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Datasheet for the decision of 11 February 2014

Case Number: T 0850/10 - 3.3.01

Application Number: 03723521.5

Publication Number: 1501904

IPC: C09D167/06, C09D163/10, C09D175/14, B29C63/34

Language of the proceedings: EN

Title of invention:
USE OF A CURABLE RESIN COMPOSITION FOR (RE)LINING OF PIPE SYSTEMS, ETC.

Patent Proprietor:
DSM IP Assets B.V.

Opponent:
Scott Bader Company Ltd.

Headword:
Pipe (re)lining/DSM

Relevant legal provisions:
EPC Art. 100(a)

Keyword:
Non-admission of a late-filed document admitted by the opposition division - (no)
Inventive step - (no)

Decisions cited:
G 0007/93

Catchword:

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Case Number: T 0850/10 - 3.3.01

D E C I S I O N
of Technical Board of Appeal 3.3.01
of 11 February 2014

Appellant: (Patent Proprietor)	DSM IP Assets B.V. Het Overloon 1 6411 TE Heerlen (NL)
Representative:	Verhaegen, Ilse Maria M. DSM Intellectual Property P.O. Box 4 6100 AA Echt (NL)
Appellant: (Opponent)	Scott Bader Company Ltd. Wollaston Wellingborough Northamptonshire NN29 7RL (GB)
Representative:	Webster, Jeremy Mark Mewburn Ellis LLP 33 Gutter Lane London EC2V 8AS (GB)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 8 February 2010 concerning maintenance of the European Patent No. 1501904 in amended form.**

Composition of the Board:

Chairman: A. K. Lindner
Members: C. M. Radke
L. Bühler

Summary of Facts and Submissions

I. Both the patentee (hereinafter called patentee) and the opponent (hereinafter called opponent) appealed against the interlocutory decision of the opposition division, posted on 8 February 2010, that European patent No. 1 501 904 as amended according to auxiliary request 5 fulfils the requirements of the EPC.

II. The patent relates to the use of a certain curable resin composition in a flexible, sleeve shaped object (e.g. for (re)lining tubes, tanks and vessels).

Claim 1 as granted reads as follows:

"**1.** Use of a curable resin composition containing a curable resin dissolved in a copolymerizable monomer and an initiator, in a flexible, sleeve-shaped object, **characterized in that**

(i) the curable resin composition consists of:

(A) 30-70 wt.% of an unsaturated polyester resin, a vinyl ester resin, a vinyl ester urethane resin or a mixture of such resins,

(B) 30-70 wt.% of a copolymerizable free monomer or a mixture thereof, it being understood that the wt. % of styrene and/or methyl methacrylate therein does not exceed 20 wt.%, and

(C) 0.05-5 wt.% of an initiator,

the total of the weight percentages of the components (A),(B) and (C) being 100; and **in that**

(ii) the flexible, sleeve-shaped object consists of a supporting or reinforcing material that has been impregnated with the said curable resin composition; and **in that**

(iii) at least one of the surfaces of the flexible, sleeve-shaped object is provided with a barrier

layer that is impermeable to the curable resin composition."

III. The opposition was directed against the patent as a whole and was based on grounds under Article 100(a) (lack of inventive step) and (b) EPC.

IV. The documents cited during the opposition proceedings include the following:

(D1) D. Rhys-Jones, First International Conference on the Internal and External Protection of Pipes, September 9th - llth, 1975, University of Durham, Paper El, pages E1-1 to E1-8, X76, X77

(D3) GB-A-1 340 068

(D4) P. E. Froehling, Journal of Applied Polymer Science, vol. 27 (1982), 3577-3584

(D9) Cray Valley, Product Catalogue, Photocure resins and specialty monomers, CRAY VALLEY Communication, January 1996, three pages

(Dl3) Bisomer Speciality Monomers, International Speciality Chemicals, Southampton/GB, May 1996, four pages

