

Examiners' Report Paper A 2018

Purpose and extent of the examiners' report

The purpose of the present examiners' report is to enable candidates to prepare for future examinations (cf. Article 6(6) of the Regulation on the European qualifying examination for professional representatives).

Subject of Paper A 2018

The paper concerns a process for making one or more convex protrusions on a glass pane, the protrusions being monolithic with the glass pane. They are made by irradiating with a laser, by which the glass melts. Terminating the irradiation while using a flow of cooling air leads to solidification of the molten glass in form of a protrusion on the glass surface, having a convex shape.

Paragraphs [009] and [010] of the client's letter teach that conventional IR continuous wave and UV continuous wave lasers are less suitable for the process, as they do not have sufficient energy to melt the glass. Using pulsed UV and/or IR lasers photo-induced absorption was possible. The continuous lasers need a very long irradiation time, which is said to be not practical in paragraph [009]. The use of continuous lasers is nevertheless possible and it was not necessary to limit to pulsed lasers.

The protrusion forms a monolithic structure with the glass pane, which means that the glass pane and protrusion form a single unit. This will result in an increase in transparency of the glass of 20 to 40% (see paragraph [013]).

When these protrusions have a size of at least 100 μm the glass panes are very useful in double or triple vacuum-insulated-glass (VIG) glazing. The protrusions then function as spacers. The advantage of using these spacers is that they are made of the same material as the glass pane itself. The optical properties of the insulated glazing are thus hugely improved. Small regular protrusions (smaller than 100 μm) could possibly be known, but there is no prior art in the paper showing such protrusions. The candidates should answer the paper using only the information in

the paper. Hence, it was not necessary to limit the claims to the size of the protrusions, because the feature is not described as essential. There is no reason to assume that it is not possible to perform the invention with smaller protrusions.

The paper cites two prior art documents. Document D1 describes a process in which irregular protrusions can be formed on the surface of a glass pane by irradiating the glass surface with a laser. The document does not disclose how to make convex protrusions. It does, however, disclose the possibility to use such a glass pane in VIG glazing. It is not disclosed that the protrusions in D1 function as spacers.

Document D2 is an announcement from a producer of VIG windows. The document describes that they have improved the optical properties by 10 percent by using spacers made of glass. It is mentioned that the spacers are separate convex elements, made of the glass material itself (see paragraph [004]). It is not clear how the 10 percent optical improvement is obtained. The protrusions are, however, separate (paragraph [004]) and thus clearly not monolithic with the glass pane.

General comment

There was no double penalisation in the marking. For instance, if a candidate had the same mistakes in, for example, the method claim and in the product claim, e.g. not including reference numerals, the mistakes were only deducted in the method claim. This does not include claims that were not novel. Claims lacking novelty never attracted any marks.

Possible claims

Possible product claim: Glass pane

Usually, it is a product that will be sold. In terms of protection provided by the claims, product claims are hence more important than method claims. Reference is also made to paragraph [001], from which it is apparent that the client wants to grant licences to glazing manufacturers.

The candidates were expected to realise that they could claim not only the method described by the client but also a single glass pane with a convex protrusion, which

forms a monolithic structure with the glass pane. Such a glass pane, although not specifically requested by the client is not known from the prior art at hand.

A claim for such a glass pane can have the following wording:

A glass pane (3) comprising at least one protrusion having a convex shape and forming a monolithic structure with the glass pane (3).

25 marks are available for such a claim.

The paper makes clear that it is essential that the protrusion is convex (paragraph [018]). This convex shape is also important for rendering the claim novel over D1. Claims that did not have this feature lost 25 marks for lack of novelty, unless they defined other features that made the claim novel.

