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**Datasheet for the decision
of 30 June 2010**

Case Number: T 0251/08 - 3.3.01

Application Number: 01931865.8

Publication Number: 1296966

IPC: C07D 275/04

Language of the proceedings: EN

Title of invention:

Method and compositions for inhibiting the growth of
microorganisms in metal working fluids

Patentee:

Arch UK Biocides Limited

Opponent:

-

Headword:

BBIT Sodium Omadine metal working fluid/ARCH UK BIOCIDES

Relevant legal provisions:

EPC Art. 123(2), 56, 54

Relevant legal provisions (EPC 1973):

-

Keyword:

"Main request - auxiliary request 1-3 (no) - unexpected effect
not shown - obvious alternative"

"Auxiliary request 4 (yes) - non-obvious alternative"

Decisions cited:

T 0181/82

Catchword:

-



Case Number: T 0251/08 - 3.3.01

D E C I S I O N
of the Technical Board of Appeal 3.3.01
of 30 June 2010

Appellant: Arch UK Biocides Limited
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Representative: Elsy David
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 20 July 2007
refusing European patent application
No. 01931865.8 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: P. Ranguis
Members: J.-B. Ousset
C.-P. Brandt

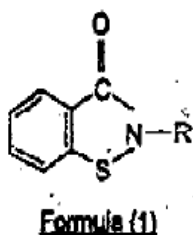
Summary of Facts and Submissions

- I. The appellant lodged an appeal against the decision of the examining division to refuse European patent application No. EP-A-01 931 865.8
- II. The following documents are considered to be relevant for the present decision:
- (1) US-A-3 517 022
 - (2) WO-A-99/65315
 - (3) GB-A-2 230 190
 - (5) GB-A-1 531 431
 - (6) EP-A-0 475 123.
- III. The examining division found that the subject-matter of the main request was not novel in view of the content of document (2). Claim 5 of the first auxiliary request contravened the requirements of Article 123(2) EPC, novelty was acknowledged but the subject-matter of claim 8 lacked inventive step in view of the disclosure of document (3). Claim 1 of the second auxiliary request was considered to be novel, but was not inventive starting from the closest prior art document (2). Claim 1 of the third auxiliary was considered as novel but not inventive in view of document (3).
- IV. Together with its statement setting out the grounds of appeal, four sets of claims were filed as main and first, second and third auxiliary requests. The second and third auxiliary requests were replaced by a revised version (see point VII below).

Claim 1 of the main request reads as follows:

"1. A formulation suitable for use in synthetic, semi-synthetic and soluble oil metal working fluids comprising:

(a) from 10 to 60 parts of the compound of Formula (1)



wherein

R is C₄₋₅ alkyl; and

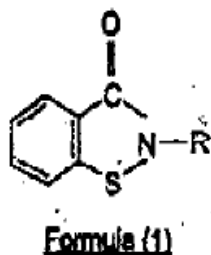
(b) from 90 to 40 parts of a water miscible solvent selected from a C₂-C₁₂ diol and a polyalkylene glycol containing up to 12 carbon atoms;

wherein the parts (a) and (b) are by weight and the sum of the parts (a) and (b) = 100."

Claim 1 of the first auxiliary request reads as follows:

"1. A formulation suitable for use in synthetic, semi-synthetic and soluble oil metal working fluids comprising:

(a) from 10 to 60 parts of the compound of Formula (1)



wherein

R is C₄₋₅ alkyl; and

(b) from 90 to 40 parts of a water miscible solvent selected from a C₂-C₁₂ diol and a polyalkylene glycol containing up to 12 carbon atoms;

(c) sodium pyridine-2-thiol-1-oxide

wherein the parts (a) and (b) are by weight and the sum of the parts (a) and (b) = 100, and the weight ratio of component (a) to component (c) is 1:99 to 99:1."

