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**D E C I S I O N**  
**of 22 March 2004**

**Case Number:** T 0852/03 - 3.2.6

**Application Number:** 96914783.4

**Publication Number:** 0831981

**IPC:** B23K 35/363

**Language of the proceedings:** EN

**Title of invention:**  
Epoxy-based, Voc-free soldering flux

**Applicant:**  
Fry's Metals Inc.

**Opponent:**  
-

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 123(2), 84, 54

**Keyword:**  
"Support by description (yes - after amendment)"  
"Novelty (yes - after amendment)"

**Decisions cited:**  
-

**Catchword:**  
-



Case Number: T 0852/03 - 3.2.6

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.6  
of 22 March 2004

**Appellant:**

Fry's Metals, Inc.  
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**Representative:**

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**Decision under appeal:**

Decision of the Examining Division of the  
European Patent Office posted 17 March 2003  
refusing European application No. 96914783.4  
pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** P. Alting van Geusau  
**Members:** G. L. De Crignis  
R. T. Menapace

## Summary of Facts and Submissions

I. European patent application No. 96914783.4 published as international application PCT WO 96/37336 was refused by decision of the examining division dated 17. March 2003. The decision was based on the following claim 1:

"A soldering flux comprising  
a reactive epoxy resin;  
a non-volatile liquid epoxy diluent having a viscosity that is lower than that of the reactive epoxy resin;  
a soldering activating agent;  
an epoxy curing agent; and  
a thixotropic agent,  
the soldering flux having a viscosity of from 10 Poise to 50 Poise and being free of volatile organic solvent."

II. The examining division held that the subject-matter of claim 1 lacked novelty over the prior art (Article 54 EPC)

D1: US-A-5 088 189.

It further held that there was no clear basis in the originally filed documents for the present claim 1. This objection under Article 123(2) EPC, however, was raised for the sake of completeness and did not represent a ground for refusal.

III. Notice of appeal was filed by the appellant (applicant), on 22 May 2003. The appeal fee was paid on the same day. A statement setting out the grounds of appeal was filed on 21 July 2003 together with two sets of claims

(identical to claim 1 as refused by the examining division) (main request), the other set constituting the first auxiliary request, claim 1 of which reads:

"A soldering flux comprising  
a reactive epoxy resin;  
a non-volatile liquid epoxy diluent *distinct from the reactive epoxy resin*;  
a soldering activating agent;  
an epoxy curing agent; and  
a thixotropic agent,  
the soldering flux having a viscosity of from 10 Poise to 50 Poise and being free of organic solvent."

- IV. With letter of 23 February 2004 a second auxiliary request and with letter of 18 March 2004 a third auxiliary request were filed.

Claim 1 of the second auxiliary request reads:

"A soldering flux comprising  
an epoxy resin system made up of a reactive epoxy resin and a non-volatile liquid epoxy diluent having a viscosity that is lower than that of the reactive epoxy resin,  
a component serving as a soldering activating agent and as an epoxy curing agent, and  
a thixotropic agent,  
wherein the soldering flux has a viscosity of from 10 Poise to 50 Poise and is free of volatile organic solvent, and wherein the component serving as the soldering activating agent and epoxy curing agent is provided in powdered form and blended into the epoxy

*resin system, wherein said component remains suspended in powdered form until the soldering flux is heated.*

Claim 1 of the third auxiliary request reads:

*"A soldering flux composition comprising a reactive epoxy resin, a soldering activating agent, an epoxy curing agent, a thixotropic agent,*

*characterised in that the soldering flux further comprises a non-volatile liquid epoxy diluent having a viscosity that is lower than that of the reactive epoxy resin and comprising an oligomer having at least one epoxy group per molecule, polyglycol diepoxide, an alkyl glycidyl ether, a glycidyl acid ester, a polyether diol, nonyl phenol or dibutyl phtalate, the soldering flux having a viscosity of from 10 Poise to 50 Poise and being free of volatile organic solvent."*

- V. Oral proceedings were held on 22 March 2004. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the sets of claims filed as main request or first to third auxiliary request, or the set of 10 claims submitted during the oral proceedings as a fourth auxiliary request.

Claim 1 of the fourth auxiliary request reads:

*"A soldering flux comprising 40 - 50 wt% of a reactive epoxy resin, 25 - 30 wt% of a non-volatile liquid epoxy diluent, which is either a reactive diluent containing*

*one or more epoxy functional groups or a non-reactive diluent,*

*20 - 35 wt% of a component serving as a soldering activating agent and as an epoxy curing agent, and*

*2 - 3.5 wt% of a thixotropic agent,*

*wherein the soldering flux has a viscosity of from 10 Poise to 50 Poise and is free of volatile organic solvent which can evaporate during the reflow process, and wherein the component serving as the soldering activating agent and epoxy curing agent is provided in powdered form and blended into the epoxy resin system, wherein said component remains suspended in powdered form until the soldering flux is heated."*

VI. In support of the allowability of claim 1 of each request the appellant argued that all the claims were sufficiently clear, supported by the original application documents and novel.

As regards the lack of novelty objection raised by the examining division, the appellant contended that D1 disclosed only a single epoxy component, whereas claim 1 of the main request required two epoxy components.

The appellant's argumentation as regards support by the description (Article 84 EPC) with respect to claim 1 of the main request as well as that of each of the claims 1 of the auxiliary requests 1 to 3 was based on page 3, lines 15 to 21 of the application as filed. In this paragraph reference was made to the general basis of the composition of the soldering flux which did not contain any specific weight percentages and hence, this disclosure should be taken into account when

interpreting the statement of the invention on page 2, second paragraph.

