
Candidate's Answer – B (Chemistry)

REGISTERED MAIL
European Patent Office
Directorate General 2
Erhardtstrasse 28
D – 80331 Munich
Germany

21 March 2002

Dear Sirs

European Patent Application No -----

I refer to the communication under Article 96(2) and Rule 51(2) EPC. Please replace the claims on file with the new claims enclosed.

1. Amendments

Basis for the new claims can be found in the specification as filed as follows:

- Claim 1: original claim 1; page 4, lines 11-12; disclaimer of subject matter of D1
- Claim 2: page 4, lines 14 to 16
- Claim 3: original claim 2; page 4, lines 11-12
- Claim 4: page 4, lines 14 to 16
- Claim 5: page 5, lines 26-27
- Claim 6: page 5, lines 27-30
- Claim 7: original claim 3; page 6, line 6
- Claim 8: page 1, line 1 combined with original claim 3 and page 6, line 6
- Claim 9: original claim 3; page 6, line 6, page 4, lines 11-12.

Basis for the disclaimer used in claim 1 is found not in the application as filed but in D1. Decision T 426/94 held that such a disclaimer was allowable to overcome a novelty-destroying disclosure and that the wording of the disclaimer should adhere as closely as possible to that of the prior art document. It is noted here that D1 is citable under Articles 54(3) and (4) only and is therefore relevant only for novelty. Further, the wording of the disclaimer is taken directly from claim 1 of D1. The disclaimer is therefore allowable in accordance with T 426/94 and the Guidelines C-VI, 5.8b. The claims as a whole are therefore allowable under Article 123(2) EPC.

2. Clarity of Amendments

It is also submitted that the new claims are clear and concise within the meaning of Article 84 EPC. In particular the subject matter of claim 1, which is defined by a disclaimer is allowable under Article 84 EPC because it cannot be defined more clearly and concisely using positive language (T 4/80 and Guidelines C-VI, 5.8b).

Further, the subject matter of claim 8, which is defined as a product by process claim, is allowable under Article 84 EPC because it cannot be more clearly and concisely defined in terms of the features of the wall tile itself (C-III, 4.7b and T 320/87).

3. Novelty

- 3.1 D1 discloses frits having a specified composition. These frits have been excluded from amended claim 1 by way of disclaimer. Amended claim 1, and claim 2 which depends on claim 1, are therefore novel over D1.

D1 does not disclose tile glazes, methods for producing tile glazes, methods for producing wall tiles, wall tiles obtainable thereby or the use of a frit in a method for producing wall tiles. Thus, claims 3 to 9 are novel over D1.

- 3.2 The frits of the present invention are limited to those containing 60 to 64 wt% SiO₂, 12 to 16 wt% Al₂O₃, 19 to 23 wt% CaO and 1 to 3 wt% R₂O (wherein R is an alkali metal). Due to this limitation, the subject matter of the present claims are novel over D2 as a selection invention.

The frit of the present invention fulfills the requirements for a selection invention set out in T 279/89 since

- (a) the selected subject matter is narrow compared with D2, in particular since three of the ranges of components of the frit are significantly narrower than the corresponding ranges of D2;
- (b) the selected subject matter is distant from the single example of D2 which has an SiO₂ content of only 57.5 weight percent; and
- (c) the selected subject matter is purposive since the use of the frits claimed leads to glazed tiles having an improved wear resistance and acid resistance compared with the Example of D2. This can be seen from the properties of Examples 1-3 of the present invention with the Example of D2.

All of the claims of the present invention except claim 8 are limited to frits having the narrow, selected range indicated above. Therefore, the subject matter of claims 1 to 7 & 9 is novel over D2.

Claim 8 is a product by process claim and thus the product as such must be novel, regardless of the process used to produce it (T 150/82). This is the case here since the tiles obtainable using a frit of the present invention have an improved wear resistance and acid resistance compared with the tiles known from D2 (see attached Annex).

4. Inventive step

The present invention is concerned with glazing wall tiles. D2 also relates to this subject matter and is thus the closest prior art.

D1 is citable only under Article 54(3) and (4) EPC and is therefore not relevant to the consideration of inventive step.

The objective technical problem solved by the present invention in the light of the closest prior art D2 is to provide wall tiles which have improved wear resistance and acid resistance (see page 1, lines 6-7 of the application). The solution to this problem lies in using the frit (a) as defined in claim 3. The advantageous results achieved by using a frit having this composition can be seen from the results attached in the Annex. It is clear from these experiments that the frits of the present invention lead to tiles which have an improved wear resistance and acid resistance compared with the tiles produced using the frit disclosed in D2.

There is no suggestion in D2 that using a frit having the specific composition of the frit (a) defined in claim 3 would lead to tiles having improved acid resistance and wear resistance. A skilled person seeking to improve the acid and wear resistance of the tile would therefore not have been motivated to work within the ranges set out in claim 3 (frit (a)), on the basis of the teaching of D2. The present invention is therefore not obvious from D2.

Since all of the claims except claim 8 contain the feature of the frit (a) defined in claim 3, or a narrower definition, all of claims 1 to 7 & 9 are inventive over D2.

The particular efficacy of claims 2 and 4 should be noted. The inclusion of Li_2O in the frits specified in these claims leads to a glaze with a very smooth surface (see page 4, lines 14-15 of the application).

Claim 8 is also inventive over D2. As discussed in paragraph 3.2 the tiles defined by claim 8 are different from those disclosed in D2 due to their improved acid and wear resistance. For the reasons set out above with regard to claims 1 to 7 and 9, it would not be obvious to the skilled person on the basis of the teaching of D2 to modify the frit used in order to obtain the improved acid and wear resistance. It would therefore not be obvious that tiles having the properties of those defined in claim 8 could be produced.