V. With its statement setting out the grounds of appeal, the appellant submitted the following arguments:

- Document (2), relating to the protection of plastics, disclosed neither the sodium salt of pyridine-2-thiol-1-oxide nor its use in synthetic or semi-synthetic metal-working fluids.
- Document (3) described a wide range of isothiazolinone derivatives but did not disclose any specific compound which would anticipate the C₄ and C₅ alkyl derivatives of claim 1 of the present

application. Neither document (2) nor document (3) disclosed water-miscible solvents to which claim 1 of the present application had been limited.

- From document (3), the person skilled in the art was not aware of the lack of stability of the previously used preservatives in metal-working fluids. Moreover, no guidance could be found in document (3) to suggest that 2-n-butyl-1,2-benzisothiazolinone (BBIT) would turn out to be stable as a constituent of metal-working fluids at high temperature.

VI. In its annex to the summons to oral proceedings, the board made the following remarks:

- The definition of a parameter was lacking in the second and third auxiliary requests filed by the appellant with its statement setting out the grounds of appeal.
- None of the requests on file could be regarded as inventive in the absence of any unexpected effect having regard to the cited documents.

More particularly, the board observed that the teaching of document (2) in combination with the disclosures of document (5) or (6) or (3) would render the claimed subject-matter of the main and second auxiliary requests obvious in the absence of any unexpected effect. It also emphasised that the first and third auxiliary requests were not considered to involve an inventive step, starting from document (3) representing the closest prior

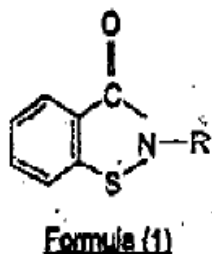
art, in the absence of a proper comparison showing the presence of an unexpected effect.

VII. With letter dated 28 May 2010, the appellant sent a revised version of the second and third auxiliary requests and filed a new fourth auxiliary request.

Claim 1 of the second auxiliary request reads as follows:

"1. A synthetic, semi-synthetic and soluble oil metal working fluid containing a formulation comprising:

(a) from 10 to 60 parts of the compound of Formula (1)



wherein: R is n-butyl; and

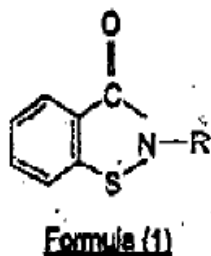
(b) from 90 to 40 parts of a water miscible solvent selected from a C₂-C₁₂ diol and a polyalkylene glycol containing up to 12 carbon atoms;

wherein the parts (a) and (b) are by weight and the sum of the parts (a) and (b) = 100."

Claim 1 of the third auxiliary request reads as follows:

"1. A synthetic, semi-synthetic and soluble oil metal working fluid containing a formulation comprising:

(a) from 10 to 60 parts of the compound of Formula (1)



wherein: R is n-butyl; and

(b) from 90 to 40 parts of a water miscible solvent selected from a C₂-C₁₂ diol and a polyalkylene glycol containing up to 12 carbon atoms;

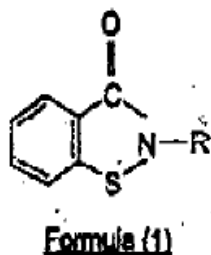
(c) sodium pyridine-2-thiol-1-oxide;

wherein the parts (a) and (b) are by weight and the sum of the parts (a) and (b) = 100, and the weight ratio of component (a) to component (c) is 1:99 to 99:1."

Claim 1 of the fourth auxiliary request reads as follows:

"1. A synthetic, semi-synthetic and soluble oil metal working fluid containing a formulation comprising:

(a) from 10 to 60 parts of the compound of Formula (1)



wherein: R is n-butyl;

(b) from 90 to 40 parts of a water miscible solvent selected from glycol and dipropylene glycol;

(c) sodium pyridine-2-thiol-1-oxide; wherein the parts (a) and (b) are by weight and the sum of the parts (a) and (b) = 100, and the weight ratio of component (a) to component (c) is 1:2 to 2:1."

VIII. In a further letter, the appellant sent experimental results of stability tests using benzisothiazolin-3-one (BIT) and BBIT, which were considered as particularly relevant by the appellant in the discussion using document (3).

