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**Datasheet for the decision  
of 1 October 2025**

**Case Number:** T 0040/24 - 3.3.07

**Application Number:** 18189569.9

**Publication Number:** 3610827

**IPC:** A61K6/802

**Language of the proceedings:** EN

**Title of invention:**

METHOD FOR THE MANUFACTURE OF A BLANK AND BLANK

**Patent Proprietor:**

DENTSPLY SIRONA Inc.  
DeguDent GmbH

**Opponent:**

Ivoclar Vivadent AG

**Headword:**

Multilayer blank/DENTSPLY

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

Inventive step - (no)

**Decisions cited:**

G 0001/24



**Beschwerdekammern**

**Boards of Appeal**

**Chambres de recours**

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Case Number: T 0040/24 - 3.3.07

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.07**  
**of 1 October 2025**

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**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
26 October 2023 concerning maintenance of the  
European Patent No. 3610827 in amended form**

**Composition of the Board:**

**Chairman**            A. Usuelli  
**Members:**            J. Molina de Alba  
                              A. Jimenez

## Summary of Facts and Submissions

I. The decision under appeal is the opposition division's interlocutory decision rejecting the main request and auxiliary request 1 and concluding that the European patent as amended in accordance with auxiliary request 2, and the invention to which it relates, met the requirements of the EPC.

II. Claim 1 as granted read as follows:

*"1. A method for the manufacture of a multilayer blank (40), having a lowermost layer (14) and a topmost layer, of a ceramic material, in particular a blank to be used for the manufacture of a dental restoration, where layers (14, 24) of different compositions are introduced layer-by-layer into a mold (10), compressed and then sintered and where individual layers contain at least a first coloring oxide, wherein as the first coloring oxide at least one oxide from the group Co, Mn, Ni, Cr is used, the proportion of which in the lowermost layer (14) containing the first coloring oxide is lower than in the topmost layer containing the first coloring oxide; and where layers have at least a second coloring oxide, at least one oxide from the group Pr, Er, Fe, Ti, V, Bi, Cu, Tb is used as the second coloring oxide, the proportion of which in the lowermost layer containing the second coloring oxide is greater than that in the topmost layer."*

III. During the opposition and appeal proceedings, the parties cited the following documents.

D1 WO 2018/115529 A1  
D2 US 2016/0228223 A1  
D3 US 2017/0273765 A1  
D4 WO 2017/114722 A1

IV. In the decision under appeal, the opposition division concluded that:

- the main request extended the protection conferred by the patent as granted,
- the subject-matter of auxiliary request 1 was not novel over D1, and
- the subject-matter of auxiliary request 2 was inventive over a combination of D4 with D2 or D3.

V. The patent proprietors and the opponent each filed an appeal against the decision. Since each of the parties is both appellant and respondent, they are referred to in the following as "the patent proprietors" and "the opponent".

VI. In their statement of grounds of appeal, the patent proprietors requested that the decision under appeal be set aside and that the patent be maintained on the basis of claims 1 to 5 as filed during the oral proceedings before the opposition division and claims 6 to 10 as filed with the statement of grounds of appeal. This set of ten claims constitutes the patent proprietors' main request, which was resubmitted as a single document on 24 September 2025.

Claim 1 of the main request differs from claim 1 as granted in that Cr has been deleted from the list of first colouring oxides and Pr and Tb have been deleted from the list of second colouring oxides.

- VII. In its statement of grounds of appeal, the opponent requested that the decision under appeal be set aside and that the patent be revoked in its entirety.
- VIII. With their reply to the opponent's statement of grounds of appeal, the patent proprietors filed an alternative set of ten claims (auxiliary request 1). As a further alternative, the patent proprietors requested that the patent be maintained in the version held allowable by the opposition division (auxiliary request 2).

Claim 1 of auxiliary request 1 differs from claim 1 of the main request in that it specifies that the lowermost layer is the bottom layer and the topmost layer is the top layer.

Claim 1 of auxiliary request 2 is identical to claim 1 of the main request.

- IX. The board scheduled oral proceedings, in line with the parties' requests, and gave its preliminary opinion on the case.
- X. Oral proceedings were held before the board by videoconference, as agreed by the parties. At the end of the oral proceedings, the board announced its decision.

