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**Datasheet for the decision  
of 27 January 2016**

**Case Number:** T 0647/14 - 3.3.05

**Application Number:** 08103612.1

**Publication Number:** 2110365

**IPC:** C03C8/02

**Language of the proceedings:** EN

**Title of invention:**  
Fish scale free enamelling of non-enamellable steel sheet

**Applicant:**  
Pemco Brugge BVBA

**Headword:**  
Enamel frit/PEMCO BRUGGE BVBA

**Relevant legal provisions:**  
EPC Art. 123(2), 54, 56

**Keyword:**  
Amendments - extension beyond the content of the application  
as filed (yes)  
Inventive step - auxiliary request (yes)

**Decisions cited:**  
T 0796/97, T 0714/00, T 1067/97, T 0025/03

**Catchword:**



**Beschwerdekammern  
Boards of Appeal  
Chambres de recours**

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Case Number: T 0647/14 - 3.3.05

**D E C I S I O N  
of Technical Board of Appeal 3.3.05  
of 27 January 2016**

**Appellant:** Pemco Brugge BVBA  
(Applicant) Pathoekeweg 116  
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**Representative:** von Kreisler Selting Werner - Partnerschaft  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 28 October 2013  
refusing European patent application No.  
08103612.1 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman** A. Haderlein  
**Members:** H. Engl  
P. Guntz

## Summary of Facts and Submissions

I. The European patent application EP 08103612.1 was refused by the examining division on the ground that claim 1 contravened Article 123(2) EPC.

II. The documents cited in the examination procedure include the following:

D1: EP-A-0 018 559  
D2: US-A-4 847 218  
D3: EP-A-0 089 418  
D6: US-B1-6 177 201

III. The notice of appeal was accompanied by new sets of claims.

The board issued two communications under Article 15(1) RPBA, raising objections under Article 123(2) EPC against the claims on file.

Under cover of a letter dated 8 December 2015 the appellant submitted claims as a main request and first and second auxiliary requests, replacing the earlier claim versions.

IV. The sole claim of said main request reads:

"Use of a porcelain enamel frit for the preparation of enamel coated steel surfaces for directly applying said enamel on both sides of steel sheets having TH values below 100 according to EU standard EN 10209 containing:

1.98 to 2.0 parts per weight of  $\text{Li}_2\text{O}$   
22.91 to 27.3 parts per weight of  $\text{Na}_2\text{O}$   
0 to 2.9 parts per weight of  $\text{CaO}$

10.4 to 10.6 parts per weight of B<sub>2</sub>O<sub>3</sub>  
43.45 to 52.9 parts per weight of SiO<sub>2</sub>  
0 to 9.0 parts per weight of ZrO<sub>2</sub>  
0 to 1.98 parts per weight of F  
7.04 to 7.2 parts per weight of NiO  
0 to 0.09 parts per weight of CoO and  
0 to 0.09 parts per weight of CuO

based on 100 parts per weight of said porcelain enamel frit."

V. Oral proceedings took place on 27 January 2016. The appellant filed a new claim replacing the first auxiliary request and a description adapted thereto.

VI. The sole claim of the first auxiliary request reads:

"Use of a porcelain enamel frit for the preparation of enamel coated steel surfaces for directly applying said enamel on both sides of steel sheets having TH values below 100 according to EU standard EN 10209 consisting in parts per weight of

Elements

Li <sub>2</sub> O	2,0
Na <sub>2</sub> O	27,3
CaO	-
B <sub>2</sub> O <sub>3</sub>	10,6
SiO <sub>2</sub>	52,9
ZrO <sub>2</sub>	-
F	-
NiO	7,2
CoO	-
CuO	-
Total	100,0

or

Elements	
Li <sub>2</sub> O	2,0
Na <sub>2</sub> O	23,1
CaO	3,0
B <sub>2</sub> O <sub>3</sub>	10,5
SiO <sub>2</sub>	43,8
ZrO <sub>2</sub>	9,1
F	2,0
NiO	7,1
CoO	0,1
CuO	0,1
Total	100,8

wherein said porcelain enamel frit is contained in a minimum of 20 weight % and the remaining constituents being other frits and/or milling additions."