IX. Oral proceedings took place on 30 June 2010.

X. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request or on the basis of the first auxiliary request submitted with its statement setting

out the grounds of appeal, or on the basis of the second, third or fourth auxiliary request submitted with its letter of 28 May 2010.

XI. At the end of the oral proceedings, the decision of the board was announced.

Reasons for the Decision

1. The appeal is admissible.

Main request and auxiliary request 2

The wording of the main request differs from that of the second auxiliary request only in that the group R attached to the nitrogen atom of the benzisothiazolin-3-one derivative of formula (1) is a C₄-C₅ alkyl in the former whereas it is n-butyl in the latter. Thus, any decision relevant for the second auxiliary request will also be valid for the same reasons for the main request.

2. Amendments

2.1 Claim 1 of the main request corresponds to claim 12 as originally filed in which the group "n" is zero in the compounds of formula (1).

Claim 1 of the second auxiliary request corresponds to claim 12 as originally filed in which "n" is zero and the group R has been limited to "n-butyl". This limitation has a basis in claim 13 dependent on claim 12 as originally filed.

2.2 The board thus concludes that the requirements of Article 123(2) EPC are fulfilled for claims 1 of these requests. The board does not find it necessary to investigate whether the other claims fulfil these requirements, since these claims 1 are not patentable for the reasons given below.

3. Novelty

3.1 Claim 1 of the main request is novel vis-à-vis the disclosure of document (3). Although the compositions described in this document contain isothiazolinone derivatives which may be benzisothiazolin-3-one in which the group R attached to the nitrogen atom of the isothiazolinone derivative can be an unsubstituted hydrocarbyl (see page 3, line 19 and claim 1), the specific group of benzisothiazolin-3-one in which the group R attached to the nitrogen atom is a C₄-C₅ alkyl group as recited in claim 1 of the main request is not unambiguously disclosed in document (3).

Although document (5) describes compositions containing benzisothiazolin-3-one derivatives in which the nitrogen atom is either substituted by a hydrogen atom or by an alkyl chain from C₁ to C₃ (see page 1, lines 21 to 22), nowhere is there any reference to isothiazolinone derivatives in which the nitrogen atom is substituted by a C₄-C₅ alkyl group.

Novelty is also to be acknowledged vis-à-vis document (2), since this document does not disclose any compositions containing C₂-C₁₂ diols or polyalkylene glycols.

3.2 For this reason, novelty of claim 1 of the main request is acknowledged. Claim 1 of the second auxiliary request is also novel, since the benzisothiazolin-3-one compound present in the claimed composition is limited to the specific BBIT.

3.3 Consequently, claims 1 of the main and the second auxiliary request are novel vis-à-vis documents (2),(3) and (5).

4. Inventive step

4.1 Document (5) represents the closest prior art. The compositions described therein are used to control the micro-organisms in different material including metal working fluids (see claim 1 and page 1, line 18). Moreover, these compositions can also contain water-miscible solvents like propylene glycol (see page 1, lines 39 to 40). Hence, the only difference between the disclosure of document (5) and the claimed subject-matter lies in the nature of the benzisothiazolin-3-one derivative (see point 3.1 above).

4.2 The appellant contended that the problem to be solved by the claimed subject-matter can be seen as the provision of compositions useful to protect metal working fluids against undesirable micro-biological growth and having a better stability at high temperature.

In order to show this alleged improved effect, the appellant provided comparative data with its letter of 15 June 2010. In this data, compositions containing

BBIT are compared with compositions containing BIT. The appellant argued that the compositions containing BBIT are more stable than the ones containing BIT.

However, any improved effect has to be shown by comparison with the closest prior art. Among the N-(C₁₋₃)alkyl groups generically disclosed in document (5), the N-methyl group is unambiguously disclosed and even exemplified and any proper comparison must be made with respect to this benzoisothiazolin-3-one derivative, i.e. N-methyl-BIT (see T 181/82, OJ EPO 1984, 401, in particular point 8). By contrast, BBIT according to the present invention was compared with BIT, namely benzoisothiazolin-3-one wherein the nitrogen atom carries a hydrogen atom.

