



# Model Solution and Compendium-type Report for Paper B

Disclaimer:

This model solution has been adapted by **epi** to assist candidates who sat the Mock e-EQE. It was prepared before the Mock e-EQE to represent a possible answer of a successful candidate, and, where marks are indicated, does not reflect a marking scheme that would be applied by the relevant Examination Committee. As such, **epi** cannot be held accountable for any discrepancies between a marking scheme of an Examination Committee and the model solution.

**Note: This paper is an adapted paper based on Paper B(E/M)2009.**

The challenges of this paper were:

- to amend correctly claim 1, to achieve novelty and inventive step.
- to realize that document D1 contains two distinct embodiments, and each should be treated as a separate piece of prior art (there is a hint in client's letter).
- as usual, to provide a correct and sufficient basis for claim amendments, and to argue for inventive step.

Expected claim amendments (claim numbering of the client's set is used here) (30 marks):

Claim 1:

- a) specifying that the solar collector comprises the metal plate and the passageway for fluid, based on claims 3 and 5. The metal plate and the passageway are consistently disclosed as comprised in the solar collector throughout the description, there is no basis for them being separate from the solar collector. (4 marks)
- b) replacing the wording "the metal plate (7) is arranged above the passageway" by "the metal plate is arranged between the fluid-tight passageway (9) and the transparent cover (3)". This resolves the ambiguous definition in claim 5 and establishes novelty over document D2. (6 marks)
- c) specifying "passageway" as "fluid-tight passageway" on each occurrence. This establishes novelty over D1, second embodiment (Fig. 2). (6 marks)
- d) formulating the claim in a two-part form, consistent with the closest prior art selected in the inventive step argumentation. (2 marks)

Claim 3:

- maintaining the claim 3 newly proposed by the client, but limiting it to copper (based on para [010], where the metal plate made of copper was disclosed as general). Aluminium was mentioned in the patent application as filed, only as a material of electrical wires, but not as a material of the metal plate. Generalizing to "a metal with a high thermal conductivity" would rely on an unclear definition and result in lack of clarity of the claim. (6 marks)

Claim 4:

- maintain as proposed. Original dependency of claim 4 was on claim 3 (now part of claim 1) which was in turn dependent on claim 1 or 2, and the original claim 5 which is now also part of claim 1 was dependent on claim 4. (2 marks)

Claim 5:

- maintain dependency. Original claim 5 is now part of claim 1, was dependent on claim 3 (now part of claim 1) or 4 (now claim 4) which were in turn dependent on claims 1 or 2. So all combinations based on original set of claims are OK, claim 3 is based on paragraph which is general. (2 marks)

- correct "passageway" to "fluid-tight passageway" for consistency with claim 1. (2 marks)

No further dependent claims were needed, and thus none were expected.

Claim not novel: no marks for the claim (in claim 1, the amendments b) and c) are necessary to achieve novelty)

Unnecessary limitations: -5 marks per unnecessary feature

Adding connectors (11) into claim 1: -2 marks

Clarity issues: -5 marks per issue

Example amended set of claims:

*1. A roof tile (1) comprising a transparent cover (3) and a solar collector (5) comprising a metal plate (7), wherein the solar collector (5) comprises a fluid-tight passageway (9) for fluid, characterized in that the metal plate (7) is arranged between the fluid-tight passageway (9) and the transparent cover (3) in such a way that heat can be transferred from the metal plate (7) to the fluid.*

*2. A roof tile (1) according to claim 1, comprising a frame (4) which supports the transparent cover (3) and which holds the solar collector (5).*

*3. A roof tile (1) according to claim 1 or 2, wherein the metal plate (7) is made of copper.*

*4. A roof tile (1) according to any one of claims 1 to 3, wherein the solar collector (5) comprises a photovoltaic module (6) mounted on the metal plate (7).*

*5. A roof tile (1) according to any one of claims 1 to 4, wherein the solar collector comprises a plug connector (11a) and a socket connector (11b) through which the fluid can enter and exit the fluid-tight passageway (9).*

Basis for amendments (19 marks):

Claim 1 is based on the original claim 1, in combination with the original claims 3 and 5.

Claim 5 was dependent on claim 3 which was in turn dependent on claim 1. (3 marks)

Claim 1 was amended so that passageways were specified as fluid-tight passageways. In the description of the application, the passageways are on all occurrences specified as fluid-tight passageways (in paragraphs [011]-[016], and in particular paragraph [016] provides a general basis for all covered embodiments, as it refers to the embodiments of Figs. 4-5 as well as frameless embodiments and embodiments without the photovoltaic module). (3 marks)

Claim 1 was amended so that the wording “above” is replaced by specifying that the metal plate is arranged between the transparent cover and the fluid-tight passageway. Basis for this feature is in paragraph [016] which relates to all covered embodiments, as it refers to the embodiments of Figs. 4-5 as well as frameless embodiments and embodiments without the photovoltaic module. (3 marks)

The feature of claim 2 corresponds to the feature of the original claim 2. The combination of features of the original claims 1, 2, 3 and 5 was disclosed (claim 5 was dependent on claim 3 which was dependent on claim 2 which was dependent on claim 1). The features amended in the current claim 1 were disclosed in combination with all embodiments containing the frame. (2 marks)

Claim 3 is based on the paragraph [010], last sentence. The material of metal plate is disclosed in a general way, so it can be understood that it is applicable for any metal plate in any embodiment. (3 marks)

Claim 4 contains the feature of the original claim 4. Original dependency of claim 4 was on claim 3 (now part of claim 1) and claim 1 or 2, and metal plate made of copper was disclosed in a general way. (2 marks)