XI. The patent proprietors' arguments, where relevant to the present decision can be summarised as follows.

The terms "lowermost layer" and "topmost layer" in claim 1 of the main request were synonymous with the terms "bottom layer" and "top layer" used in the description and drawings of the patent. This was apparent from paragraphs [0009] and [0050] and Figure 2. Therefore, each layer in the blank prepared by the method of claim 1 contained both the first and the second colouring oxides.

D4 was the closest prior art. The method of claim 1 differed from the method in D4 in that it specified that each layer added to the mould contained at least two colouring oxides of a defined nature, the first colouring oxide being present at a lower concentration in the lowermost layer than in the topmost layer and the second colouring oxide being present at a higher concentration in the lowermost layer than in the topmost layer.

This difference led to the production of a multilayer blank from which a more translucent and tooth-like dental restoration could be made. Therefore, the objective technical problem was the provision of a process for the manufacture of a blank with improved aesthetic properties and a more natural tooth-like appearance.

The solution proposed in claim 1 was not obvious.

Firstly, D4 could not be combined with D2 or D3 because their teachings were incompatible: the blank in D4 was produced using a different method and a different

material from those in D2 and D3. In D4, a granulate was poured into the mould, layer by layer, in such a way that it formed layers of uneven surface that were compressed and sintered to produce a blank with a continuous variation of colour and translucency. In D2 and D3, the layers were not produced using a granulate that could be compressed nor did they have uneven surfaces.

Secondly, even if D4 were to be combined with D2 or D3, such a combination would not lead to the method of claim 1. In D2 and D3, only the layers corresponding to the incisal region of the tooth contained the first and second colouring oxides: the first colouring oxide was missing in the layers below the incisal region. In contrast, all the layers in the blank of claim 1 contained the first and the second colouring oxides. As it was surprising that this difference gave the dental restoration of claim 1 a more natural tooth-like appearance, the method of claim 1 was inventive.

XII. The opponent's arguments, where relevant to the present decision can be summarised as follows.

The terms "lowermost layer" and "topmost layer" in claim 1 of the main request were not equivalent to "bottom layer" and "top layer". Lowermost and topmost referred only to the layers that contained colouring oxides, while bottom and top referred to all the layers in the blank. This meant that the multilayer blank in claim 1 could contain layers with no colouring oxides. Such layers could be higher than the topmost layer and lower than the lowermost layer. This interpretation was supported by paragraph [0017] of the description.

Starting from D4 as the closest prior art, the method of claim 1 of the main request differed in that the layers of the blank contained at least two colouring oxides of the nature and in the proportions defined in claim 1: the grey (first) colouring oxide was present in increasing proportions from the lowermost layer to the topmost layer and the other (second) colouring oxide was present in decreasing proportions from the lowermost layer to the topmost layer.

According to the patent, the increasing concentrations of grey colouring oxide towards the topmost layer resulted in a more translucent and tooth-like appearance in the incisal region. Therefore, the objective technical problem was the provision of a process for the manufacture of a blank with improved tooth-like appearance.

The patent proprietors were wrong that D4 could not be combined with D2 and D3. The material and method used for the preparation of the blank in D4 were not critical. The gist of D2 and D3 was that a dental restoration with a more natural appearance could be obtained by increasing the amount of grey colouring oxide and reducing the amount of other colouring oxides towards the cutting edge. This teaching was not limited by the material or the way the layers were added into the mould; it was clearly applicable to the blank of D4.

The method of claim 1 was obvious from the combination of D4 with D2 or D3. D2 and D3 taught that a blank with a more natural tooth-like appearance could be obtained by increasing translucency towards the incisal region. This was achieved by increasing the concentration of grey colouring manganese oxide towards the cutting edge

of the tooth, while decreasing the concentration of the other colouring oxides such as ferric oxide. Even if claim 1 were to be interpreted as requiring the two colouring oxides to be present in each layer of the blank, the fact that the grey colouring oxide was not present in the lower layers of D2 and D3 could not render the claimed method inventive. The patent proprietors had not shown that the presence of a grey oxide in the lower layers produced a technical effect, especially on the natural appearance of the resulting dental restoration. This was particularly true considering that the amount of grey oxide in the lower layers of the blank was not defined and could be close to zero.

