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**Datasheet for the decision
of 1 February 2007**

Case Number: T 0453/04 - 3.3.03

Application Number: 95201731.7

Publication Number: 0690083

IPC: C08G 12/40

Language of the proceedings: EN

Title of invention:

Use of an aqueous solution of a polycondensate as additive for hydraulically setting mortars

Patentee:

METS HOLDING B.V.

Opponent:

Perstorp Support AB

Headword:

-

Relevant legal provisions:

EPC Art. 54, 56, 69(1), 83, 84, 113(1)

EPC R. 67, 71(2)

RPBA Art. 11(3)

Keyword:

"Novelty (yes)"

"Inventive step (yes)"

"Disclosure - enabling - general technical teaching"

"Claims - interpretation"

"Right to be heard - yes - no procedural violation"

"Reimbursement of the appeal fee - no"

Decisions cited:

T 0109/91, T 0092/92, T 0585/92, T 0667/94

Catchword:

-



Case Number: T 0453/04 - 3.3.03

D E C I S I O N
of the Technical Board of Appeal 3.3.03
of 1 February 2007

Appellant: Perstorp Support AB
(Opponent) S-284 80 Perstorp (SE)

Representative: Hansen, Bernd
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Respondent: METS HOLDING B.V.
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Decision under appeal: Decision of the Opposition Division of the
European Patent Office dated 28 January 2004
and posted 19 March 2004 rejecting the
opposition filed against European patent
No. 0690083 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: R. Young
Members: M. C. Gordon
E. Dufrasne

Summary of Facts and Submissions

I. Mention of the grant of European Patent No. 0 690 083 in the name of Mets Holding B.V. in respect of European patent application No. 95201731.7, filed on 26 June 1995 and claiming priority of NL patent application no. 9401079 dated 28 June 1994 was announced on 13 December 2000 (Bulletin 2000/50) on the basis of 4 claims, claim 1 of which read as follows:

"1. Use of an aqueous solution of a polycondensate, obtainable by

a) preparing, in a first step, an aqueous solution of a precondensate composed of: at least one compound I containing at least two amino groups, at least one aldehyde II, at least one sulphonating agent III and, optionally, one or more co-reacting agents IV;

b) converting, in a second step, the precondensate obtained in step a) into a polycondensate at a lower pH than in step a),

wherein

a) in the first step, the following amounts of the reagents are used per mol of the compound I:

2.8 - 6 mol of the aldehyde II,

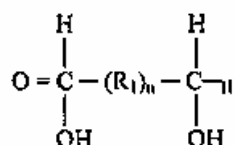
0.8 - 2.5 mol of the sulphonating agent III, and

0-3 mol of the co-reacting agent IV;

b) and in the second step, 0.1 - 1 mol of the additional amount of the compound I, again based on 1 mol of the compound I, and

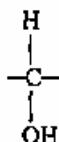
wherein, at the end of step a) any excess of unreacted compound III is reacted with an oxidizing agent and, in step b) an additional amount of the compound I is added to the precondensation product,

wherein compound I is chosen from the group comprising amino-s-triazines, melamine, urea, thiourea, guanidine, dicyanodiamines, aminocarboxylic acids, aminodicarboxylic acids, aminosulphonic acids and carpolactams [*sic*], wherein aldehyde II is chosen from the group comprising formaldehyde, acetaldehyde, butyraldehyde, furfuraldehyde and benzaldehyde, wherein the sulphonating agent III is chosen from the group comprising alkali-metal and alkaline-earth-metal sulphite and alkali-metal and alkaline-earth-metal sulphamate, and wherein the co-reacting agent (IV) is chosen from the group comprising naphthalenesulphonic acid, mono- and dibenzoic acid, toluene- xylene- and cumenesulphonic acids (including o-, p- and m-derivatives), fatty acid amine oxides, betaine, quaternary ammonium compounds, ether carboxylic acids, aminosulphonic acids, amino acids, aminocarboxylic acids, aminodicarboxylic acids, hydroxycarboxylic acids, hydroxycarboxylic acid lactones, polyhydroxycarboxylic acid lactones, sulphamic acids, a boron-containing polyhydroxycarboxylic acid or a water-soluble alkali-metal salt or alkaline-earth-metal salt of such an acid which, as such, has the formula



in which

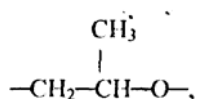
R₁ is



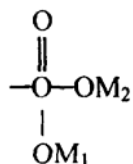
and n = 3-8, preferably 4-6,
a compound having the general formula



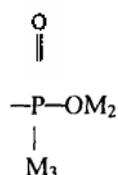
where Ar is an optionally substituted benzene radical or naphthalene radical, R₁ is an oxyethylene group, -CH₂CH₂O-, or an oxypropylene group,



an oxyethylene chain or an oxypropylene chain containing not more than 15 oxyethylene groups or oxypropylene groups, or a combination of oxyethylene groups and oxypropylene groups in a chain, the sum of said groups being not more than 15; the mean value η for n is 1-15 and R₂ is hydrogen or a phosphate group having the formula



in which M₁ and M₂ are a hydrogen ion or alkali-metal ion, or in which R₂ is a group having the formula



in which M₂ has the abovementioned meaning and M₃ is -[R₁]_n-O Ar, R₁, n and Ar having the above mentioned meaning,

ketones, aliphatic and/or aromatic carboxamides such as formamide, acetamide, propionamide, butyramide, methacrylamide or benzamide, an acid containing at least one SH group or a salt of such an acid, for example a mercaptosulphonic acid or a

mercaptocarboxylic acid, as additive for hydraulically setting mortars".

Claims 2 and 3 specified preferred embodiments of the process aspects of the use of claim 1 while claim 4 specified that the polycondensate fulfilled the definition of a plasticizing agent according to NEN 3532.

II. An opposition against the grant of the patent was filed on 13 September 2001 by Perstorp Support AB. Revocation of the patent was requested. The grounds of opposition pursuant to Articles 100(a), 100(b) and 100(c) were invoked. With respect to Article 100(a) EPC it was submitted that the subject matter claimed in the patent in suit was neither novel nor inventive.

(a) The opposition was supported *inter alia* by the following documents all submitted with the notice of opposition:

D2: DE-A-32 24 107

D4: WO-A-91/12214 (and D4a EP-B-515 529 the corresponding EP patent)

D6: EP-A-219 132

D7: EP-A-326 125

D8: US-A-5 071 945

D9: EP-A-557 211.

The following documents, submitted with a letter of the opponent dated 28 November 2003 were also relied upon:

D23: GB-A-468 677

D24: ACS symposium series, 316, 1986, Ed. By B. Meyer *et al*, "Formaldehyde Release From Wood Products: An Overview" pp 1-6.

(b) In the course of the opposition proceedings two experimental reports were filed:

by the opponent with a letter of 28 November 2003 (hereinafter "R1");

by the patent proprietor with a letter of 20 January 2004 (hereinafter "R2").

According to R1 the opponent had prepared a sulphonated melamine formaldehyde resin according to the method defined in the patent in suit. A second resin was prepared by a process in which the entire charge of melamine was added in the first step. It was submitted that this method yielded the product "Peramin F" in accordance with D4a. No differences in the products obtained could be observed under Fourier-Transform Infrared (FT-IR) spectroscopy.