5. Unity

Article 82 is not violated because all of the claims relate to the common novel and inventive concept of improved frits and their use in glazing wall tiles.

6. Communication

I refer to the specific points raised in the communication:

- 6.1 see paragraph 3.1 above which shows that the frits claimed in amended claim 1 are novel over D1.
- 6.2 see paragraph 3.2 above which shows that the amended claims are novel over D2.
- 6.3 see paragraph 4 above which shows the technical problem addressed by the invention and the solution thereto.
- 6.4 The amended claims include all of the features which are essential in achieving the desired result. In particular it is noted that method claim 7 and use claim 9 are limited to firing temperatures of from 1170 to 1220°C since this temperature range is essential in achieving the improved acid and wear resistance of the tiles.
- 6.5 see paragraph 1 which sets out the basis for the amended claims in the application as filed.
- 6.6 The description will be amended for conformity with the claims once the Examiner has confirmed the allowability of the new claims.

Merely as a precaution, in case the Examiner is considering refusing the application, oral proceedings are requested under Article 116 EPC.

I enclose form 1037 for acknowledgement of receipt.

Yours faithfully

AR
A REPRESENTATIVE

Annex

Experiments carried out by the applicants:

~~We have carefully studied the communication and the most relevant document 2. We decided to perform some further experiments in order to compare the tile glaze exemplified in document 2 with that made in examples of our application. The tiles of our examples 1-3 and the tile made in accordance with the example in document 2 were manufactured exactly as indicated in our application and document 2 respectively. The wear resistance and the acid resistance of these tiles were measured in accordance with the Standard No. DIN xxxyyy. The wear resistance and acid resistance were each rated from 1-10 in accordance with this standard. A value of 5 or above is considered to be good. A value of 8 or above is excellent.~~

Example	Firing Temperature	Wear Resistance	Acid Resistance	Bubbles Observed
1	1190°C	8	8	No
2	1190°C	9	7	No
3	1190°C	7	9	No
Example of Document 2	1190°C	5	6	No

CLAIMS

1. A frit for a tile glaze consisting of:

SiO ₂ :	60 to 64 wt%
Al ₂ O ₃ :	12 to 16 wt%
CaO:	19 to 23 wt%
Alkali metal oxides:	1 to 3 wt%
ZrO ₂ :	0 to 10 wt%
B ₂ O ₃ :	0 to 2 wt%
MgO, BaO, SrO and ZnO:	0 to 10 wt% in total
other oxides, chlorides or sulphates:	up to 3 wt%

other than a frit consisting of:

SiO ₂ :	from 63 to 65 wt%
Al ₂ O ₃ :	from 12 to 14 wt%
ZrO ₂ :	from 1 to 5 wt%
CaO:	from 15 to 20 wt%
Alkali metal oxides:	0.5 to 4 wt%
ZnO:	up to 5 wt%
B ₂ O ₃ :	up to 5 wt%
Additional oxides:	up to 5 wt%

2. A frit according to claim 1 which contains Li₂O in an amount of from 0.5 to 1.5 wt%.

3. A tile glaze consisting of 100 parts by weight of the following components (a) to (i) and 0 to 15 parts by weight of pigment:

(a) 50 to 90 parts by weight of a frit for a tile glaze consisting of:

SiO ₂	60 to 64 wt%
Al ₂ O ₃	12 to 16 wt%
CaO	19 to 23 wt%
Alkali metal oxides	1 to 3 wt%
ZrO ₂	0 to 10 wt%
B ₂ O ₃	0 to 2 wt%
MgO, BaO, SrO and ZnO	0 to 10 wt% in total
other oxides, chlorides or sulphates:	up to 3 wt%

said weight percents being relative to the total weight of frit (a);

- (b) Feldspar: 8 to 25 parts by weight
(c) Clay 0.5 to 10 parts by weight
(d) Zirconium silicate: 0 to 20 parts by weight
(e) Quartz: 0 to 10 parts by weight
(f) Alumina: 0 to 5 parts by weight
(g) Titania: 0 to 10 parts by weight
(h) Barium carbonate 0 to 10 parts by weight
(i) Zinc oxide: 0 to 5 parts by weight

4. A tile glaze according to claim 2 wherein the frit (a) contains Li₂O in an amount of from 0.5 to 1.5 wt%.
5. A process for producing a tile glaze as defined in claim 3 or claim 4 which comprises suspending components (a) to (i) as defined in claim 3 or 4 and in the amounts specified in claim 3 or 4, and if necessary a pigment in the amount specified in claim 3, in water or alcohol.
6. A process according to claim 5, wherein all solid components, 30 to 45 parts by weight of water and 0.05 to 0.50 parts by weight suspending agent per 100 parts by weight of the mixture, are added to a ball mill and the mixture is ball milled.
7. A method for producing wall tiles which comprises applying to a green tile a glaze as defined in claim 3 or 4, drying the tile and firing the tile at a temperature of from 1170 to 1220°C.
8. A wall tile obtainable by the process defined in claim 7.

9. Use of a frit for a tile glaze consisting of:

SiO_2	55 to 65 wt% 60 to 64 wt%
Al_2O_3	10 to 18 wt% 12 to 16 wt%
CaO :	18 to 25 wt% 19 to 23 wt%
<i>Alkali metal oxides</i>	0.5 to 4 wt% 1 to 3 wt%
ZrO_2 :	0 to 10 wt%
B_2O_3 :	0 to 2 wt%
MgO , BaO , SrO and ZnO :	0 to 10 wt% in total,
<i>other oxides, chlorides or sulfates:</i>	<i>up to 3 wt%.</i>

in a method for producing wall tiles, which comprises firing said tile at a temperature of from 1170 to 1220°C.