XIII. The parties' final requests were as follows.

- The patent proprietors requested that the decision under appeal be set aside and that the patent be maintained in amended form on the basis of claims 1 to 5 as filed during the oral proceedings before the opposition division, claims 6 to 10 as filed with their statement of grounds of appeal, and the description filed at the oral proceedings before the opposition division with amended paragraphs [0031], [0037] and [0038] as filed with their statement of grounds of appeal (main request).

Alternatively, they requested that the patent be maintained in amended form on the basis of claims 1 to 10 and paragraphs [0001] to [0054] as filed with their reply to the opponent's statement of grounds of appeal (auxiliary request 1).

As a further alternative, the patent proprietors requested that the patent be maintained in the

version held allowable by the opposition division (auxiliary request 2).

- The opponent requested that the decision under appeal be set aside and that the patent be revoked in its entirety.

## **Reasons for the Decision**

### *1. Claim construction*

- 1.1 Claim 1 of the main request defines a multilayer blank having a lowermost layer and a topmost layer, where individual layers contain at least a first colouring oxide and a second colouring oxide.

According to the opponent, the lowermost layer and the topmost layer are not necessarily the absolute bottom and top layers of the blank. In the opponent's view, "lowermost" and "topmost" refer only to the layers that contain the two colouring oxides, while "bottom" and "top" refer to all of the layers in the blank.

Therefore, the blank of claim 1 could contain layers which do not contain any colouring oxides, namely layers higher than the topmost layer or lower than the lowermost layer. This interpretation is allegedly supported by paragraph [0017] of the patent, which reads:

*"Usually the lowermost layer is the bottom layer and the topmost layer is the top layer."*

1.2 The board does not agree with this interpretation. Claim 1 defines a multilayer blank having a lowermost layer and a topmost layer, in which individual layers contain at least a first and a second colouring oxide. The claim does not refer to any bottom or top layers, but it is clear from the claim wording that the lowermost layer is the lowest layer in the blank, i.e. the bottom layer, and the topmost layer is the highest layer in the blank, i.e. the top layer.

In line with decision G 1/24 of the Enlarged Board of Appeal (see the Order), although the wording of claim 1 is the starting point and the basis for assessing the patentability of the invention, the board has also consulted the description and drawings when interpreting the claim. In the board's view, the description and drawings merely confirm the clear wording of claim 1.

Paragraphs [0009] and [0050] and Figure 2 of the patent, disclose the terms "lowermost" and "bottom" or "topmost" and "top" as being synonymous: paragraph [0009] refers to "*the lowermost layer or bottom layer*" and paragraph [0050], which explains Figure 2, states that "*...grey cobalt oxide increases from the bottom layer in the direction of the top layer*". Figure 2, which is reproduced here below, depicts a blank in which the lowest layer is referred to as the "lowermost or bottom layer", and the highest layer is referred to as the "top or topmost layer". In all cases, the bottom layer and the top layer also contain the two colouring oxides.

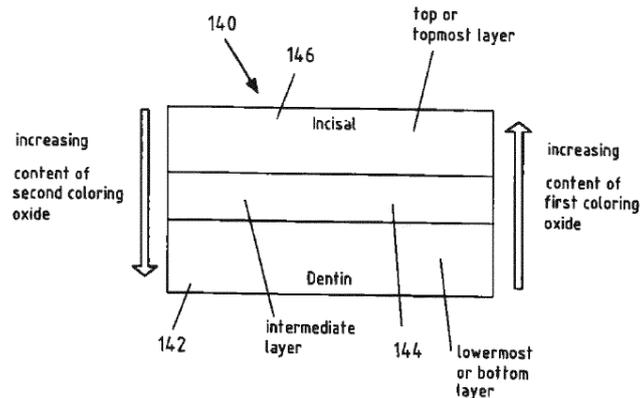


Fig. 2

The teaching in paragraph [0017] of the patent that the lowermost layer is usually the bottom layer and the topmost layer is usually the top layer does not change the clear meaning of claim 1. Rather, it confirms that claim 1 defines the usual embodiment in which "lowermost" and "bottom" are synonyms; as are "topmost" and "top".

Therefore, the board agrees with the patent proprietors that in claim 1, the lowermost and topmost layers are the bottom and top layers, respectively. This interpretation implies that all of the layers in the blank of claim 1 contain the first and the second colouring oxides.