In R2 the patentee reported two experiments. In the first one, a urea-formaldehyde resin was prepared by the method defined in the patent in suit. A second experiment omitted the second

addition of urea. It was submitted that the spectrum of the resin prepared according to the patent exhibited a band which was absent from that prepared without the addition of a second charge of urea. It was submitted that this indicated that the extra charge of urea had been incorporated during the condensation. It was submitted that such a difference would not be or would be hardly observed when extra melamine was added. This was ascribed to the symmetrical nature of the molecule, resulting in extinction of the stretching vibrations. It was submitted that the results with urea demonstrated that the second condensation step would also occur with melamine.

III. In a decision announced orally on 28 January 2004 and issued in writing on 19 March 2004 the opposition division rejected the opposition.

(a) It was held that the arguments concerning Art. 100(c) EPC were based on the misspelled expression "phosphate" group" in the definition of the co-reacting agent (IV) in claim 1, that the central (pentavalent) O atom must be a phosphorus atom and only in this case would the formula be correct and describe a phosphonate group as would be understood by the skilled reader. Hence the claims of the patent in suit met the requirements of Article 100(c) EPC.

(b) With regard to objections pursuant to Article 100(b) EPC in respect of the misspelled expression "phosphate" and the formula containing a pentavalent oxygen it was held to be clear that

the term "phosphate" should in fact read "phosphonate" since the pentavalent oxygen must be a pentavalent phosphorus atom. Such compounds were known and could be synthesised.

It was further held that the examples of the patent in suit described in detail at least one method for carrying out the invention.

- (c) With regard to novelty it was held that none of the documents cited by the opponent with the exception of D2 disclosed a polycondensate obtainable by a process wherein an amino group containing compound I was added in more than one step to an aldehyde II and at least one sulphonating agent III, or disclosed a use of such a polycondensate. In those examples of D2 where the polycondensate was also sulphonated, the pH in the second step was higher than in the first step. Further the concentration of the sulphonating agent III was lower than in the polycondensates used according to claim 1 of the patent in suit. The polycondensates of D2 were not employed as additives for hydraulically setting mortars, but were applied in glues.

The - theoretical - arguments of the patentee that the two step process gave rise to differences in the supramolecular structure which were not necessarily detectable by IR were found, with reference to experimental report R2 to be convincing.

It was further held with respect to the experimental evidence that while differences in the IR spectrum might prove the existence of structural differences, identical spectra did not necessarily indicate that there was an absence of difference in the structure of the polycondensate. Thus the FT-IR evidence of the opponent which did not show a difference was not held to be proof of an identical structure.

It was held that the opponent had failed to discharge the burden of proof of showing beyond reasonable doubt that the products of any of the cited documents were in fact similar to those obtained by following the process parameters of claim 1.

- (d) Concerning inventive step it was held that with respect to the above cited example 4 of D2 the objective problem to be solved by the patent was to provide a further use of the amino formaldehyde polycondensate of D2. This polycondensate was not used as an additive for hydraulically setting mortars and, according to the patentee could not be thus used due to the low degree of sulphonation resulting in low solubility. Hence any combination of the teachings of D2 with other documents relating to the use of other sulphonated aminoformaldehyde polycondensates, which were water soluble, as additives for hydraulically mortars would not lead to the claimed invention.

With regard to an objection of the opponent based on D8 as the closest prior art and in particular

example 2 thereof the objective technical problem was held to be the provision of a further sulphonated aminoformaldehyde polycondensate suitable as an additive for hydraulically setting mortars. There was no teaching in D8 to employ a resin obtainable by the process as defined in the patent in suit. On the contrary, D8 taught away from the addition of further amino compound as a formaldehyde scavenger as this was considered to be undesirable because the quality of the product could be negatively influenced and the additional treatment was "economically problematical".

The combination of D8 with other documents, e.g. D23 or D24 would not lead to any other conclusion.

(e) Consequently the opposition was rejected.

IV. A notice of appeal against this decision was filed by the opponent on 1 April 2004, the requisite fee being paid on the same day.

V. The statement of grounds of appeal was filed on 29 July 2004.

(f) The opponent, now the appellant, maintained objections pursuant to Article 100(c) EPC with respect to the term "phosphate" group and the "obviously incorrect" structural formula including a pentavalent oxygen atom.

(g) Objections pursuant to Article 100(b) EPC were maintained.

- (i) With respect to the pentavalent oxygen in the disputed formula, in the case that the formula should be considered to be correct then a deficiency pursuant to Article 100(b) EPC would arise. It would be extremely difficult, if not impossible to synthesize compounds comprising a pentavalent oxygen.
- (ii) With respect to the oxidising agent it was disputed that hydrogen peroxide - an oxidising agent identified at page 4, lines 45 and 46 of the patent - would be compatible with all starting materials and intermediates covered by the scope of claim 1 of the patent in suit. In support of this objection reference was made to a standard textbook "Advanced Organic Chemistry", J. March, Wiley and Sons, 4th edition, 1992, reactions 9-24 and 9-32. It was submitted that this disclosed that aromatic amines (covered by compound I of claim 1) might be oxidised to nitroso compounds by hydrogen peroxide and that carboxylic acids - covered by component I and component IV of claim 1 were oxidised to peroxy acids by hydrogen peroxide. In view of the fact that claim 1 did not specify the temperature or pH of the first step it was evident that hydrogen peroxide would not be a suitable oxidizing agent for all variants of the process.
- (iii) With respect to the term "polycondensate" it was objected that no part of the patent

provided a clear definition as to which products could be regarded as a polycondensate and which products were excluded by this term. It was further submitted that there existed no generally accepted meaning for the term "polycondensate" for example in terms of the minimum degree of condensation required. Thus there was a broad grey area of compounds which might or might not be considered to fall within the scope of the term "polycondensate".

- (iv) It was observed that claim 1 indicated that certain molar amounts of compounds II, III and IV were to be used with respect to one mole of compound I in the first step and that a specified additional amount of compound I was to be added in the second step. It was submitted that it was not clear from the wording of claim 1 whether the relative amounts of compounds II, III and IV were to be calculated based on the amount of compound I that was used in the first step, or whether these relative amounts were to be computed with respect to the overall amount of compound I that was added during both steps (a) and (b). Neither the description nor the examples contained any information in this respect.

- (h) Novelty was denied with respect to the disclosures of D4 (and D4a), D6, D7, D8 and D9. In particular it was argued that each of these documents taught

the use of a polycondensate as an additive in hydraulically setting mortars, wherein, in each case, the polycondensation had been carried out in a conventional manner, i.e. by adding the entire amount of component I during the first step.

- (i) It was argued that due to the "broad and unspecific" manner in which the process was defined this difference did not lead to any product characteristics which were not found in conventional polycondensates.

- (ii) The appellant submitted that the evidence - theoretical and experimental - advanced, made it "more probably than not" that there was no difference between the products of the patent in suit and those of the prior art and hence that the burden of proof should have shifted to the patentee. Reference was made *inter alia* to decision T 109/91 (15 January 1992, not published in the OJ EPO).

- (iii) With regard to the theoretical arguments it was submitted that the products of the prior art and the products of the patent had a structural element in common, namely methylene bridging groups. Also common to the prior art and the products of the patent in suit was the feature that not all the structural units derived from the amine component (compound I) bore sulphonate groups.