The best transparency (improvement 20 to 40%) is obtained when the protrusions are monolithic with the glass pane (see paragraphs [012] and [013]). By gluing the protrusions or by having protrusions with a non-convex shape an improvement in transparency of only 10% is obtained. D2 describes that a 10% improvement is obtained in transparency. It is not clear how this improvement is obtained in D2. The protrusions are, however, separate (paragraph [004] of D2) and thus clearly not monolithic with the glass pane. In order to make this claim clearly new over D2, the feature of monolithic hence needs to be included in the claim for a glass pane. Claims that did not have this feature included the separate convex elements of D2 and lost 25 marks for lack of novelty.

From the Guidelines F-IV, 4.12 it is clear that a product-by-process claim is only allowable if it is impossible to define the claimed product other than in terms of a process of manufacture. This was not the case here. Some candidates nevertheless drafted this glass pane claim as a product-by-process claim. These candidates lost 15 marks.

However, if the product-by-process claim did contain in addition to the reference to the method, all the necessary product features only 5 marks were lost. An example

of such a claim is the product claim indicated above, further defining that the product is obtainable by the process.

A restriction to a height of 100 μm is not necessary in the glass pane independent claim. This specific height is only disclosed by the client ([018]) in the context of satisfactory insulation. The glass pane could however be used for many other purposes, e.g. those described in D1. 5 marks were lost if the candidates specified the height.

Each clarity problem in the claim resulted in a deduction of 3 marks.

Any unnecessary limitation, not falling under the ones specified above, resulted in a deduction of 5 marks.

Candidates who generalised to any transparent substrate instead of a glass substrate lost 10 marks as this generalisation was clearly not supported by the client's letter.

Candidates who did not have the reference numerals lost 1 mark.

Possible product claims: VIG glazing

A second type of product claims should be directed to the VIG glazing, which is the product sold or licensed by the client. Such claims can also be drafted as claims referring back to the claim directed to the glass pane.

The VIG glazing claims could have the following wording:

A Vacuum-Insulated-Glass (VIG) glazing comprising at least one glass pane (3) as defined in any of the glass pane claims herein above, wherein the at least one protrusion serves as spacer.

A Vacuum-Insulated-Glass (VIG) glazing according to the preceding claim in the form of a double glazing comprising a glass pane with at least one protrusion on one

surface (4) of the glass pane (3) and a further glass pane without protrusions on any of its surfaces.

A Vacuum-Insulated-Glass (VIG) glazing according to the first VIG glazing claim hereinabove in the form of a VIG triple glazing, comprising two glass panes (3) with at least one protrusion on one surface (4) of the glass pane (3) and a further glass pane without protrusions on any of its surfaces.

A Vacuum-Insulated-Glass (VIG) glazing according to the first VIG glazing claim hereinabove in the form of a VIG triple glazing, comprising a glass pane (3) having protrusions on both surfaces (4, 5) of the glass pane (3) placed between two further glass panes without protrusions on any of its surfaces.

A total of 20 marks was available for the claims directed to the VIG glazing. It was expected that the candidates drafted a claim (or claims) directed to each of the VIG glazing of the three embodiments described in the client's letter, i.e. the double glazing with one inventive glass pane, a triple glazing with two inventive glass panes with protrusions on one side and triple glazing with one inventive glass pane with protrusions on both sides. These embodiments attracted 5 marks each. A more general claim, as defined in the first VIG glazing claim hereinabove, could also be formulated. This general claim could attract further 5 marks. If this general claim was missing, but there was an equivalent general use claim, such a use claim could also attract 5 marks.

If the claims were drafted as product-by-process claims 12 of the 20 possible marks were lost.

Each unnecessary limitation resulted in a loss of 5 marks. This was applied once for all embodiments (no double penalisation).

If the VIG glazing claims were restricted to VIG glazing wherein the protrusions were coincident, 3 marks were deducted as such a limitation was not necessary.

Paragraph [015] mentions that this feature is only necessary to have transparency at all view angles. This is merely a preferred embodiment.