2. *Main request - inventive step (Article 56 EPC)*

2.1 The patent deals with the manufacture of a multilayer blank by superposing layers of ceramic material of different compositions into a mould and subsequently compressing and sintering them (paragraphs [0001] and [0002]). The blank can be used to make a dental restoration, such as a crown, a bridge, a veneer, etc., which has the natural appearance of a tooth (paragraph [0014]).

In accordance with claim 1 of the main request, each layer in the blank of the invention contains at least a first colouring oxide selected from the group of Co, Mn and Ni, and a second colouring oxide selected from the group of Er, Fe, Ti, V, Bi and Cu. The proportion of the first colouring oxide increases from the lowermost layer to the topmost layer, while the proportion of the second colouring oxide decreases from the lowermost layer to the topmost layer. The lowermost layer is the layer closer to the root, while the topmost layer is the layer closer to the cutting edge. They are also referred to as the dentine and incisal layers, respectively (paragraph [0037] and Figures 2 and 3).

- 2.2 The parties have agreed that D4 is the closest prior art. Like the patent, D4 discloses the manufacture of a multilayer blank that can be used for the preparation of a dental restoration. The blank is manufactured by filling, layer by layer, at least two ceramic layers of different composition into a mould, followed by pressing and sintering (page 1, first paragraph). The layers are filled in such a way that they penetrate each other, creating a transition region in which the intensity of the tooth colour decreases and translucency increases in a continuous manner (page 4, third and fourth paragraphs). The colouring oxide in D4 is selected from Pr, Er, Fe, Co, Ni, Ti, V, Cr, Cu, Mn or Tb, and is preferably  $\text{Fe}_2\text{O}_3$ ,  $\text{Er}_2\text{O}_3$  or  $\text{Co}_3\text{O}_4$  (page 5, third paragraph). D4 illustrates the manufacture of a blank in which the colour oxide fraction is continuously reduced from the dentine layer to the incisal layer. This results in an increase in translucency from the dentine layer to the incisal layer (page 11, fourth paragraph and Figures 3a, 3c and 3d).

- 2.3 The method of claim 1 differs from the one in D4 in that the ceramic layers contain at least two colouring oxides, namely a Co, Mn or Ni oxide in increasing proportions from the dentine layer to the incisal layer, and an Er, Fe, Ti, V, Bi or Cu oxide in decreasing proportions from the dentine layer to the incisal layer.
- 2.4 According to the patent, a common feature in all of the multilayer blanks of the prior art is that they attain different colourations and translucence properties by decreasing the amount of colouring oxides from the dentine layer to the incisal layer (paragraph [0009]). This teaching is in line with the general disclosure and the blank illustrated in D4, wherein the colouring oxide generally corresponds to the second colouring oxide in claim 1. In addition to this common feature in the prior art exemplified by D4, the blank obtained by the method of claim 1 contains a grey colouring oxide in increasing proportions from the dentine layer to the incisal layer. This grey colouring oxide corresponds to the first colouring oxide in claim 1 and, according to the patent, its increasing proportions towards the incisal layer yield a more translucent and tooth-like appearance in the incisal region of the tooth (paragraphs [0018], [0026] and [0051]).

Thus, the technical effect of the combination and distribution of colouring oxides defined in claim 1 is the realisation of a dental restoration with a more natural appearance. This was not disputed by the opponent.

- 2.5 Based on this technical effect, the parties agreed that the objective technical problem was the provision of a

process for the manufacture of a blank with improved aesthetic properties and a more natural tooth-like appearance.

2.6 In its discussion of obviousness, the opponent combined D4 with D2 or D3.

D2 and D3 belong to the same patent family and they disclose essentially the same content. They teach that a natural human tooth has a translucent effect only in the third of the tooth corresponding to the incisal region (paragraph [0006], penultimate sentence). Therefore, they propose mimicking the natural aspect of a human tooth using a dental blank with an incisal region that is more translucent than the other regions (paragraphs [0007] and [0008]).

The blank of the invention in D2 and D3 was illustrated in Figure 2a and Table 2. It was prepared using manganese oxide as a source of grey colour and ferric and chrome oxides as sources of yellow and brown colours (titles above paragraphs [0036], [0043] and [0048] in D2 and above paragraphs [0034], [0041] and [0046] in D3). The blank described in Figure 2a and Table 2 has five layers in the incisal region with increasing amounts of grey colouring oxide and decreasing amounts of yellow and brown colouring oxides from Area 5 to Area 1, i.e. from the dentine layer to the incisal layer. This increase in the level of grey colour as the chroma intensity decreases confers to the blank the appearance of a human tooth (paragraph [0051] in D2 and paragraph [0049] in D3).