(D14) US-A-5 231 121

(Dl5) EP-A-0 875 546

(D16) EP-A-1 044 777

(D17) JP-A-2001-062 921

(D17B) Translation of (D17) submitted by the opponent with the letter dated 25 September 2009

(Dl8) Encyclopaedia of Polymer Science and Engineering, second edition, vol. 12, 1988, Wiley-Interscience, John Wiley & Sons, New York/US, pp. 268-273 and 290

(Dl9) J. R. Kolczinski et al., Effect of Organic Peroxide Molecular Structure and Environment on

Polyester Resin Cures, Paper 1A, pp. 1 - 10, 22nd Annual Conference of The Society of The Plastics Industry, Inc, Reinforced Plastics Division, Washington DC 31 January - 3 February 1967

(D20) Internet information "Crosslinking Peroxide; Safe Processing and Typical Crosslink Temperatures", Akzo Nobel NV2002, http://www.akzonobel-polymerchemicals.com/ProductGroups/Safe +Processing +and+..., retrieved on 26 April 2007, one page

(D21) Perkadox 16 datasheet, Akzo Nobel, two pages

(D22) Trigonox 21 data sheet, Akzo Nobel, two pages

(D23) Trigonox C data sheet, Akzo Nobel, two pages

(D24) Accelerator NL-63-100 data sheet, Akzo Nobel, five pages, February 2003.

V. The opposition division decided in particular that

- the main request (i.e. the patent as granted; see point II above) and auxiliary requests 1-4 did not meet the requirements of Article 83 EPC as there was no guidance in the patent as to which monomers (B) would work;
- auxiliary request 4 also did not meet the requirements of Articles 123(2) and 84 EPC;
- late-filed documents (D15), (D16) and (D18)-(D24) were not admitted into the proceedings (see point 9 of the reasons), while (D13), (D14) and (D17) were admitted.

VI. The following additional documents were cited during the appeal proceedings:

(D25) US-A-5 731 366

(D26) J. Brandrup and E. H. Immergut (ed.), Polymer Handbook, third edition, John Wiley & Sons, New

York/US 1989, page III-1 to III-11

(D27) Annex B1 to the opponent's letter dated 18 June 2010, four pages

(D28) Annex B2 to the opponent's letter dated 18 June 2010, six pages

VII. The board annexed a communication to the summons to oral proceedings. In this communication, it *inter alia* gave reasons for its preliminary opinion

- that it should not overrule the discretionary decision of the opposition division to admit document (D17) into the proceedings unless it came to the conclusion that the opposition division had exercised its discretion according to the wrong principles, or without taking into account the right principles, or in an unreasonable way; and
- that document (D17) was to be considered as the closest prior art.

VIII. In its letter dated 23 January 2014, the patentee indicated that it would not be attending the oral proceedings before the board. Enclosed with this letter were claims of eight auxiliary requests and pages of the description purportedly adapted to each of these sets of claims.

IX. The claims presently on file are:

- claims 1-11 as granted (main request),
- claims 1-10 of the first auxiliary request,
- claims 1-8 of the second auxiliary request,
- claims 1-8 of the third auxiliary request,
- claims 1-6 of the fourth auxiliary request,
- claims 1-7 of the fifth auxiliary request,
- claims 1-5 of the sixth auxiliary request,
- claims 1-7 of the seventh auxiliary request,

and

- claims 1-5 of the eighth auxiliary request,

where the auxiliary requests were filed with the letter of 23 January 2014.

a) Claim 1 of the main request is cited under point II above.

b) Claim 1 of the first and second auxiliary requests reads as follows:

"1. Use of a curable resin composition containing a curable resin dissolved in a copolymerizable monomer and an initiator, in a flexible, sleeve-shaped object, characterized in that
(i) the curable resin composition consists of:
(A) 30-70 wt.% of an unsaturated polyester resin, a vinyl ester resin, a vinyl ester urethane resin or a mixture of such resins,
(B) 30-70 wt.% of a copolymerizable free monomer or a mixture thereof, it being understood that the wt. % of methyl methacrylate therein does not exceed 20 wt.%, and
wherein the copolymerizable free monomer (B) has been chosen from the series formed by methyl methacrylate, hydroxyethyl methacrylate, hydroxypropyl methacrylate, butanediol dimethacrylate, triethylene glycol dimethacrylate, trimethylolpropane trimethacryate and phenoxyethyl methacrylate,
(C) 0.05-5 wt.% of an initiator,
wherein the resin composition is completely free of styrene and
the total of the weight percentages of the components (A),(B) and (C) being 100; and in that

(ii) the flexible, sleeve-shaped object consists of a supporting or reinforcing material that has been impregnated with the said curable resin composition; and in that
(iii) at least one of the surfaces of the flexible, sleeve-shaped object is provided with a barrier layer that is impermeable to the curable resin composition." (emphasis added by the board in order to denote the amendments with respect to claim 1 of the main request).

c) Claim 1 of the third and fourth auxiliary requests differs from that of the first and second auxiliary request in that
- the former requires that "**the resin composition is completely free of styrene and methyl methacrylate**" and in that
- "methyl methacrylate" has been deleted from the list of copolymerisable free monomers (B).

d) Claim 1 of the fifth and sixth auxiliary requests differs from that of the fourth and fifth auxiliary requests in that "**the copolymerizable free monomer (B) has been chosen from the series formed by hydroxypropyl methacrylate and butanediol dimethacrylate**".

e) Claim 1 of the seventh and eighth auxiliary requests differs from that of the fifth and sixth auxiliary requests in that the copolymerisable monomer (B) has been limited to **butanediol dimethacrylate**.

X. The patentee's arguments, as far as relevant for this decision, may be summarised as follows:

a) Document (D17) was late-filed, is not prima facie relevant and should not be admitted into the proceedings.

b) Inventive step

Only documents (D1), (D3) and (D17) relate to relining and could be used for assessing inventive step. Document (D1) or (D3) is to be considered as the closest prior art. The problem to be solved was to reduce the emission of volatile compounds while maintaining the properties required for (re)lining. In document (D17), styrene is generally used as a free monomer, so this document cannot be considered as the closest prior art.

In contrast to the teachings of document (D1) or (D3), the present claims require that styrene and/or methyl methacrylate are at least partly replaced by other monomers. This results in less emission of volatile organic compounds while maintaining the properties required for (re)lining. There is no hint in the prior art at the solution defined in the claims; document (D17), if admitted into the proceedings, in fact teaches away from this solution.

XI. The opponent's arguments, as far as relevant for this decision, may be summarised as follows:

Document (D17) is the closest prior art. This document mentions methacrylic acid esters of polyhydric alcohols as suitable monomers, i.e. the class of monomers to which butanediol dimethacrylate (BDDMA) belongs. Styrene is preferred as monomer in (D17) only because it is cheap and readily available. The objective

problem was to provide a resin composition for (re)lining in which styrene and/or methyl methacrylate is replaced by other monomers (especially by BDDMA, the only monomer used in the examples of the patent in suit). There is no evidence that the absence of styrene and methyl methacrylate or their replacement by BDDMA gives rise to a technical advantage. The opponent's experimental reports (D27) and (D28) show that styrene-containing resins are the strongest and that BDDMA does not show any overall advantage. Even if the technical problem was to find a low odour/low volatile alternative resin composition, the solution would be obvious in view of document (D17) if combined with the teaching

- of document (D14) which discloses the replacement of styrene by BDDMA in a fibre-reinforced resin;
- of document (D4) which suggests to replace styrene and methyl methacrylate in unsaturated polyester resins by monomers which are not toxic or volatile; and
- of document (D9) (which discloses BDDMA as a monomer for resins having chemical, heat, water and abrasion resistance) or (D13)(which discloses the high boiling point of BDDMA).