- (iv) With regard to the experimental evidence, it was submitted that the polycondensates according to claim 1 of the patent in suit and those obtained in accordance with the prior art process gave rise to identical spectra. It was submitted to be extremely unlikely that the IR spectra of different materials would be identical. While in certain cases differences in the structure of two molecules would not be evident in IR this was limited to a specific case of symmetrical structure. This condition would be extremely unlikely to be fulfilled in the case of the polycondensates under consideration.
- (i) With regard to inventive step it was submitted that taking D2 as the closest prior art the objective technical problem was to provide an alternative use for the polycondensates known from D2.
- (i) Since the use of sulphonated melamine-formaldehyde resins as additives in hydraulically setting mortars was common general knowledge, and was taught in a number of the cited documents, this problem would have been solved with no difficulty by the skilled person.
- (ii) The increase of pH in D2 was carried out after completion of the reaction to stabilise the product. Thus both condensation steps were carried out at the

same pH. Due to the fact that claim 1 of the patent in suit did not specify a minimum difference between the pH values of the two condensation steps so that even an infinitesimally small variation in pH could be in agreement with the claim, no difference would arise if the pH were not changed between the first and second steps.

- (iii) With regard to the amount of sulphonating agent it was argued that claim 1 did not require that all sulphonating agent be incorporated into the polycondensate. On the contrary, the reference to the oxidation of remaining sulphonating agent at the end of the first condensation step provided a clear indication that claim 1 of the patent in suit encompassed embodiments wherein only a fraction of the total amount of the total amount of sulphonating agent was incorporated, meaning that the subject matter of claim 1 was not characterized by the content of sulphonate groups and thus the lower amount of sulphonating agent employed in D2 did not provide a distinction.

- (iv) The submission of the patent proprietor regarding the poor solubility of the polycondensates of D2, and hence their unsuitability for use in mortars had been presented for the first time during the oral proceedings before the opposition division. It should not have been taken into account by the opposition division as it constituted

a late filed fact which the opponent had not been able to take into account in its preparation. Thus this assertion contravened the opponent's legal right to be heard pursuant to Article 113(1) EPC (see also V(e) below). Further this assertion had been supported by no evidence or arguments.

- (v) It was further argued that since mortars were heterogeneous systems it was not clear that a certain minimum solubility of the additives was necessary. In any case the absence from claim 1 of the patent in suit of a restriction on the minimum degree of sulphonation meant that a part of the embodiments encompassed by claim 1 would also be unsuitable for the intended use.

- (vi) With regard to the objections based on D8 as the closest prior art it was argued that even if there were some structural differences there was no evidence of any technical effect arising therefrom. On the contrary it was more likely that there was no technical effect. Thus the only objective technical problem that could be formulated with respect to D8 was "the provision of an alternative polycondensate for use as an additive in hydraulically setting mortars". Any modification conceivable to the skilled person would be an obvious solution to this problem. Regarding the finding of the opposition division that D8 taught away from the claimed solution of addition of a second

charge of the amino functional compound during the condensation reaction, it was submitted that D8 did not discuss subsequent addition of the amino compound **during** the polycondensation, but discussed addition of amine functional compound to the resin and hence **after completion** of polycondensation. Thus this teaching of D8 had nothing to do with the teaching, or, therefore, the patentability of claim 1 of the patent in suit.

- (vii) Regarding any one of D1, D3, D4, D6, D7, D9 and D12 to D21 as closest prior art it was submitted that these documents taught the use of similar polycondensates to those of the patent in suit as additives to hydraulically setting mortars. The technical problem in relation to these documents was the same as for D8, namely the provision of an alternative polycondensate for this purpose. The arguments were analogous to those presented in the case of D8.
- (j) It was submitted that the opposition division had been influenced by assertions made for the first time at the oral proceedings, namely with regard to novelty by the argument relating to the difference in "supramolecular" structure (see section III(c) above) and with regard to inventive step by the argument relating to the solubility of the polycondensates of D2 (see sections III(d) and V(d)(iv) above). The opponent had had no

possibility to prepare suitable counter-arguments to these assertions during the oral proceedings.

Therefore a procedural violation, namely infringement of the right to be heard pursuant to Article 113(1) EPC had occurred. Thus reimbursement of the appeal fee was equitable.

VI. In a rejoinder dated 6 December 2004 the proprietor, now the respondent requested that the patent be maintained unamended. Two amended sets of claims were submitted. The first of these was entitled "Claims"; the second set was entitled "Claims (Auxiliary Request I)".

According to the amended set of claims entitled "Claims", which included editorial corrections, the formula containing the pentavalent oxygen had been corrected by replacing this with a phosphorus atom. The text of the claim had been corrected to define "phosphonate" instead of "phosphate".

According to the auxiliary request ("Auxiliary Request I"), the two embodiments of co-reacting agent IV containing phosphorus had been deleted. It was submitted that due to these amendments the objections raised with respect to added subject matter had been addressed.

(k) Regarding the submissions of the appellant with respect to Article 100(c) EPC it was argued that the skilled person would immediately realise that the pentavalent oxygen was incorrect and would consult the prior art mentioned in the patent to

remedy this obvious mistake. Once the oxygen was replaced by the phosphorous it would be immediately realised that the term "phosphate" should read phosphonate.

(l) Regarding the submissions of the appellant with respect to sufficiency of disclosure (see V(b)(i)-(iv) above):

(i) The respondent referred to the arguments in respect of Article 100(c) EPC in respect of the pentavalent oxygen.

(ii) Regarding the definition of the oxidising agent it was submitted that the assertions regarding the non-suitability of hydrogen peroxide were supported by no experiments.

(iii) Regarding the restrictive effect of the term "polycondensate" it was submitted that this was a well known term and was clear and unambiguous for the relevant skilled person.

(iv) With respect to the relative amounts of starting materials it was submitted that the description and claim 1 were clear.

(m) With regard to the objections relating to novelty it was submitted that the appellant had failed to discharge the burden of proof. In this respect it was argued that since the opposition division had acknowledged novelty the burden of proof remained with the opponent. With respect to the FT-IR evidence it was submitted that the prior art

polymers had a linear structure whereas the polymers of the patent had a more or less three dimensional structure - star - or sphere-shaped resulting from the second addition of the amino-functional compound inducing crosslinking.

- (n) Regarding inventive step it was submitted that D2 related to a precursor for foams and that there was no motivation for the skilled person to combine D2 with a document relating to concrete additives.

The appellant had provided no evidence that the polymers of D2 were identical to those of the patent in suit, or that polymers according to the patent in suit could be obtained by the process disclosed in D2. Certain essential features of the patent in suit were not disclosed in D2. In particular the amount of sulphonating agent disclosed in D2 resulted in a polymer with a lower degree of sulphonation and hence lower solubility than the process of the patent in suit. It was disputed, with reference to T 92/92 (21 September 1993, not published in the OJ EPO) that this argument constituted a late-filed fact.

With regard to D8 it was argued that this did not disclose the addition of an additional amount of compound I in a second step. This additional addition of compound I in a second step was essential according to the invention and provided a novel structure (three-dimensional rather than linear). This structure also provided improved polymer properties when used as an additive to

hydraulically setting mortars. D8 disclosed that known polymers had the disadvantage of relatively high amounts of free formaldehyde. While this could in principle be solved by subsequent addition of urea or a urea derivative (e.g. melamine) this was taught to be undesired. Since the polymers of D8 were to be used in the same technical area as the patent, the skilled person was taught away from performing the second step in order to provide polymers for use as additives in hydraulically setting mortars.

- VII. In a communication dated 17 November 2006 accompanying the summons to oral proceedings, the board expressed its provisional, preliminary opinion that the requested correction of "phosphate" to "phosphonate" and correction of the formula containing the pentavalent oxygen pursuant to R. 88 EPC was not permissible.
- VIII. In a letter dated 18 December 2006 the appellant indicated that it did not intend to attend the oral proceedings and withdrew its request for oral proceedings. It was explicitly stated that the appeal was not withdrawn.
- IX. In a letter dated 21 December 2006 the respondent maintained the request for rejection of the opposition as the main request. A new auxiliary request ("New Auxiliary Request I") consisting of claims 1 to 4 was submitted, to become the first auxiliary request. The previously submitted auxiliary request ("Auxiliary Request I" section VI above) became the second auxiliary request.