VII. The appellant essentially argued as follows:

The examining division was of the opinion that the application as originally filed did not disclose ranges derived from the two distinct compositions of frits A and B. The board's objection with respect to the main request was that claim 1 of the main request was an unallowable intermediate generalization from specific embodiments of the invention and certain compositional ranges disclosed in the description, thus contravening Article 123(2) EPC.

However, the present claim was not constructed by extracting individual features taken from a specific embodiment of the invention, but by reciting the complete features taken from a specific embodiment,

i.e. an example.

The skilled person would understand the examples in Table 1 in such a way that also the intermediate frit compositions falling between the compositions of "Frit A" and "Frit B" solved the problem underlying the invention and were thus part of the invention.

#### VIII. Requests

The appellant requested that the decision under appeal be set aside and a patent be granted on the basis of the main request, filed with letter dated 8 December 2015, or in the alternative on the basis of the first auxiliary request, filed during oral proceedings on 27 January 2016, or on the basis of the second auxiliary request, filed with letter dated 8 December 2015.

### **Reasons for the Decision**

#### 1. Amendments

##### 1.1 *Main request*

According to Article 123(2) EPC a European patent or patent application may not be amended in such a way that its content as amended contains subject-matter extending beyond the content of the application as originally filed. According to established case law it is in particular not allowable to amend a claim by extracting isolated features taken from a specific embodiment of the invention in the description, e.g. an example, thereby ignoring their close structural or

functional link with other features of this embodiment. Reference is made to decisions T 1067/97, T 714/00 and T 25/03, cited in "Case Law of the Boards of Appeal", 7<sup>th</sup> edition, 2013, II.E.1.

1.2 In the present case, it is undisputed that the ranges of the various constituents of the porcelain enamel frits as appearing in amended claim 1 are not disclosed as such in the originally filed application documents. Apparently, the end points of each range are taken from the compositional values of the two concrete examples of frits designated in the description as "Frit A" and "Frit B", respectively (after having converted the respective parts per weight values of Frit B to weight-%). As a result of the amendments, in particular the following ranges of components (based on 100 parts per weight) now form part of claim 1, in comparison with the more general disclosure in the description:

Claim 1, main request		description, page 12, l. 9-23
-----		
CaO	0 to 2.9	CaO 0.1 to 8
ZrO <sub>2</sub>	0 to 9.0	ZrO <sub>2</sub> -
CoO	0 to 0.09	CoO 0.1 to 5
CuO	0 to 0.09	CuO 0.1 to 5
-----		

Accordingly, amended claim 1 presents the skilled person with new information insofar as the constituents CoO, CuO and CaO may be used in the respective ranges of greater than 0 and lower than 0,1 parts per weight. The new range for ZrO<sub>2</sub> is also not clearly and unambiguously disclosed in the originally filed documents.

1.3 The appellant argued that claim 1 of the main request was not constructed by extracting individual features, i.e. percentage values, taken from a specific embodiment of the invention, but by reciting the complete features taken from a specific embodiment, i.e. an example.

However, in the board's view, this does not detract from the fact that nothing in the originally filed application documents suggests that said individual values should be considered as the upper or lower end point of a range for that particular component. The board also observes that the upper end points of the ranges of Na<sub>2</sub>O, Li<sub>2</sub>O, SiO<sub>2</sub>, B<sub>2</sub>O<sub>3</sub> and NiO are taken from Frit A, whereas the upper end points of the ranges for CaO, ZrO<sub>2</sub>, F, CoO and CuO are taken from Frit B. This finds no basis in the original documents.

The appellant referred to decision T 726/97 where the board had allowed values of a claimed range to be extracted from examples, albeit "under very exceptional circumstances" (see Reasons, point 2, last sentence). However, in T 726/97 the originally disclosed ranges were restricted by taking certain end point values from examples, whereas in the present case the appellant aims to construct new ranges entirely made up from values of the examples (see in particular Reasons, point 2, 6<sup>th</sup> sentence).