Inclusion of the frame of the VIG glazing into the wording of the claims was not necessary as these features were considered implicit from the term VIG glazing, a term known to the skilled person (which was nevertheless expected to be defined in the description in line with the definition provided in the client's letter). Candidates who did include the frame in their claims did however not lose any marks.

Method claim

From paragraph [002] onwards, it is clear that the client has invented a new method of making monolithic convex protrusions on a glass pane. Claims to this method were expected.

An independent method claim covering this method could have the following wording:

A method of creating at least one convex protrusion on a surface of a glass pane comprising:

- irradiating a glass pane (3) with a UV and/or IR laser beam (2) to create the at least one convex protrusion on the surface (4) of the glass pane (3) facing the laser (1),*
- solidifying the at least one convex protrusion by terminating the irradiation while providing a stream of cooling air over the surface (4) of the glass pane (3).*

25 marks are available for this claim.

Claims lacking novelty did not attract any marks, i.e. lost 25 marks.

Clarity issues resulted in a deduction of 3 marks for each clarity problem.

Any unnecessary limitation, not falling under the ones specified below, resulted in a deduction of 5 marks.

The paper only described UV and IR-lasers and did not provide any support for a generalisation to any laser. If the claim was not limited to UV and IR-lasers but included any laser 2 marks are lost.

It is not necessary to define the lasers to be pulsed. From paragraph [009] it is clear that with continuous lasers the process is slow and uneconomical but nevertheless works. Candidates who limited to pulsed (UV and IR) lasers lost 5 marks.

It is necessary to define that the protrusion is convex in view of the method disclosed in D1. Paragraph [018] of the client's letter specifies that a convex protrusion can only be achieved by terminating the irradiation while a stream of cooling air is provided on the surface of the glass pane. This does not, however, specify that one always gets a convex protrusion when using cooling air. Therefore the claims had to specify that the protrusion is convex. 2 marks were lost if this feature was not present.

In order to get the convex protrusions according to the invention, it is essential that a stream of cooling air is used to cool the glass pane at the stage of the termination of the irradiation, i.e. while solidification occurs. This is clear from paragraph [018]. If this feature is not present, the process is identical to the process of D1 and the claim thus lacks novelty. Accordingly, 25 marks are lost for lack of novelty.

It is not necessary to limit the height of the protrusion to 100 µm or more (see above). Candidates who limited their independent claims to a certain height lost 5 marks.

If the claim only specifies that the protrusion is convex, the claim is novel but an essential feature, i.e. air cooling whilst solidification, is missing. 15 marks are lost in this case.

As for the product, candidates who merely defined a transparent substrate instead of a glass substrate lost 10 marks (once only, no double penalisation). There is no support for a claim to just any transparent substrate.

Repeating the irradiation with the laser, as disclosed in paragraph [013], is not essential. This was thus considered an unnecessary limitation. Candidates who did limit their claims by specifying that this step had to be repeated lost 5 marks.

It was however necessary to specify that the irradiation was terminated (while a stream of cooling air was provided). Not specifying the termination step resulted in a deduction of 5 marks.

Some candidates defined the method as a method for obtaining VIG, but nevertheless only included the steps necessary for the production of the glass pane with monolithic convex protrusions. The use of this method scope resulted in a loss of 5 marks.

This also applied for other claims including an incorrect scope of the method, such as, for example, a process for making windows.

Candidates who did not have reference numerals lost 1 mark.

Dependent claims

The client's letter describes several useful fall-back positions that need to be covered by dependent claims. A total of 15 marks is available for the dependent claims. Suitable fall-back positions include the following.

For the method claim:

- Laser is a pulsed UV and/or IR-lasers laser
- Providing protrusions on both sides
 - Rotating glass pane
 - Two pulsed IR lasers
- Obstacle element
 - Obstacle element being a plate
 - Made of sodium chloride or quartz glass
- Repeating steps of making protrusions

For the claim to the glass pane:

- Hemisphere flattened at upper part

- Height of the protrusions at least 100 µm
- More than 1 protrusion

For the claim to the VIG glazing:

- The protrusions on different sides of the pane are coincident in the triple VIG.