Claim 1 of the newly filed first auxiliary request ("New Auxiliary Request I") was amended compared to the claims as granted by deletion of the reference to a phosphate group and the formula having a pentavalent oxygen atom. The remaining alternatives for the residue R_2 were retained. A consequential, editorial amendment was made regarding the placement in the claim of the definition of the residue M_2 .

Therefore claim 1 of the newly filed first auxiliary request ("New Auxiliary Request I") read as follows:

"1. Use of an aqueous solution of a polycondensate, obtainable by

a) preparing, in a first step, an aqueous solution of a precondensate composed of: at least one compound I containing at least two amino groups, at least one aldehyde II, at least one sulphonating agent III and, optionally, one or more co-reacting agents IV;

b) converting, in a second step, the precondensate obtained in step a) into a polycondensate at a lower pH than in step a),

wherein

a) in the first step, the following amounts of the reagents are used per mol of the compound I:

2.8 - 6 mol of the aldehyde II,

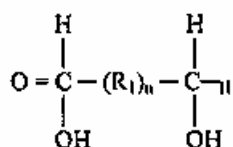
0.8 - 2.5 mol of the sulphonating agent III, and

0-3 mol of the co-reacting agent IV;

b) and in the second step, 0.1 - 1 mol of the additional amount of the compound I, again based on 1 mol of the compound I, and

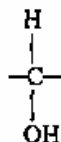
wherein, at the end of step a) any excess of unreacted compound III is reacted with an oxidizing agent and, in

step b) an additional amount of the compound I is added to the precondensation product, wherein compound I is chosen from the group comprising amino-s-triazines, melamine, urea, thiourea, guanidine, dicyanodiamines, aminocarboxylic acids, aminodicarboxylic acids, aminosulphonic acids and carpolactams [*sic*], wherein aldehyde II is chosen from the group comprising formaldehyde, acetaldehyde, butyraldehyde, furfuraldehyde and benzaldehyde, wherein the sulphonating agent III is chosen from the group comprising alkali-metal and alkaline-earth-metal sulphite and alkali-metal and alkaline-earth-metal sulphamate, and wherein the co-reacting agent (IV) is chosen from the group comprising naphthalenesulphonic acid, mono- and dibenzoic acid, toluene- xylene- and cumenesulphonic acids (including o-, p- and m-derivatives), fatty acid amine oxides, betaine, quaternary ammonium compounds, ether carboxylic acids, aminosulphonic acids, amino acids, aminocarboxylic acids, aminodicarboxylic acids, hydroxycarboxylic acids, hydroxycarboxylic acid lactones, polyhydroxycarboxylic acid lactones, sulphamic acids, a boron-containing polyhydroxycarboxylic acid or a water-soluble alkali-metal salt or alkaline-earth-metal salt of such an acid which, as such, has the formula



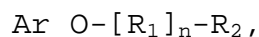
in which

R₁ is

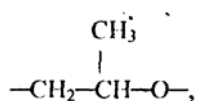


and n = 3-8, preferably 4-6,

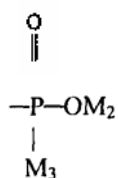
a compound having the general formula



where Ar is an optionally substituted benzene radical or naphthalene radical, R₁ is an oxyethylene group, -CH₂CH₂O-, or an oxypropylene group,



an oxyethylene chain or an oxypropylene chain containing not more than 15 oxyethylene groups or oxypropylene groups, or a combination of oxyethylene groups and oxypropylene groups in a chain, the sum of said groups being not more than 15; the mean value η for n is 1-15 and R₂ is hydrogen or in which R₂ is a group having the formula



in which M₂ is a hydrogen ion or alkali metal ion and M₃ is -[R₁]_n-O Ar, R₁, n and Ar having the above mentioned meaning,

ketones, aliphatic and/or aromatic carboxamides such as formamide, acetamide, propionamide, butyramide, methacrylamide or benzamide, an acid containing at least one SH group or a salt of such an acid, for example a mercaptosulphonic acid or a mercaptocarboxylic acid, as additive for hydraulically setting mortars".

Claims 2-4 were identical to claims 2-4 as granted (see section I above).

- X. In a further letter dated 29 January 2007 the respondent announced that Mr Benjamin Mets, the inventor and director of Mets Holding B.V. would attend the oral proceedings.
- XI. Oral proceedings took place on 1 February 2007 attended only by the respondent, accompanied by Mr Mets.
- (o) Following discussion of the admissibility of the requested amendment to address the issue of the incorrect formula, the respondent withdrew the main request. The set of claims submitted with the letter of 21 December 2006 ("New Auxiliary Request I") thus became the main request and the set of claims submitted as auxiliary request with the rejoinder to the statement of grounds of appeal became the sole auxiliary request.
 - (p) Regarding the objections of the appellant pursuant to Article 100(b) EPC in respect of the oxidising agent the respondent submitted that the appellant bore the burden of demonstrating that the disclosure in this respect was insufficient, which burden had not been discharged.
 - (q) Regarding the objections in respect of the term "polycondensate" it was submitted that this was a well known term in the art.
 - (r) With regard to the definition of the amount of compound I to be employed in the second step the

respondent submitted that the molar amount was based on 1 mol of compound I used in the first step.

- (s) With regard to D8 the respondent submitted that the initial stage was identical to that of the process according to claim 1 of the patent in suit. Reaction did not start until the reaction mixture was heated to 70-80°C. D8 employed sodium pyrosulphite which decomposed to yield sodium sulphite.

The first stage of the process defined in claim 1 of the main request resulted in a linear product. On addition of the further charge of urea a spherical/round or cluster structure was formed with the SO_3^- groups on the outside.

The patent proprietor further submitted that this resulted in better solubility than the linear prior art products, and resulted in improved properties as demonstrated by the examples submitted during the proceedings before the examining division.

- XII. The appellant (opponent) requested that the decision under appeal be set aside and the patent in suit be revoked.

The respondent (patent proprietor) requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request (claims 1 to 4) filed as "New Auxiliary Request I" with the letter dated 21 December 2006, or, in the

alternative, on the basis of the auxiliary request, filed as "Auxiliary Request I" with the letter dated 6 December 2004.

Reasons for the Decision

1. The appeal is admissible.
2. As announced in its letter dated 18 December 2006 (section VII above), the appellant was not represented at the oral proceedings before the board. The appellant having been duly summoned, the board decided to hold the oral proceedings in its absence, according to Rule 71(2) EPC and Article 11(3) of the Rules of Procedure of the Boards of Appeal.

Main request

3. *Article 100(c)/123(2) EPC*

The objection pursuant to Article 100(c)/123(2) EPC related to the presence of the term "phosphate" group in claim 1 of the patent as granted.

Since the offending term - and the formula containing the pentavalent oxygen associated therewith - have been deleted from the claims of the main request the grounds for this objection have been removed.

No other objections pursuant to Article 123(2) EPC were raised by the appellant. The board is also satisfied that no defects in this respect exist.

4. *Article 100(b)/83 EPC*

- 4.1 The chemical formula with the pentavalent oxygen atom has been deleted from the claim (Section 3, above).

The objection regarding the difficulty or impossibility of preparing said compound has thus been addressed by deletion of the formula concerned.

- 4.2 The oxidising agent

The arguments of the appellant (see section V(b)(ii) above) are in two parts.