Therefore, the comparative tests provided by the appellant have not been made vis-à-vis the closest state of the art and cannot show an improved effect.

4.3 The problem underlying the present application is thus to be reformulated in the provision of alternative compositions useful to protect metal working fluids against undesirable micro-biological growth.

4.3.1 In view of the data present in the application, the board is convinced that this problem has actually been solved.

4.4 It remains to be decided whether or not the solution proposed by both claims 1 is obvious in view of the state of the art.

- 4.4.1 In that respect, the question is whether or not the person skilled in the art would have been led in an obvious way to choose a compound of formula (I) where R is C₄₋₅ alkyl (main request) or R is n-butyl (second auxiliary request) in order to solve the technical problem defined above.
- 4.4.2 The appellant argued that the disclosure of document (5) is not directed to the C₄ and /or C₅ alkyl groups linked to the nitrogen atom of the isothiazolinone derivatives described therein and that if the teaching of document (5) is limited to a C₃ alkyl group there must be a reason for that. However, in the absence of any technical reason, the appellant's assertion is unsubstantiated and not convincing.
- 4.4.3 By contrast, the person skilled in the art would have noted that document (2) relates to compositions useful to inhibit the micro-biological growth in metal working fluids and that benzoisothiazolin-3-one N-C₃₋₅-alkyl derivatives, for example n-butyl (BBIT), can be used in such compositions (see page 6, lines 36-37; page 1, lines 10 to 27 and page 7, Table). There is, therefore, a strong presumption that the replacement of derivatives in which R is C₁₋₃ (see document (5)) with BBIT can solve the technical problem defined above. To rebut that finding, the appellant relied on document (1) where all the benzoisothiazolin-3-one derivatives are substituted on the benzene ring. This argument is irrelevant since document (1) does not relate to metal working fluids and would not have been considered by the person skilled in the art for solving the technical problem defined above. Furthermore, document (2) teaches the equivalence between benzothiazolinone

derivatives substituted and non-substituted on the benzene ring (see formula 1, page 1, n is from 0 to 4).

- 4.4.4 Therefore, one of the obvious alternative offered to solve the technical problem would have been to replace the N-(C₁₋₃)alkylbenzothiazolin-3-one derivatives disclosed in document (5) with BBIT disclosed in document (2), thereby arriving at the claimed solution according to claims 1 of the main and second auxiliary requests.
- 4.5 Claims 1 of the main and the second auxiliary requests are not based on an inventive step (Article 56 EPC). Since the board can only decide on a request as a whole, both requests are to be rejected.

First and third auxiliary requests

The wording of the first auxiliary request differs from that of the third auxiliary request only in that the group R attached to the nitrogen atom of the benzothiazolin-3-one derivative of formula (1) is a C₄-C₅ alkyl in the former whereas it is n-butyl in the latter. Thus, any decision relevant for the third auxiliary request will also be valid for the same reasons for the first auxiliary request.

5. Amendments

Claim 1 of the first auxiliary request is based on page 6, lines 9 to 16 in which the group "n" has the value zero. Furthermore, the presence of the sodium salt of the pyridine-2-thiol-1-oxide is based on the disclosure of page 7, lines 3 to 4 and the ratio

between the compound of formula (1) and the sodium salt of the pyridine-2-thiol-1-oxide is disclosed on page 8, lines 18 to 19.

Claim 1 of the third auxiliary request is based on the same passages. The limitation of the value taken by the group R now being n-butyl is based on page 8, lines 14 to 15 mentioning that BBIT is the especially preferred compound.

The board thus concludes that the requirements of Article 123(2) EPC are fulfilled for claims 1 of these requests. The board does not find it necessary to investigate whether the other claims fulfil these requirements, since these claims 1 are not patentable for the reasons given below.

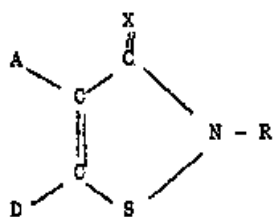
6. Novelty

6.1 Claims 1 of the first and third auxiliary requests differ respectively from claims 1 of the main and second auxiliary requests in that the compositions now claimed contain an additional component, namely the sodium salt of the pyridine-2-thiol-1-oxide.