Description

Candidates were also expected to draft the introductory portion of a description. For this description 15 marks are available. 5 marks are available for providing a detailed description of the two prior art documents. In case a candidate used the two-part form correctly, a shorter description of the prior art serving as basis for the pre-ambles was allowed. 5 marks were available for correctly defining the aim of the invention. In view of D1 the objective problem can be defined as the provision of a glass pane for VIG glazing having improved transparency. In view of D2 the same objective problem applies. Finally, 5 marks were available for making the client's letter into a description, which should include any necessary definition ("VIG", "convex", etc...). An actual description was expected and not a communication to the examiner comprising e.g. a full problem solution approach. Candidates should know the requirements of Rule 23(4) IPRE (and of Rule 42(1)(a)-(c) EPC) when drafting their descriptions.

Example set of claims

1. A method of creating at least one convex protrusion on a surface of a glass pane comprising:

- irradiating a glass pane (3) with a UV and/or IR laser beam (2) to create the at least one convex protrusion on the surface (4) of the glass pane (3) facing the laser (1),
- solidifying the at least one convex protrusion by terminating the irradiation while providing a stream of cooling air over the surface (4) of the glass pane (3).

2. A method according to claim 1, wherein irradiating is performed with a pulsed laser.
3. A method according to claim 1 or claim 2, further comprising repeating the method steps as defined in claim 1 on a second surface (5) of the glass pane (3) to provide protrusions on both surfaces (4, 5) of the glass pane (3).
4. A method according to claim 3, wherein providing the protrusions on the second surface (5) of the glass pane (3) comprises turning around the glass pane (3) after having provided the protrusions on the first surface (4) of the glass pane (3) to provide protrusions on the second surface (5) of the glass pane (3).
5. A method according to claim 3, wherein providing the protrusions on the second surface (5) of the glass pane (3) comprises the use of two lasers (1), one on each side of the glass pane (3).
6. A method according to any of claims 3 to 5, wherein the protrusions on each side are arranged coincidentally.
7. A method according to any of claims 3 to 6, wherein pulsed IR-lasers are used.
8. A method according to any of the preceding claims, wherein the protrusions are formed against an obstacle element which is transparent to the laser.
9. A glass pane (3) comprising at least one protrusion having a convex shape and forming a monolithic structure with the glass pane (3).
10. A glass pane (3) according to claim 9, wherein the protrusions have the form of a hemisphere that is flattened at its upper part.
11. A glass pane (3) according to claim 9 or claim 10, wherein the protrusions have a height H of at least 100 μm .

12. A Vacuum-Insulated-Glass (VIG) glazing comprising at least one glass pane (3) as defined in any of claims 9 to 11, wherein the at least one protrusion serves as spacer.

13. A Vacuum-Insulated-Glass (VIG) glazing according to claim 12 in the form of a double glazing comprising a glass pane with at least one protrusion on one surface (4) of the glass pane (3) and a further glass pane without protrusions on any of its surfaces.

14. A Vacuum-Insulated-Glass (VIG) glazing according to claim 12 in the form of a VIG triple glazing, comprising two glass panes (3) with at least one protrusion on one surface (4) of the glass pane (3) and a further glass pane without protrusions on any of its surfaces.

15. A Vacuum-Insulated-Glass (VIG) glazing according to claim 12 in the form of a VIG triple glazing, comprising a glass pane (3) having protrusions on both surfaces (4, 5) of the glass pane (3) and two further glass panes without protrusions on any of its surfaces.

Examination Committee I: Paper A - Marking Details - Candidate No

Category		Max. possible	Marks Marker 1	Marker 2
Claims	Method for making protrusions on glass sheet	25		
Claims	Glass pane	25		
Claims	Vacuum insulated glass	20		
Dependent claims	Dependent claims	15		
Description	Description	15		