Regarding the submission that hydrogen peroxide would not be compatible with all the starting materials and intermediates encompassed by the claims the board notes that the cited text book reference does not relate to the use of hydrogen peroxide alone. On the contrary, it discloses the treatment of primary aromatic amines with a combination of hydrogen peroxide and acetic acid, resulting in nitroso compounds, and the treatment of carboxylic acids with a combination of hydrogen peroxide and an acid catalyst leading to peroxy acids.

The patent discloses one way of carrying out the oxidation - with hydrogen peroxide. The appellant has not established that use of this oxidising agent would not lead to the desired result. It has merely been shown that a different reagent, containing hydrogen peroxide as one of its components would - probably - not give the desired result.

Thus the objections of the appellant concerning the sufficiency of the disclosure in respect of the oxidising agent are not supported by the facts.

4.3 The restrictive effect of the term "polycondensate"

This term was present in claim 1 as granted. The arguments of the appellant in this respect concern the allegedly ambiguous scope of this term (see section V(b)(iii) above).

This is however a question of clarity, which is governed by Article 84 EPC, which Article is not one of the grounds of opposition recited in Article 100 EPC. The appellant has not argued, much less advanced evidence that the skilled person would be unable to prepare the polycondensate as defined in claim 1 of the main request.

Accordingly the appellant has failed to prove that this aspect of the subject matter of the patent in suit is not sufficiently disclosed.

4.4 The relative amounts of starting materials

This feature was also present in claim 1 as granted. The arguments advanced (section V(b)(iv) above) relate to the clarity of the claim and as such are governed by Article 84 EPC, which as explained in section 4.3 above is not a ground for opposition.

Similarly to 4.3 above it has not been argued or demonstrated that the skilled person would be unable to

prepare the polycondensate defined in claim 1 of the main request.

Accordingly the appellant has failed to prove that this aspect of the subject matter of the patent in suit is not sufficiently disclosed.

4.5 It is therefore concluded that the objections raised pursuant to Article 100(b)/83 EPC are not supported by the facts and thus that the patent in suit in the form of the main request meets the requirements of said Articles.

5. *The patent in suit*

According to claim 1 of the main request the patent in suit relates to the use, as an additive for hydraulically setting mortars, of a polycondensate obtainable by a defined two step process.

The additives are used as a concrete processing aid, ("super-plasticizer") as explained in paragraph [0003] of the patent in suit.

In paragraph [0021] it is taught that the resins prepared by the process can be sulphonated and condensed at relatively high temperatures, with the result that polycondensation can take place at a pH above 7.0 resulting in "appreciably lesser amounts of salts" being produced after adjusting the pH to 10.5 at the end of the preparation. The process also has "economic advantages".

In paragraph [0020] it is disclosed that in the process according to the invention a polymer "is probably formed" which has more than one sulphite group joined to the nucleus "on the outside of the molecular cluster".

The respondent has repeatedly submitted throughout the opposition and appeal proceedings, with reference to paragraph [0020] that the product of the first stage of the reaction process is a linear condensation product and that upon addition of the second charge of amine compound, a cluster structure is formed which has more than one sulphite group on the outside. This position was expressed:

- in general terms in the 3rd paragraph on page 3 of the rejoinder to the notice of opposition (reference to the second charge of amine causing further crosslinking);
- more specifically in respect of the FT-IR evidence when using urea;
- by reference to differences in the "overall structural distribution" during the oral proceedings before the opposition division (page 2, paragraph 4.2 of the minutes) and
- during the appeal proceedings - see sections VI(c) and XI(e) above.

According to the submissions of the respondent at the oral proceedings before the board this structure

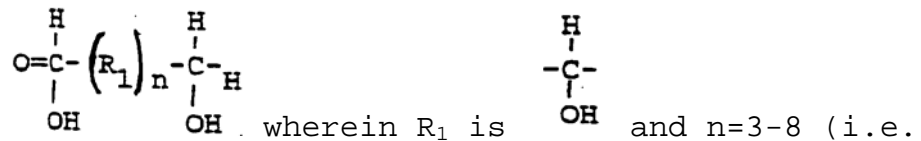
resulted in improved solubility due to the presence of SO₃⁻ groups on the outside of the cluster.

6. Novelty

Novelty objections were maintained at the appeal stage in respect of the documents D4 (and D4a), D6, D7, D8 and D9 (cf section V(c) above).

6.1 D4 relates according to claim 1 to a flowability improving agent for an aqueous composition containing cement. The agent comprises a combination, calculated on a dry product of

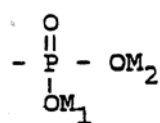
- 60-99 % by weight of a sulphonated melamine-formaldehyde resin, a sulphonated melamine-urea-formaldehyde resin or a sulphonated naphthalene-formaldehyde resin,
- 0.5-40 % by weight of a boron containing polyhydroxy carboxylic acid or a water soluble alkali salt or alkaline earth metal salt of such an acid which per se has got the formula:



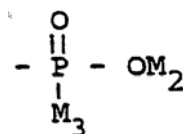
one of the compounds encompassed by the definition of the co-reacting agent IV according to claim 1 of the patent in suit as granted) and optionally

- 0.5-30 % by weight of compound of general formula Ar-O-[R₁]_n-R₂ wherein Ar is a possibly substituted benzene rest or naphthalene rest, R₁ is an oxyethylene group, -CH₂CH₂O- or an oxypropylene group;

$$- \text{CH}_2 - \overset{\text{CH}_3}{\underset{|}{\text{CH}}} - \text{O} -$$
 , an oxyethylene chain or an oxypropylene chain with up to fifteen oxyethylene groups or oxypropylene groups or a combination of oxyethylene groups and oxypropylene groups to a chain where the sum of these groups is at most fifteen; the mean value \bar{n} for n is 1-15 and R₂ is hydrogen or a phosphonate group with the formula



where M₁ and M₂ are hydrogen ion or alkali metal ion or where R₂ is a group with the formula



where M₂ has the above meaning and M₃ is $-\text{[R}_1\text{]}_n\text{-O Ar}$ where R₁, n and Ar have the above meaning.

Thus this - optional - compound is according to one definition of co-reacting agent IV of claim 1 of the patent in suit as granted and of the main request, but encompassing the possibility that the residue R₂ may be phosphonate.

There is no description in D4 of how the sulphonated resin is made. In particular it is not disclosed that in preparing this the amine component is added in two steps as required by the claims of the patent in suit. Therefore the literal disclosure of D4 does not inescapably predicate the formation of a product corresponding to the subject matter of claim 1 of the main request.

The appellant based the attack of anticipation on theoretical arguments (see V(c)(iii) above) and experimental evidence (V(c)(iv) above).

- 6.1.1 The theoretical arguments of the appellant relate to the structure of the resulting products, namely that both contain methylene bridging groups, and to the "broad and unspecific" nature of the process defined. As noted in section 5, above, the consistent position of the respondent throughout the prosecution of this case has been that the addition of the amino functional compound in two steps results in a specific structure, namely a molecular cluster. The appellant has advanced no arguments relating to the technical merits of this aspect. In particular the existence of this mechanism has not been disputed. On the contrary, instead of addressing the substance of these submissions the appellant has restricted itself to arguing that these were late filed and therefore should not be taken into account (see V(e) above). Since, however, this information was contained in the application as originally filed, the allegation that it is late filed is not supported by the facts.

Insofar as the appellant has failed to demonstrate that this formation of a molecular cluster does not take place the theoretical arguments advanced are not sufficient to show that the structure of the products resulting from the process involving addition of the amine compound in two steps is identical to that resulting from a single addition of the amine.