Moreover, the ranges for (Na<sub>2</sub>O + Li<sub>2</sub>O + K<sub>2</sub>O), B<sub>2</sub>O<sub>3</sub>, (SiO<sub>2</sub> + TiO<sub>2</sub> + ZrO<sub>2</sub>), CaO, BaO, Al<sub>2</sub>O<sub>3</sub>, F, P<sub>2</sub>O<sub>5</sub> and Sb<sub>2</sub>O<sub>3</sub> as disclosed in claims 6 and 7 and on page 12 of the description of the application as originally filed were completely abandoned and are now partly in contradiction with claim 1 of the main request (see point 1.2 above).



Therefore, the board is not convinced by the appellant's arguments.

1.4 The claim of the main request is therefore not allowable (Article 123(2) EPC).

1.5 Auxiliary request 1

The sole claim of this request is properly based on the original disclosure, in particular on the description, Examples 1 and 2, page 11, lines 2 to 6, page 13, lines 1 to 4, page 1, lines 9 and 10, and page 4, line 4.

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

2. Novelty (auxiliary request 1)

2.1 Document D1 discloses enamel frits for direct enameling of iron, mild steel, cold-rolled steel etc. The frits exhibit particularly good adhesion to the steel surface without developing defects such as pores, black dots, fish scales etc. (see page 2, lines 12 to 35; page 6, lines 8 to 28). The frits according to D1 contain, in weight-% (see pages 8 and 9):

-----

SiO <sub>2</sub>	25 - 45
Na <sub>2</sub> O	10 - 30
Li <sub>2</sub> O	0 - 5
B <sub>2</sub> O <sub>3</sub>	0 - 25
CaO	5 - 20
CoO	0 - 8
NiO	0 - 8
CuO	0 - 6
F	0 - 5

-----

Concrete examples of the frits of D1 contain from 13.6 to 20.8 % B<sub>2</sub>O<sub>3</sub> and from 26.4 to 34.5 % SiO<sub>2</sub> (see page 19, Table I-A).

The frits of the present application differ from those disclosed in D1 at least in that the amount of SiO<sub>2</sub> is higher, while the percentage of B<sub>2</sub>O<sub>3</sub> is lower.

2.2 D2 discloses enamel frits for steel sheets with superior bonding for use on substrates of steel which have not been pickled or nickel plated (see column 1, lines 7 to 10).

The frits have the following general composition (in weight-%) (see D2, column 2, lines 40 to 68):

-----

SiO <sub>2</sub>	25 - 65
Na <sub>2</sub> O	5 - 25
Li <sub>2</sub> O	0 - 8
B <sub>2</sub> O <sub>3</sub>	5 - 30
BaO	0 - 26
CaO	0 - 16
NiO, CoO, CuO, Mn <sub>2</sub> O <sub>3</sub> , Fe <sub>2</sub> O <sub>3</sub>	1 - 6
F	0 - 10
TiO <sub>2</sub>	0 - 14

-----

Concrete examples of the frits contain from 24.4 to 29.5 weight-% B<sub>2</sub>O<sub>3</sub> (see column 4, lines 11 to 22). They are thus considerably richer in B<sub>2</sub>O<sub>3</sub> than the enamel frit in accordance with the claim according to the first auxiliary request. Furthermore, the enamel frit

of example 1 contains 3.95 % of NiO.

2.3 D3 discloses two concrete examples of base coat enamel frits for cold rolled steel sheets, the frits having the following analysis:

	Example I	Example II
SiO <sub>2</sub>	41.4	32.3
Al <sub>2</sub> O <sub>3</sub>	4.9	4.7
R <sub>2</sub> O (alkali)	22.7	16.2
RO (alkaline earth)	5.9	13.5*
B <sub>2</sub> O <sub>3</sub>	18.7	14.2
NiO	3	4.3
CoO	1.5	-
F	2	6.5

\*BaO

The frit of the claim of the first auxiliary request differs from those frits as regards their content of SiO<sub>2</sub>, B<sub>2</sub>O<sub>3</sub> and NiO.