There is no evidence showing that the technical effect is achieved over the whole scope of the claim, even for BDDMA, i.e. that all the compositions would be suitable for the given purpose.

XII. The patentee requested in writing that the decision under appeal be set aside and that the patent be maintained as granted (main request) or, alternatively, on the basis of the claims and adapted descriptions of any of the first to eighth auxiliary requests filed with the letter of 23 January 2014. Furthermore it

requested that documents (D17) and (D25) not be admitted into the proceedings.

The opponent requested that the decision under appeal be set aside and that European patent No. 1 501 904 be revoked.

XIII. The oral proceedings before the board were conducted in the absence of the duly summoned patentee (see Rule 115(2) EPC). At the end of these proceedings the chairman announced the decision of the board.

Reasons for the Decision

1. Both appeals are admissible.

2. Patentee's request not to admit documents (D17) and (D25)

2.1 Document (D17) had been admitted into the proceedings by the opposition division.

The reasons given for this was that document (D17) was **prima facie relevant** (see also point 6.6 of the reasons, where its relevance is explained in detail).

In its communication, the board gave the following reasons for its preliminary opinion on the admission of this document (see point 3.1 of the communication):

"If the way in which a first instance department has exercised its discretion on a procedural matter is challenged in an appeal, it is according to decision G 7/93 (OJ EPO 1994, 775, point 2.6 of the Reasons) not

the function of a board of appeal to review all the facts and circumstances of the case as if it were in the place of the first instance department, and to decide whether or not it would have exercised such discretion in the same way as the first instance department. If a first instance department is required under the EPC to exercise its discretion in certain circumstances, such a department should have a certain degree of freedom when exercising that discretion, without interference from the boards of appeal. A board of appeal should only overrule the way in which a first instance department has exercised its discretion if the Board comes to the conclusion that the first instance department in its decision has exercised its discretion according to the wrong principles, or without taking into account the right principles, or in an unreasonable way."

The board referred to the Guidelines for Examination in the EPO which mention that late-filed facts and evidence should not be admitted if they are not relevant (see Part E-III, bottom of point 8.6 in the version of April 2009):

"In exercising this discretion, the Division will in the first place have to consider the relevance of the late-filed facts or evidence (see VI, 2) or the allowability of the late-filed amendments, on a prima facie basis. If these facts or evidence are not relevant or if these amendments are clearly not allowable, they will not be admitted."

The board concluded that the opposition division exercised its discretion according to the right principles, i.e. the relevance of the late filed

document, when deciding on the admission of document (D17).

Therefore, the fact that document (D17) was late-filed and that the patentee considered it not to be prima facie relevant are not sufficient reasons for the board to overrule the way in which the opposition division exercised its discretion. In its response to the board's communication, the patentee did not provide any additional argument as to why the opposition division had exercised its discretion according to the wrong principles, or without taking into account the right principles, or in an unreasonable way. Hence, the board saw no reason to deviate from its preliminary opinion and rejected the patentee's request that document (D17) not be admitted into the proceedings.

2.2 Due to the fact that the reasons for this decision are not based on document (D25), there was no need to take a decision on the patentee's request that this document not be admitted into the proceedings.

3. Inventive step

3.1 Independent claim 1 of all the requests relates to the use of a curable composition containing a resin (A) and copolymerisable free monomer (B) (see point IX a) to e) above). Among these claims, claim 1 of the seventh and eighth auxiliary requests is limited in such a way that its subject-matter forms part of the subject-matter of claim 1 of each of the preceding requests (see point IX e) above). Consequently, if the subject-matter of claim 1 of the seventh and eighth auxiliary requests turns out not to be inventive, then the subject-matter of none of the claims 1 is.

In view of the outcome of the present decision, it is sufficient to determine whether claim 1 of the seventh and eighth auxiliary requests is based on an inventive step.

3.2 Closest prior art

The closest state of the art is normally a prior-art document disclosing subject-matter with the same objectives as the claimed invention and having the most relevant technical features in common.