6.2 This specific salt is mentioned neither in document (5) nor in document (2).

6.3 Document (3) discloses industrial biocides finding applications *inter alia* in metal working fluids (see page 1, lines 4 to 7). Compositions comprise:

(a) isothiazolinone or isothiazolothione derivatives, preferably isothiazolinone derivatives of formula



wherein R is preferably a hydrogen atom or an alkyl group containing 1 to 4 carbon atoms

A and D can be various monovalent substituents (H, halogen, cyano, hydrocarbonyl) or A and D together with the carbon atom to which they are attached form a five- or six-membered ring, which may be optionally substituted. A and D may form a hydrocarbon ring such as benzene (see page 3, line 5 to page 4, line 12);

(b) an alkali metal salt of 2-mercaptopyridine-1-oxide and more particularly the sodium salt (see page 4, lines 33 to 35).

These compositions also contain a carrier, *inter alia* propylene glycol (see page 8, line 13).

Novelty is acknowledged in the absence of an unambiguous combination in which A and D form a benzene ring and R is an alkyl group containing 1 to 4 carbon atoms. In addition, no specific ranges between the isothiazolinone derivatives and, respectively, the carrier and the sodium salt of pyridine-thiol-1-oxide are disclosed.

6.4 Hence, novelty of claims 1 of the first and third auxiliary requests is acknowledged.

7. Inventive step

- 7.1 Document (3) describes metal working fluid compositions which generically disclose isothiazolinone derivatives, an alkali metal salt of pyridine-2-thiol-1-oxide and more particularly the sodium salt (see page 4, lines 33 to 35). These compositions may also contain propylene glycol as carrier (see page 8, line 13).
- 7.2 Although, document (3) does not unambiguously disclose the claimed subject-matter of claims 1 of the first or third auxiliary requests (see point 6.3 above), said claimed subject-matter is encompassed by the teaching of that document. It is the closest state of the art.
- 7.3 The appellant submitted that the technical problem to be solved by the claimed subject-matter can be seen as the provision of compositions useful to protect metal working fluids against undesirable micro-biological growth and having a better stability at high temperature.
- 7.4 First, as noted in the communication of the board, the fact that document (3) does not address explicitly the problem of stability at high or hostile temperature is not relevant as such, since it must be assumed that the compositions of document (3) have to be stable in order to be commercially acceptable (see page 2, lines 15-17). Secondly, the experimental tests provided by the appellant were run using BIT and BBIT without pyridine-2-thiol-1-oxide. However, to substantiate an improvement a comparison should have been made vis-à-vis example 1 of document (3), i.e. a mixture containing BIT and the sodium salt of pyridine-2-thiol-1-oxide, as the closest individualised combination of (a) and (b), as required by the board (see

communication, page 6). In the absence of a proper comparison vis-à-vis the closest state of the art, the technical problem to be solved cannot be worded as submitted by the appellant.

- 7.5 Since the alleged effect has not been shown by the appellant, the problem underlying the present application is thus to be reformulated as the provision of alternative compositions useful to protect metal working fluids against undesirable micro-biological growth.

In view of the content of the description, the board is satisfied that this problem has been solved.

- 7.6 It remains to be decided whether or not the claimed solution is obvious in view of the state of the art.
- 7.6.1 The person skilled in the art seeking to solve the said problem would know from document (3) that any isothiazolinone derivatives per se (a) in point 6.3 above, in combination with sodium salt of 2-mercaptopyridine-1-oxide and propylene glycol, would be useful to prevent spoilage caused by bacteria in metal working fluids. The benzisothiazolin-3-one of the present invention is encompassed in the generic isothiazolinone derivatives of document (3) (see point 6.3 above). Furthermore, the relative proportion by weight of components (a) and (b), i.e. sodium salt of 2-mercaptopyridine-1-oxide, can vary from 1:100 to 100:1 (see claim 15 of document (3)), encompassing, therefore, the range defined in claim 1. Since document (3) indicates propylene glycol as a carrier, any proportion of carrier with respect to component (a) is

envisaged for solving the technical problem defined above, therefore encompassing the defined range of claim 1.

