Because of this referral to the art and also because of the ambiguity of the disclosure of D10 regarding the precise nature of the coatings (see section 5.1. above), the skilled person would be induced to consult the relevant prior art such as, for instance, document D1. From what is taught in D1, however, and in particular in view of the fact that comparative example 7R with a sodium sulphate coating leads to the worst oxygen stability, the skilled person could not have expected that a sodium sulphate coating



would solve the problem stated above. He would therefore have excluded this particular coating as a non-viable option.

It is the boards' established case law that for assessing the presence of inventive activity the question to be asked is not whether the skilled person **could** have carried out the invention, but whether he **would** have done so in the hope of solving the underlying problem or in the expectation of some improvement or advantage (see Case Law of the Boards of Appeal of the EPO, Fourth Edition, 2001, page 117, first paragraph, and the decision cited there). The board considers that in the present case the skilled person **could** have tried out all possible coatings suggested in D10, but he **would not** have tried out what he had reason to believe would not solve the technical problem he was confronted with.

As regards ensilability, the board considers that in contrast to the respondents' arguments it is not immediately apparent by inspection whether or not a product remains free - flowing under the storage conditions in a silo. The tests according to the Jenike method performed in the opposed patent involve storage of the product under a defined pressure for up to 28 days. A comparison of example B1 and comparative example VB3 in Table I of the opposed patent reveals that although both products are initially free-flowing, VB3 becomes cohesive after 28 days, whereas inventive sample B1 does not. This suggests that the ensilability of a product cannot be predicted from its appearance and behaviour immediately after production or even

after some period of storage in an uncompressed condition. D1 and D10 are both silent on this property.

The subject matter claimed in claim 1 of the main request therefore involves an inventive step having regard to documents D1 and D10.

6.4 None of the remaining documents on file, taken alone or in combination with the documents analyzed above contain additional information which could render the claimed solution of the above stated technical problem obvious.

6.5 For the above reasons, the subject matter claimed in claim 1 of the main request meets the requirement of inventive step set out in Art. 56 EPC. The same finding applies to the subject matter of dependent claim 2, of process claims 3 - 5 and of use claim 6 of said main request, because all these claims refer back to and thus incorporate all of the features of claim 1.

6.6 Since the claims of the main request can be allowed, there is no need to consider the auxiliary requests.

**Order**

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

1. The decision under appeal is set aside.
  
2. The case is remitted to the first instance with the order to maintain the patent on the basis of the claims according to the main request filed during the oral proceedings and a description to be adapted.

The Registrar

The Chairman

G. Rauh

M. Eberhard