The claimed invention relates to the use of a curable resin composition containing a curable resin dissolved in a copolymerisable monomer and an initiator, in a flexible, sleeve-shaped object (see under point II above).

The objectives are the provision of a composition which is suitable for the (re)lining of pipe systems, and which shows low emission or penetration of volatile components (see paragraph [0018] of the patent in suit).

Only documents (D1), (D3) and (D17) relate to the (re)lining of pipe systems. In view of the fact that the major source of volatile compounds are the copolymerisable monomers, documents (D1) and (D3) - which do not even mention that such monomers might be used - do not seem to be related to the objective of reducing the emission or penetration of volatile components. Therefore, the board does not share the patentee's view that either document (D1) or (D3) is the closest prior art. In contrast to these documents, (D17) explicitly discloses the incorporation of such monomers into the resin composition (see its claim 1).

Hence, document (D17) represents the closest prior art.

Document (D17) discloses a thermosetting resin composition as pipe lining material containing the following mandatory components:

(a) between 50 and 70 wt.% based on the weight of components (a) and (b) of an unsaturated polyester resin,

(b) polymerisable monomer, and

(c) thixotropy conferring agent (see claim 1 of (D17B)).

It also contains an initiator for curing the composition (see document (D17B), page 23, lines 15-20), preferably in an amount of 0.1 to 5 parts by weight per 100 parts of components (a) and (b) (see the sentence bridging pages 23 and 24) and may contain a fibrous reinforcing material (see claim 5). In paragraph [0028] a list of monomers (b) including styrene, methyl methacrylate and methyl acrylate is disclosed. Document (D17) suggests as monomers "**the methacrylic acid esters of polyhydric alcohols, such as neopentyl glycol dimethacrylate**" (see (D17B), page 18, lines 3-5). In the last sentence of the paragraph it is mentioned that styrene is generally used as it is cheap and readily available.

Claim 5 of document (D17) discloses the lining of a pipe by impregnating with said resin composition a tubular body containing a fibre-reinforcing material.

The disclosure of this document differs from the subject-matter of claim 1 of the seventh and eighth auxiliary requests only in that the former does not require that

- the monomer (B) is butanediol dimethacrylate (BDDMA) and
- the resin composition is completely free of styrene and methyl methacrylate

(see point IX e) above).

3.3 The problem and its solution

In accordance with paragraph [0018] of the patent in suit, the problem to be solved may be considered as to provide a use in the (re)lining of pipe systems of a resin composition that shows low emission or penetration of volatile components. Due to the high boiling point of BDDMA even at low pressure (according to (D13) 132 °C at 4 mmHg (5.3 mbar)) as compared to those of styrene and methyl methacrylate (styrene: 145.2 °C at atmospheric pressure, and 33.6 °C at 10 mbar; methyl methacrylate: 100 to 101 °C at atmospheric pressure, and 24 °C at 32 mbar; see document (D26), page III-9, entry "Styrene"; and page III-7, entry "Methacrylic acid --,methyl ester"), the board is satisfied that this problem was solved by replacing styrene and methyl methacrylate by BDDMA.

Further improvements which might justify the formulation of a more ambitious problem have not been demonstrated. Neither the patent in suit nor the test report enclosed with the patentee's letter dated 26 September 2011 contains an example directly comparing the resin composition claimed with the one disclosed in the closest prior art (D17), i.e. an example which differs from an example according to the claimed invention only in that BDDMA is replaced by styrene in the resin composition used. Nor did the patentee claim or show that a surprising effect occurs

when styrene is replaced not only partly but completely by BDDMA.

3.4 The avoidance of volatile compounds as such cannot contribute to the presence of an inventive step as it was known that volatile monomers should be avoided in unsaturated polyester resins. Document (D4) deals with the possible replacement of **styrene** by other crosslinking monomers in such resins because of its possible toxicity and the smoke evolution on burning (see the "Synopsis" on the front page). In the penultimate paragraph on the first page it is mentioned that "alternative monomers which have been proposed are either "cleanburning" but **volatile** and/or toxic, e.g., **methyl methacrylate**,[6] or nonvolatile but not applicable in room-temperature curing techniques, e.g. allyl monomers" (emphasis added by the board).