6.1.2 The appellant also advanced experimental evidence during the opposition proceedings in the form of FT-IR spectra ("R1", see section II(b) above).

In the experiment in R1 stated to represent the procedure of the patent in suit the then opponent charged in a first step 75% of the total amount of melamine. The remaining 25% was added in the second step. Both steps were however carried out at the same pH. This experiment did not carry out the second step at lower pH than the first and thus did not accurately reproduce the process steps according to claim 1 of the patent in suit.

In this connection, the argument that claim 1 did not require any particular extent of pH change between the first and second steps and that consequently an infinitesimal change would suffice is irrelevant in the case in point where no change at all in the pH was carried out.

Therefore the evidence advanced does not demonstrate the properties of products obtained by the process steps set out in claim 1 of the main request.

The second experiment, in which the entire charge of melamine was added in the first step, was stated to employ the resin in accordance with D4. However D4 does not contain any description of the preparation of the resin, beyond a reference at pages 5-6 to certain prior art documents. The appellant/opponent advanced no evidence to demonstrate the method that actually was employed by the inventors of D4. Therefore it has not been established that the product stated in the

experimental report to represent the teachings of the prior art was in fact employed in any prior art document cited.

Therefore the experimental evidence advanced by the appellant is defective for two reasons. Firstly the teachings of the patent in suit were not accurately replicated. Secondly the product presented as representative of the prior art has not been demonstrated to belong to the prior art.

Thus the experimental evidence of the appellant/opponent does not demonstrate that the process steps set out in claim 1 of the main request, in particular the addition of a second amount of the amine functional compound result in products indistinguishable from those of the prior art citation D4.

6.1.3 The appellant submitted (see V(c)(ii) above) in this case that the burden of proof should be shifted to the proprietor.

(a) In opposition proceedings the opponent has the burden of proving that the objections raised under Article 100 EPC have been substantiated. If this results in revocation of the patent, then at the appeal stage the burden shifts to the proprietor to demonstrate that the decision of the opposition division was wrong (T 585/92, 9 February 1995, reasons 3.2 (not contained in the abridged version of the decision published in OJ EPO 1996, 129)).

- (b) In the present case however the opposition was rejected, i.e. the grounds alleged pursuant to Article 100 EPC were found not to be substantiated. In this case the burden remains with the appellant/opponent to show that the decision of the opposition division was incorrect. The burden is not automatically shifted to the proprietor to show on appeal that the reasons for maintaining the patent were justified (T 667/94, 16 October 1997, not published in OJ EPO, reasons 3).
- (c) The standard burden of proof in opposition proceedings is generally that on the balance of probabilities. This burden may shift as a function of the weight of the evidence advanced (T 109/91, cited *supra* reasons 3.10).
- (d) The appellant (opponent) has argued with reference to T 109/91 that in this case this principle regarding the burden of the proof should be reversed (see section V(c)(ii) above).
- (i) The situation underlying T 109/91 concerned a case in which the opponents had undertaken a detailed investigation of the allegedly novelty destroying prior art entity (a plasmid).
- (ii) The situation in the present case is, however, significantly different from that underlying T 109/91. The provision of a single piece of evidence in the form of IR spectra does not correspond to the highly detailed investigation carried out by the

opponents in the case underlying T 109/91, even if one were to disregard the other deficiencies in the evidence provided (see section 6.1.2 above).

Therefore the facts underlying the present case do not correspond to those considered in T 109/91. Consequently the conclusions of T 109/91 are likewise not relevant in the present circumstances.

- (e) In the present case the appellant/opponent has advanced no evidence whatsoever to demonstrate that the mechanism adduced by the respondent/proprietor throughout the prosecution, and accepted as correct by the opposition division was incorrect.

Accordingly the facts and evidence advanced by the appellant/opponent meet do not justify reversing the burden of proof.

6.1.4 Thus it is concluded that neither the evidence of the express literal disclosure nor the evidence relating to the implicit disclosure of the examples of D4 supports the position of the appellant that D4 discloses the subject matter of claim 1 of the main request.

6.1.5 Hence the subject matter of claim 1 is novel over the disclosure of D4.

6.2 D6 relates according to claim 1 to a four step process for preparing a stable sulphonated melamine-formaldehyde condensate solution, which solution according to claims 44-49 and the first paragraph of

the description are used as additives for mixtures containing inorganic settable cementitious materials including Portland cement, i.e. as additives for hydraulically setting mortars. According to claims 44-47 and the first paragraph of the description these additives are used as super-plasticizers.

According to claim 1 of D6, the four steps of the process used to prepare the solution are:

- (a) condensing melamine and formaldehyde in an aqueous reaction medium having a formaldehyde:amino group ratio of from about 1:1 to about 1.33:1 (i.e. per mol melamine 3-4 mols formaldehyde), and a pH of from about 10 to about 13, the condensation being conducted at about 45° to about 55°C;
- (b) sulphonating the condensate formed in step (a) by adding a sulphonating agent to the reaction medium obtained in step (a) and heating to about 70-90°C, sulphonation being carried out at pH about 10-13;
- (c) further condensing the product of step (b) by reducing the temperature to about 40-60°C, adjusting the pH to about 2.5-4.0 and maintaining these conditions for about 5-150 minutes, the reaction being stopped prior to gelation of the further condensed sulphonated melamine-formaldehyde condensate by adjusting the pH to about 6.5-9.0; and
- (d) stabilizing by heating at about 70°-100°C for about 30-180 minutes.

According to claim 4 of D6 the sulphonating agent can be an alkali metal sulphite, wherein the ratio of melamine:sulphite is from about 1:0.8 to about 1:1.2. At page 7, first complete paragraph, it is explained that the ratio is that of sulphite ions to melamine, i.e. a molar ratio. Thus both the type of sulphonating agent and quantity are as required by claim 1 of the patent in suit.

6.2.2 The process steps defined according to claim 1 of the main request are distinguished from those of D6 by the features:

- according to the patent in suit the aldehyde, the compound containing at least two amino groups and the sulphonating agent are combined in solution to form a precondensate. In the following step the pH is reduced and the precondensate is converted to a polycondensate at the lower pH. D6, however, discloses a process in which in a first step melamine and formaldehyde are condensed, and the sulphonating agent is added in a second step to the reaction medium resulting from the first step;

- according to the patent in suit the pH is reduced in the second step of the condensation. Claim 1 of D6 specifies the same pH range for both steps. While it is within the scope of claim 1 of D6 that the two steps are carried out at different pH values, there is no disclosure that the second step is carried out at a different pH than the first step;

- D6 does not include a step of subsequent addition of an extra charge of melamine at a lower pH. Thus in the process disclosed in D6 all the amino functional compound, i.e. melamine is combined in a single step.

6.2.3 The appellant has advanced no evidence to show that despite the identified differences between the process steps disclosed in D6 and those specified in claim 1 of the patent in suit the structure of the product obtained according to D6 will be identical to that obtained according to the process features of claim 1 of the main request (compare the discussion in relation to D4 in section 6.1.1 above).

6.2.4 Accordingly the appellant has not discharged the burden of proving that D6 discloses the subject matter of claim 1 of the main request.

6.2.5 Hence the subject matter of claim 1 is novel over the disclosure of D6.

6.3 D7 relates according to page 2, lines 1-7 to a flowability improving agent, a process for its production and the use thereof as an additive in a composition containing cement, lime and/or gypsum. According to page 2, line 5-7 it is known that such mixtures are composed in such a way that they contain a surplus of water as compared to the minimum amount required for the curing and binding reaction of the cement.