Claim 1 of the fourth auxiliary request was directed to the complete combination of the features set out in the originally filed statement of invention and should therefore meet the requirements of Article 84 EPC. The subject-matter of claim 1 was said to be novel because D1 did not disclose the specifically claimed ranges.

VII. At the end of the oral proceedings the Chairman of the board gave the decision as set out below.

### **Reasons for the Decision**

1. The appeal is admissible.
2. *Novelty - Claim 1 of the main request*

D1 discloses with respect to said claim 1:

a soldering flux (column 1, lines 8 - 11) comprising a reactive epoxy resin (column 2, line 28), a non-volatile liquid epoxy diluent having a viscosity that is lower than that of the reactive epoxy resin (column 2, line 30), a soldering activating agent (column 2, line 29), an epoxy curing agent (column 2, line 32) and a thixotropic agent (column 2, line 31).

D1 does not disclose explicitly that the soldering flux has a viscosity of 10 Poise to 50 Poise and is free of volatile organic solvent.

The only argumentation submitted by the appellant in support of the alleged novelty was that D1 disclosed only a single epoxy component, whereas the claimed flux included two epoxy components. This argument cannot be followed since the wording of claim 1 does not exclude a flux having only a single epoxy component. In this respect, it was correctly stated in the International Preliminary Examination Report that D1 disclosed all the components claimed in claim 1 and that the liquid epoxy diluent claimed could be represented by either a non-reactive diluent or a reactive diluent containing one or more reactive epoxy groups (see page 4, lines 2 to 9 of the patent specification). Therefore, at least where a diluent is represented by a non-reactive diluent, no difference exists between the subject-matter of claim 1 and the disclosure of D1. Hence, the subject-matter of claim 1 is not novel.

3. *Support by the description (Article 84 EPC)*

3.1 Considering the subject-matter claimed in the main request and the auxiliary requests 1 to 3 more generally, the board draws attention to the summary of invention as originally given in the application as filed (WO 96/37336, in particular on page 2, lines 11 to 18), according to which the epoxy based VOC free soldering flux in accordance with the instant invention comprises a specific mixture of different components in combination with specific weight percentages for the components. Within the general ranges given for the components in this part of the original disclosure further preferable ranges and components are specified.



- 3.2 The board observes that the originally filed claim 1 does not include the weight percentage ranges for the components specified in the summary of invention in the description, so that there is a discrepancy between the invention claimed and that defined in the description. It has therefore to be established whether the subject-matter as claimed meets the requirements of Article 84 EPC as regards support by the description.
- 3.3 When confronted with this discrepancy during the oral proceedings the appellant referred to some general statements of the preferred embodiments in the description. However, these statements do not provide the required basis, because the preferred embodiments concern further limitations within the concept of the invention and not a broadening of the inventive concept. Also when scrutinizing the disclosure of the application as a whole, one does not find support in any other part of the disclosure for a claim without the combination of weight percentages specified in the description. Therefore, in addition to lack of novelty, claim 1 of the main request, fails to be supported by the description, as required by Article 84 EPC.
- 3.4 Turning to claim 1 of the auxiliary requests 1 to 3, it becomes evident that none of these claims contains the complete combination of features specified in the summary of invention either and for this reason none of these claims is acceptable under Article 84 EPC.
4. *Claim 1 of the fourth auxiliary request*
- 4.1 The amendment of claim 1 by the limitation to the weight percentages and the powdered form of the

activating/curing composition is allowable under Article 123(2) EPC, as the application as originally filed, paragraph 2 on page 2 and page 4, lines 27 to 32, mentions these features in combination with the other features of claim 1. Since the combination of features mentioned in the summary of invention is now included and the claim is clear and concise, no objection arises under Article 84 EPC.

4.2 D1 is the closest state of the art and discloses:

a soldering flux (column 1, line 8/9) comprising  
40 - 50 wt% of a reactive epoxy resin (column 2, line 28, examples: bisphenol-A based epoxy resin, 50 % the same in the application),  
a soldering activating agent (column 2, line 29 and 51 - 53, carboxylic acids),  
an epoxy curing agent (column 2, line 32 and 61 - 63 catalysts) and  
a thixotropic agent (column 2, line 31 and 53 - 56, cellulose),

but not also:

25 - 30 wt% of a non-volatile liquid epoxy diluent which is either a reactive diluent containing one or more epoxy functional groups or a non-reactive diluent,  
20 - 35 wt% of a component serving as a soldering activating agent and as an epoxy curing agent, and  
2 - 3.5 wt% of a thixotropic agent,  
wherein the soldering flux has a viscosity of from 10 Poise to 50 Poise and is free of volatile organic solvent which can evaporate during the reflow process, and wherein the component serving as the soldering activating agent and epoxy curing agent is provided in

powdered form and blended into the epoxy resin system, wherein said component remains suspended in powdered form until the soldering flux is heated.

It follows from this that claim 1 according to the fourth auxiliary request is novel over D1. Since none of the cited prior art documents is more relevant than D1, the requirement of novelty (Article 54 EPC) is met.

5. *Further procedure*

In the present case substantial amendments to the claim were made. The board considers the subject-matter of the claims as amended according to the fourth auxiliary request to meet the requirements of Article 123(2) and 84 EPC and of Article 54 EPC. Since no examination in respect of inventive step has been carried out yet remittal of the case to the examining division for further prosecution is appropriate.

**Order**

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

1. The decision under appeal is set aside.
2. The main request and the first, second and third auxiliary request are rejected.
3. The case is remitted to the first instance for continuation of the examination proceedings.

The Registrar:

The Chairman:

M. Patin

P. Alting van Geusau