Therefore, D3 is not relevant for novelty.

2.4 Document D6 discloses ground coat enamel frits for steel sheets having the following composition (in weight-%) (see column 5, Table 1, disclosing the general compositional ranges, the preferred and most preferred ranges of frits according to a first embodiment; and column 2, Table 2, for an alternative ground frit composition):

D6, Table 1	D6, preferred	D6, Table 2
-----		

SiO <sub>2</sub>	35 - 50	40 - 45	40
Na <sub>2</sub> O	0 - 28	20 - 26	20
Li <sub>2</sub> O	0 - 4	1 - 2	1
B <sub>2</sub> O <sub>3</sub>	13 - 20	14 - 18	20
Al <sub>2</sub> O <sub>3</sub>	0 - 5	1 - 3	3
CaF <sub>2</sub>	0 - 10	2 - 8	10*
CoO	0 - 2	0 - 1	1
NiO	0 - 3	0 - 2	
CuO	0 - 2	0 - 1	
F			3

-----  
 \* CaO

It can be seen that the frits of D6 are considerably richer in B<sub>2</sub>O<sub>3</sub> and CaO than the enamel frit in accordance with the claim of the first auxiliary request, which contains 10.5 or 10.6 parts per weight of B<sub>2</sub>O<sub>3</sub>. The alternative ground coat frit disclosed in Table 2 of D6 additionally contains significantly more CaO than the frit according to the claim of the first auxiliary request.

2.5 The claimed subject-matter is thus novel having regard to the cited prior art, in particular documents D1 to D3 and D6. The requirements of Article 54 EPC are met.

3. Inventive step (auxiliary request 1)

3.1 The present application relates to the use of a porcelain enamel frit for direct application on both sides of steel sheets having TH values below 100 according to EU standard EN 10209, without developing so-called fish scale defects (see pages 6 to 9 of the description).

- 3.2 A similar use of a porcelain frit for direct enamelling of untreated, unstabilized, cold rolled steel is disclosed in D1, which is considered to represent the closest prior art.
- 3.3 The problem of the application may be seen as providing an alternative direct coat porcelain enamel frit to be used on both sides of steel sheets having TH values below 100 according to EU standard EN 10209 (i.e. conventionally non-enamellable steel grades).
- 3.4 As a solution to this problem, the application under appeal proposes the use of a porcelain enamel frit having either of the compositions as called for in claim 1 of auxiliary request 1, on both sides of steel sheets having TH values below 100 according to EU standard EN 10209.
- 3.5 Having in particular regard to the examples provided in the description, the board is satisfied that the above defined problem has been solved.
- 3.6 It remains to be decided whether the claimed subject-matter involves an inventive step having regard to the prior art.

The available prior art does not suggest the use of porcelain frits which are particularly low in  $B_2O_3$  and CaO in comparison with the prior art, in particular those of D1 and D6, and which can be used as a two-sided coating directly on the kind of steel surfaces mentioned in claim 1 of auxiliary request 1. D2 and D3 are silent about the problem of fish-scale formation resulting from hydrogen defects. They cannot suggest the claimed invention, either.

- 3.7 The board therefore concludes that the subject-matter of claim 1 of the first auxiliary request is based on an inventive step (Article 56 EPC).
- 3.8 The board finds the adapted description to be in line with the claim as amended.
- 3.9 As the first auxiliary request is allowable, there is no need to consider the claim of the second auxiliary request.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the Examining Division with the order to grant a patent on the basis of the following documents:
  - claim 1 of the first auxiliary request and
  - description pages 1 to 19,as submitted during oral proceedings on 27 January 2016.

The Registrar:

The Chairman:



C. Vodz

A. Haderlein

Decision electronically authenticated