3.5 Hence, it remains to be decided whether or not the person skilled in the art would have tried to solve the problem mentioned above by replacing the styrene preferably used in document (D17) by BDDMA.

BDDMA (butanediol dimethacrylate) is the methacrylic acid ester of the polyhydric alcohol butanediol.

To replace styrene and methyl methacrylate by "the methacrylic esters of polyhydric alcohols, such as neopentyl glycol dimethacrylate" was obvious from reading the closest prior art (see document (D17B), paragraph [0028], page 18, lines 3-5). This disclosure of (D17) is, however, not limited to the dimethacrylate of neopentylglycol. When looking for a suitable glycol dimethacrylate monomer, the person skilled in the art would not have restricted his search to unsaturated polyester systems used in the (re)lining of tubes, but

would also consider such systems used for other purposes where good mechanical strength is required, such as the moulding compositions disclosed in document (D14) (see column 1, line 1-16, and column 3, lines 58-60).

This document relates to a moulding composition based on

(a) unsaturated polyester resins
(b) a mixture of styrene and a di(meth)acrylic acid ester of a (cyclo)aliphatic diol,
(c) natural fibres and
(d) additives (see column 1, lines 9-15).

According to column 1, lines 46-52 of (D14), "Intensified environmental concern and the drastic **reduction of the MAC (maximum allowable concentration) for styrene in 1987 from 100 pp to 20 ppm**, have led to the requirement placed on molded parts manufacturers by the automobile manufacturers that the parts manufacturers produce jute reinforced molded parts having a residual styrene content of <0.1 wt.%" (emphasis added by the board).

Table 1 in columns 3 and 4 and Table 2 in columns 4 and 5 show that the **partial replacement of styrene by 1,4-BDDMA** (1,4-butanediol dimethacrylate; see column 4, lines 14-15) **lowers the residual styrene content considerably while keeping the residual 1,4-BDDMA at a constantly low level.**

Hence, document (D14) advises the person skilled in the art to replace part of the styrene by 1,4-BDDMA in order to produce moulded parts having a low content of residual styrene. In example 8 of document (D14), the monomer mixture contains 90% by weight of 1,4-BDDMA and

10% by weight of styrene (see Table 2 in column 4). According to claim 1, the styrene content in the monomer mixture may be as low as one percent by weight. In fact, document (D14) does not give any reason why styrene should be present at all.

For these reasons it was obvious to the person skilled in the art aiming to solve the problem mentioned above to modify the use disclosed in document (D17) by replacing the total amount of the preferred monomer styrene by 1,4-BDDMA (which is a BDDMA).

When doing this, he would end up with a use as defined in the preamble and parts (i) and (ii) of claim 1 of the seventh and the eighth auxiliary requests.

3.6 Part (iii) of claim 1 of each of the requests requires that "at least one of the surfaces of the flexible, sleeve-shaped object is provided with a barrier layer that is impermeable to the curable resin composition."

It has not been argued that this feature might contribute to the presence of an inventive step, nor has the board reasons to do so (see claim 1 of document (D3) according to which the flexible laminate comprises "a membrane which is relatively impermeable to fluids").

3.7 Hence, the subject-matter of claim 1 of the seventh and eighth auxiliary requests is not based on an inventive step.

3.8 For the reason given under point 3.1 above, this means that the subject-matter of claim 1 of the main request and of each of the auxiliary requests lacks inventive step.

4. The board can only decide on a request as a whole. As the subject-matter of none of the claims 1 of the present requests is inventive, grounds under Article 100(a) EPC prejudice the maintenance of the patent on the basis of these requests.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

M. Schalow A. K. Lindner

Decision electronically authenticated