6.3.1 According to claim 1 of D7 the flowability improving agent comprises a combination of:

A) a sulphonated melamine-formaldehyde, sulphonated melamine-urea-formaldehyde or sulphonated naphthalene-formaldehyde resin;

B) a compound of the formula $\text{Ar O} \cdot [\text{R}_1]_n \cdot \text{R}_2$ in which compound the residues R_1 and R_2 are defined in identical terms to the corresponding - optional - compound of D4 (see section 5.1 above) and thus corresponding to one possibility for co-reacting agent IV of claim 1 of the main request, with the difference that according to claim 1 of D7 R_2 may additionally be a phosphonate group.

6.3.2 According to example 1 of D7 a process is disclosed employing:

- 753g of 37% of formaldehyde (i.e. 9.3 mol)
- 280g melamine (i.e. 2.22 mol)
- 54.5g urea (i.e. 0.9 mol)
- 291 g sodium metabisulphite (i.e. 1.53 mol)
- 66 g (0.19 mol) of a compound B wherein Ar is phenol, R_1 is $-\text{CH}_2\text{CH}_2\text{O}-$, n is 4 and R_2 is $-\text{P}(=\text{O})(\text{OH})_2$, i.e. a phosphonate.

Thus the corresponding ratio (amino group containing compound:aldehyde:sulphonating agent) is 1:3.0:0.5.

For the reaction, 1114.0g of water and the formaldehyde are charged into a reaction vessel and the melamine, urea and sodium metabisulphite added at stirring. After these are dissolved and the reaction mixture has cleared up, the pH is rendered basic (10.5-11.2) by addition of sodium hydroxide. Reaction is continued at 75°C until free sulphite could not be detected any

longer. Following cooling to 50°C, the co-reacting agent B (a phosphonate) and sulphuric acid are added; a pH of 5.2 is obtained. The condensation reaction is continued for ca 4 hours until a viscosity of 170cp (Emilia) is obtained. Subsequently the reaction mixture is cooled and the pH raised to 10.8 with sodium hydroxide to provide a satisfactory storage stability. The process features defined in claim 1 of the main request are distinguished from the process disclosed in example 1 of D7 by:

- The amount of sulphonating agent of 0.8-2.5 mol/mol amino functional compound excludes the amount of 0.5 mol/mol amino functional compound employed in example 1 of D7:
- According to claim 1 of the main request, when the co-reacting agent IV is employed it must be present in the first step BEFORE the reduction in pH;
- a co-reacting agent employed (a phosphonate) which is excluded by the claims of the main request;
- there is no second addition of amine functional compound(s).

The fact that the co-reacting agent employed in D7 is not one of those permitted by claim 1 of the main request means that the product used according to the disclosure of D7, example 1 is not encompassed by those used according to claim 1 of the main request.

Further, as noted with respect to D4 and D6, the appellant has not demonstrated that, despite the differences in the process disclosed in D7, in particular the absence of a second step of addition of amine at a lower pH, it will nevertheless result in a product which is indistinguishable from that used according to claim 1 of the main request.

6.3.3 Therefore the appellant has failed to establish that the disclosure of D7 anticipates the subject matter of claim 1 of the main request.

6.3.4 Thus the subject matter of claim 1 is novel over the disclosure of D7.

6.4 D8 relates to a process for the production of sulphonic group-containing condensation products based on amino-triazines with a low content of free formaldehyde (col. 1, lines 11-16 and lines 60ff). The compounds are useful as additives for hydraulically hardening building materials, including mortar. Their utility is ascribed to their dispersing properties. (col. 4, lines 29ff). The reduction in free formaldehyde is achieved by an alkaline after-treatment step (col. 3, lines 54-58).

The products also have excellent storage stability (col. 2 lines 28ff).

6.4.1 According to the discussion of the background to the invention and the prior art at column 1, lines 47-57 of D8 (cf. sections III(d) and V(d)(vi) above):

"In principle, it is, naturally, possible to reduce the content of free formaldehyde of these resins by the subsequent addition of a formaldehyde receiver, for example one based on urea or a urea derivative. However, in this way, foreign materials get into the condensation product, which is undesirable for many fields of use because the quality of the product can thereby be negatively influenced. Furthermore, this subsequent treatment represents an additional treatment step which requires additional operation and investment costs and is, therefore, economically problematical."

The use of the wording "subsequent addition" and the reference to the "formaldehyde content of **these resins**" (emphasis by the board) indicates that this discussion relates to a step of treating the formed resins with a formaldehyde receiver, but does not, in contrast to the process steps defined in claim 1 of the main request, refer to a step of a second addition of such a material **during** the polycondensation reaction by which said "these resins" are formed (see also submission of the appellant referred to in section V(d)(vi) above).

- 6.4.2 According to example 2 of D8, which example was invoked by the appellant in the discussion of inventive step before the opposition division (see section III(d) above), melamine and formaldehyde in the molar ratio of 1:2.58 are reacted as follows: to formaldehyde and water at a pH of 8.0-8.5 is added melamine, and the pH adjusted to 11.5 with sodium hydroxide. With simultaneous heating to 70°-80°C sodium pyrosulphite is added and stirring continued until sulphite is no longer detectable. The molar amount of sulphite, based on 1 mole melamine is 1.22. The pH is adjusted to 6.0 with sulphuric acid and further condensed at 80°C to an

end viscosity of 9 mm²/s (80°C). Subsequently the reaction solution is rendered alkaline (pH 11.3) with sodium hydroxide and heated for 20 minutes to 80°C before cooling.

- 6.4.3 At the oral proceedings the respondent submitted that the initial stages of the process of D8 and claim 1 of the main request were indistinguishable (see section XI(e) above).
- 6.4.4 Thus the process features specified in claim 1 of the main request are distinguished from the disclosure of D8, example 2 by the features that:
- a higher concentration of formaldehyde is employed (2.8-6 mol compared to 2.58 mol employed in example 2 of D8);
 - a second portion of amine is added after the precondensate stage has been reached;
 - there is no necessary post treatment with sodium hydroxide.
- 6.4.5 As explained in section 6.4.1 above, the more general disclosure of D8 also contains no disclosure of such a addition of a second portion of amine.
- 6.4.6 As noted with respect to the other documents discussed above, the appellant has not demonstrated that, despite the fact that a second step of addition of amine at lower pH is not employed in the process of D8 the resulting products will nevertheless exhibit the structure indicated in the patent in suit and hence be

indistinguishable from that used according to claim 1 of the main request.

6.4.7 Therefore the appellant has failed to establish that the disclosure of D8 anticipates the subject matter of claim 1 of the main request.

6.4.8 Hence the subject matter of claim 1 is novel over the disclosure of D8.

6.5 D9 relates according to the first paragraph of the description and claim 1 to a thinning agent for mortars which is a condensation product of:

- a compound with at least two amine functionalities;
- an aldehyde;
- an acid with SH function, or a salt of such an acid;
- an acid with at least one amine function or a salt of such an acid and
- optionally one or more compounds capable of liberating one or more sulphonate ions.

According to example 1 *p*-sulphanilic acid (0.9 mol) and thioglycolic acid (0.35 mol) are placed in water, the pH is adjusted to 5.5 to 5.9 with NaOH and the temperature maintained at 70°C. 1 mole of melamine is introduced and 3.5 moles of formaldehyde, in the form of a 37% aqueous solution progressively added. Reaction

is allowed to proceed for two hours, ensuring that the temperature does not exceed 75°C. Once the pH has stabilised at around 11.5-12 thioglycolic acid is added until the pH falls towards 8/9 and stabilises. The resulting solution has a pH of 8.5.