2.7 The patent proprietors argued that the skilled person would not combine D4 with D2 or D3 and that even if they were to combine these documents, they would not be

led to the method of claim 1. For the reasons set out below, the board disagrees with this view.

- 2.7.1 According to the patent proprietors, the skilled person would not combine D4 with D2 or D3 because the blank in D4 is prepared using a method and a ceramic material that are incompatible with those used in D2 and D3. First, the method of D4 requires that the layers have an uneven surface to produce a blank with a continuous variation of colour and translucency, while in D2 and D3 the layers do not have an uneven surface. Second, the layers in D4 are prepared using a pourable granulate material which is subsequently compressed, while the layers in the examples of D2 and D3 are prepared from slurries, which cannot be compressed.

This argument is not convincing. All of D4, D2 and D3 are directed to the preparation of a multilayer blank suitable for making dental restorations that have colour and translucency properties close to those of human teeth. In the three documents, this aim is achieved by means of a gradient in the proportion of colouring oxides that are added to each ceramic layer. The specific method of adding and bringing together the layers is secondary. It does not preclude the application of the essential teaching of D2 and D3 to that of D4, namely that increasing proportions of grey colouring oxide combined with decreasing proportions of other colouring oxides towards the incisal layer result in a dental restoration with an appearance closer to that of human teeth.

- 2.7.2 With regard to whether the combination of D4 with D2 or D3 would lead to the method of claim 1, the teaching of D2 and D3 is that a dental restoration that mimics the colour and translucent appearance of a human tooth can

be made from a blank in which grey levels increase and chroma intensity decreases towards the incisal layer. This is illustrated in the example in D2 and D3 using manganese oxide as the grey colouring oxide and ferric and chrome oxides as the other colouring oxides. As a consequence, the skilled person wishing to prepare a dental restoration with a more natural tooth-like appearance than that of D4 would, in the light of D2 and D3, prepare a blank containing increasing proportions of manganese oxide and decreasing proportions of ferric and chrome oxide towards the incisive layer.

The patent proprietors argued that still the combination of D4 with D2 or D3 would not lead to the method of claim 1 because the latter requires all of the layers in the blank to contain the first and the second colouring oxides, while in D2 and D3 the grey colouring oxide is only present in the incisal region of the blank.

The patent proprietors are right that claim 1 requires the first and the second colouring oxides to be present in all of the layers of the blank, while D2 and D3 limit the presence of the grey colouring oxide to the layers in the incisal region. However, as noted by the opponent, the patent proprietors have not shown that the presence of a grey colouring oxide in areas closer to the root than the incisal region has any technical effect. In fact, the patent attributes the improved appearance of the dental restoration of the invention to the translucence achieved by the grey colouring oxide in the incisal region (paragraphs [0018], [0026] and [0051]). This teaching is in line with the disclosure in D2 and D3 that the increasing amounts of grey colouring oxide towards the incisal layer mimic

the translucency of human teeth, which is a property that exists only in the incisal region (paragraph [0006], penultimate sentence). Therefore, the presence of a grey colouring oxide in layers located below the incisal region is merely a customary modification with no associated technical effect which, consequently, cannot justify the acknowledgement of an inventive step.

2.8 Therefore, the board concludes that the method of claim 1 is not inventive.

3. *Auxiliary request 1 - inventive step (Article 56 EPC)*

Claim 1 of auxiliary request 1 differs from claim 1 of the main request in that it specifies that the lowermost layer is the bottom layer and that the topmost layer is the top layer. As explained above (point 1.2, last paragraph), the lowermost and topmost layers in claim 1 of the main request are considered to also be the bottom and top layers, respectively. Therefore, the reasons as to why the method of claim 1 of the main request lacks an inventive step also apply to the method of claim 1 of auxiliary request 1.

4. *Auxiliary request 2 - inventive step (Article 56 EPC)*

Claim 1 of auxiliary request 2 is identical to claim 1 of the main request. Therefore, the subject-matter of auxiliary request 2 does not involve an inventive step, either.

## 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:



S. Sánchez Chiquero

A. Uselli

Decision electronically authenticated