7.6.2 In conclusion, in view of the teaching of document (3) alone, the person skilled in the art would have been led, without inventive ingenuity for solving the technical problem defined above, to design a composition comprising BBIT, sodium salt of 2-mercaptopyridine-1-oxide and propylene glycol in the proportions defined in claim 1 of both requests. This obvious alternative falls within the claimed subject-matter of claims 1 of the first and third auxiliary requests.

7.7 Claims 1 of the first and third auxiliary requests do not involve an inventive step (Article 56 EPC). Since the board can only decide on a request as a whole, the first and third auxiliary requests are to be rejected.

Fourth auxiliary request

8. Amendments

8.1 Claim 1 of the fourth auxiliary request corresponds to claim 1 of the third auxiliary request in that the water-miscible solvent has been limited to two specific diols, namely diethylene glycol and dipropylene glycol according to claim 14 as originally filed. Moreover, the ratio of the N-n-butyl-benzisothiazolin-3-one to the salt of pyridine-2-thiol-1-oxide has been limited to 1:2 to 2:1 according to claim 19 as originally filed.

8.2 The requirements of Article 123(2) EPC are thus fulfilled.

9. Novelty

9.1 Additionally to the distinguishing features listed in point 6 above, the fact that the diols present have now been limited to two specific compounds, i.e. diethylene glycol and dipropylene glycol, represents a further distinguishing feature between the subject-matter of claim 1 and documents (2), (3) and (5).

9.2 Novelty is acknowledged.

10. Inventive step

10.1 For the same reasons as given in point 7.2 above, document (3) represents the closest prior art. In the absence of any relevant comparative tests, as explained in point 7.4 above, the board considers that the problem underlying the present application is identical to the one defined in point 7.5 above.

10.2 It remains to be decided whether or not the claimed solution is obvious in view of the state of the art.

10.2.1 The question in that respect is what kind of carrier is offered to the person skilled in the art in the prior art relating to the same technical field.

10.2.2 Document (3) describes that, additionally to the generic isothiazolinone derivatives and the sodium salt of pyridine-2-thiol-1-oxide, the compositions disclosed therein can also contain a carrier (see page 8, lines 1

to 4). This carrier is preferably a liquid like water or acetic acid; N,N-dimethylformamide; propylene glycol; dimethylsulfoxide or N-methyl-2-pyrrolidone (see page 8, lines 12 to 14) in which the isothiazolinone derivative and the pyridine sodium salt are preferable soluble in these carriers or mixture of carriers.

10.2.3 Document (2) does not mention any specific carrier apart from the generic mention of non-polar or polar organic liquid or water (see page 5, lines 17 to 19). This document does not offer, therefore, any relevant technical teaching in that respect. Document (5) discloses as carriers methanol, ethanol, propylene glycol, carbitol or cellosolve (diethylene glycol monoethylether) (see page 1, lines 39 to 41). Document (6) describes ketones, ether or ester as carrier (see page 3, lines 12 to 15).

10.2.4 None of the two specific diols defined in claim 1 are reported in any of the other documents (2), (5) and (6) as being an appropriate carrier to be added to compositions useful in preventing the damage caused by bacteria in metal working fluids. Hence, the person skilled in the art would not deduce from the teaching of the available prior art that compositions containing BBIT, the sodium salt of the pyridine-2-thiol-1-oxide and one of the two specific diols recited in claim 1 would be useful to protect metal working fluids against the growth of undesirable micro-biological species.

As a consequence, the board concludes that the claimed subject-matter is not obvious to the person skilled in the art in view of the available prior art.

10.3 The fourth auxiliary request, consisting only claim 1, involves an inventive step.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the first instance with the order to grant a patent on the basis of the sole claim according to the fourth auxiliary request filed with the letter dated 28 May 2010 and a description to be adapted.

The Registrar

The Chairman

M. Schalow

P. Ranguis