6.5.1 Due to the absence of a sulphonating agent the resulting products will not be sulphonated and for this reason alone the products used according to claim 1 of the main request are distinguished from those disclosed in D9.

6.5.2 Further according to the process of D9, example 1 there is only a single step of addition of amino functional compound, i.e. there is no second step of addition of amino functional compound at lower pH.

As noted with respect to the other documents discussed above, the appellant has not demonstrated that, despite the fact that a second step of addition of amine is not employed in the process of D9 the resulting products will - the absence of a sulphonating agent notwithstanding - nevertheless exhibit the structure indicated in the patent in suit and hence be indistinguishable from that used according to claim 1 of the main request.

6.5.3 Consequently the subject matter of claim 1 is novel over the disclosure of D9.

6.6 In summary, none of the documents cited as novelty destroying by the appellant disclose the process steps specified in claim 1 of the patent in suit. For the reasons discussed in section 5 above it is credible

that the process step of adding a portion of the amino functional compound in a second step at a lower pH results in a different structure of the product compared to that which would be obtainable by the processes in which the amine was added in a single batch. The appellant has advanced no arguments or evidence which would demonstrate that the conclusions of the opposition division in this respect were incorrect.

6.7 The subject matter of claim 1 of the main request, and hence also of dependent claims 2-4 is novel.

7. *The technical problem*

As discussed in section 5 above, the patent in suit relates to the use of a polycondensate obtained by a defined process as an additive for hydraulically setting mortars, specifically as a so-called "superplasticizer" or a "superplasticizing agent" as set out in paragraphs [0003] and [0017] of the patent in suit.

Although evidence was provided during examination proceedings purporting to demonstrate advantages of the products when used as superplasticizers as compared to certain commercially available products, it was not explained to the teachings of which prior art citations the comparative materials corresponded. Therefore these examples are of no evidential value in establishing the objective technical problem to be solved by the subject matter claimed in the patent in suit.

8. *The closest prior art*

According to the case law of the Boards of Appeal, the document selected as closest prior art must be a document which discloses subject matter conceived for the same purpose, or which is aiming at the same objective as the claimed invention and having the most relevant technical features in common (see "Case Law of the Boards of Appeal of the European Patent Office", 4th Edition, 2001, section I.D.3).

In view of the above formulated technical problem the closest prior art must therefore be a document which is also related to the provision of additives for hydraulically setting mortars, and specifically such additives which serve as super-plasticizers.

The appellant in the statement of grounds of appeal developed arguments on the basis of each of D2 and D8 as the closest prior art.

- 8.1 D2 relates, however, to aqueous melamine-formaldehyde condensates intended in particular for use in foams (D2, page 2 lines 26ff).

Since D2 is not concerned with the provision of additives for hydraulically setting mortars but concerns the unrelated field of foams, this document cannot form the closest prior art.

- 8.2 D8, in contrast, is related to the provision of additives for hydraulically setting mortars (see 6.4 above) and thus can form the closest prior art.

8.3 In its submissions the appellant invoked a number of other documents as closest prior art, namely D1, D3, D4, D6, D7, D9 and the documents identified as D12-D21, all of which were stated to disclose similar polycondensates as additives for hydraulically setting mortars (section V(d)(vii) above). However no detailed analysis of any of these was provided. It was also not alleged that any of these were more relevant than D8, and no arguments were advanced in this respect.

8.4 In view of the foregoing, and the submissions of the appellant there are no grounds for considering that there is any document more relevant than D8 which could be considered as the closest prior art.

9. *The objective technical problem to be solved in relation to the closest prior art D8, its solution*

The respondent has submitted that due to the cluster structure, which is said to arise from the process steps whereby the amine is added in two steps, the second stage being carried out at a lower pH the solubility of the condensates is improved (cf section 5 above).

Even if, in the appellants favour, this improved solubility were to be ignored with the consequence that there would be no evidence that the distinguishing (process) feature over this prior art gave rise to any improved superplasticizing effect, the objective technical problem to be solved by the subject matter of the patent in suit in relation to D8 would then have to be formulated as the provision of further suitable

polycondensates for use as additives for hydraulically setting mortars.

The appellant has advanced no evidence that would suggest that this problem has not been solved. On the contrary this is precisely the formulation of the technical problem invoked by the appellant in the statement of grounds of appeal (see V(d)(vi) above).

10. *Obviousness of this solution*

10.1 D8 contains no teaching to add the amine in two portions during the polycondensation, whereby the second portion is added at a lower pH than that at which the first portion is incorporated. Nor is there any other document relating to super-plasticizers which discloses such a process variation for any reason, let alone to improve the solubility.

10.2 The respondent has submitted that D8 would teach away from such a process (see V(d)(vi) above).

The problem of free formaldehyde in the resins is discussed in the introduction of D8 (col. 1, line 47ff). As explained in section 6.4.1 above, the teaching of D8 relates to a measure subsequent to and hence separate from the polycondensation. In particular, it is not to be understood as referring to a process involving simultaneously use of a lower pH during a step of converting a precondensate into a polycondensate as required by step (b) of claim 1 of the patent in suit.

10.3 Therefore D8 provides no teaching which would lead the skilled person to employ a condensation process in

which - during the condensation to form a resin - the amine was added in two portions, the second addition being performed at a lower pH than the first step.

10.4 The argument of the appellant that "any modification conceivable to the skilled person" (cf V(d)(vi) above) would be an obvious solution is not convincing since it has not been alleged, let alone proved, that the relevant problem would be the minimalist one of providing an alternative composition regardless of whether it was suitable for use as a super-plasticizer for mortars.

10.5 The subject matter of claim 1 and of dependent claims 2-4 of the main request therefore meets the requirements of Article 56 EPC.

11. *The request for reimbursement of the appeal fee*

The appellant argued that the decision of the first instance in relation to both novelty and inventive step had in part been based on statements made for the first time at the oral proceedings (see section V(e) above).

11.1 It is true that the term "supramolecular structure" arose for the first time in the decision. At the oral proceedings before the opposition division the term employed was "overall structural distribution".

However as explained in section 5 above these terms were employed merely in connection with elucidation of a fact which has been in the original application and hence in the proceedings from the outset and to which

reference had repeatedly been made throughout the first instance proceedings.

Thus this was not - contrary to the assertions of the appellant - a new aspect presented for the first time at the oral proceedings before the opposition division. Thus, the discussion of this aspect constituted reasons based on the facts and evidence which had already been put forward.

11.2 Regarding the discussion about the suitability of the materials of D2 as additives for mortars and the role of the low degree of sulphonation, the board notes that in the response to the notice of opposition the proprietor argued that the amount of sulphonating agent employed in the examples of D2 was about 0.18 moles/mole amino functional compound, whereas claim 1 of the patent required a minimum amount of 0.8 moles. Thus the issue of the low amount of sulphonation in the case of the products of D2 was already in the proceedings. The reference to the degree of solubility arising from the extent of sulphonation constitutes an explanation of the consequences of this identified difference and is therefore an argument that is based on facts and evidence that were already present in the procedure.

11.3 Accordingly no procedural violation took place and the request for reimbursement of the appeal fee is not justified (Rule 67 EPC).

Order

For these reasons it is decided that:

12. The decision under appeal is set aside.

13. The case is remitted to the first instance with the order to maintain the patent on the basis of the main request (claims 1 to 4) filed as "New Auxiliary Request I" with the letter dated 21 December 2006 and after any necessary consequential amendment of the description.

The Registrar:

The Chairman:

E. Görgmaier

R. Young