Claim 5 contains the feature of the original claim 6. The original claim 6 was dependent on claim 5 (now part of claim 1) which was dependent on claims 3 or 4 (claim 3 is now part of claim 1), which were in turn dependent on claims 1 or 2. Metal plate made of copper was disclosed in a general way. Therefore, all combinations of the present claim 5 were disclosed. (3 marks)

Novelty (7 marks):

The independent claim 1 differs from D1, first embodiment (Fig. 1), in that it requires the presence of a passageway. (2 marks)

The independent claim 1 differs from D1, second embodiment (Fig. 2), in that it requires the presence of a fluid-tight passageway. (2 marks)

The independent claim 1 differs from D2 in that it requires that the metal plate is arranged between the fluid-tight passageway and the transparent cover. (While in D2, the fluid-tight passageway is arranged between the transparent cover and the metal plate.) (3 marks)

Inventive Step (43 marks):

Document D1 discloses two separate embodiments of roof tiles for providing electrical energy. In a first embodiment (Fig. 1), the tile contains a metal plate, a photovoltaic module, electrical wires and a transparent cover. The photovoltaic module is arranged between the metal plate and the cover. In a second embodiment (Fig. 2), the tile additionally contains fins on the other side of the metal plate which improve heat dissipation. The fins form open passageways. (2 marks)

Document D2 discloses a roof tile for providing thermal energy, which contains a transparent cover, a metal tube and a metal plate wherein the metal tube is arranged between the cover and the metal plate, and heat can be transferred from the metal plate to the metal tube. The tube has a plug connector and a socket connector. (2 marks)

Both documents D1 (both embodiments) and D2 relate to the same field of roof tiles as the invention. D1 relates to roof tiles for providing electrical energy (both embodiments of D1 have this purpose). D2 relates to roof tiles for providing thermal energy. In claim 1, the presence of photovoltaic module (electrical energy) is not required, thus the purpose of the roof tile as defined in claim 1 is to provide thermal energy. The closest prior art is thus D2. (5 marks)

However, the second embodiment of D1 is an acceptable alternative closest prior art. If a proper justification is provided, full marks can be obtained.

The distinguishing feature from D2 is as cited in the novelty section. (1 mark)

The effect of the distinguishing feature is that no tubes can be seen when the roof tiles are mounted on the roof, and the roof tiles are very robust. Furthermore, this arrangement allows to incorporate a photovoltaic module when needed. (3 marks)

Starting from D2, an objective technical problem can be expressed as: How to improve the robustness of a roof tile comprising a transparent cover and a solar collector, wherein the solar collector comprises a metal plate and a fluid-tight passageway for fluid. and/or How to

allow incorporation of a photovoltaic module when needed. A secondary objective technical problem can be expressed as: How to improve the appearance of the above roof tile. (4 marks)

Considering D2 on its own:

The upper surface of the metal plate in D2 is reflective. Therefore, the fluid-tight passageway of D2 needs to be located above the plate in order to receive the solar radiation reflected by the plate. Because in D2 a part of the radiation directly heats the tube, the skilled person would be biased against placing the metal plate in between the transparent cover and the tube since this portion of the thermal energy would then be lost.

There is therefore no indication in D2 itself to place the metal plate between the transparent cover and the metal plate. If the skilled person were to do so, there would be an additional step required of arranging the metal plate and the tube so that heat could be transferred from the metal plate to the fluid, without the transfer occurring by reflection.

With respect to the objective problem stated above, there is no hint in D2 as to how the tile could be made more robust. Faced with the problem, the skilled person would not have any indication in D2 to change the relative positions of the metal plate, the transparent cover and the fluid-tight passageways in order to solve the problem. With respect to the secondary objective technical problem, D2 gives no indication as to how to improve appearance of a roof tile comprising a solar collector. (9 marks)

Considering D2 in combination with D1, embodiment of Fig. 1:

D1, embodiment of Fig. 1 (D1/1) discloses a roof tile comprising a solar collector for providing electrical energy, it does not disclose a roof tile comprising a solar collector for providing thermal energy. The general purpose of the roof tile of D1/1 is therefore different from that of the roof tile of the invention, and the skilled person would not consider looking to this prior art for a solution to the technical problems posed. Furthermore, the roof tile of D1/1 does not disclose any passageway for fluid, therefore it is remote from the roof tile of the invention in terms of technical features. For this reason also the skilled person would not consider combining the technical features of D2 and D1/1 in order to solve the objective technical problems.

If the skilled person were to combine the teaching of D2 with that of D1/1, they would not arrive at the subject matter of claim 1 of the application for the following reasons:

With respect to the objective technical problem, prior art D1/1 does offer a solution to this problem, the solution being to make the transparent cover robust enough to withstand all kinds of weather conditions. Therefore, in order to solve the problem the skilled person would make the transparent cover of the roof tile according to D2 stronger. The skilled person

would therefore arrive at a roof tile being as disclosed in D2 except that the transparent cover would be made stronger. With respect to the secondary objective technical problem, the skilled person might consider that the absence of tubes in the tiles of D1/1 lead to a better appearance than the tiles of D2. However, since a fluid-tight passageway in a tube is essential for the functioning of the tiles of D2, this consideration would not prompt the skilled person to modify the tiles of D2. (8 marks)

Considering D2 in combination with D1, embodiment of Fig. 2:

The skilled person would not consider combining D2 with D1, embodiment 2 (D1/2) for the same reasons that they would not consider combining D2 with D1/1. Furthermore, the purpose of the solar collector of D2 is to provide thermal energy, whereas the only mention of thermal energy in the solar collector of D1/2 is the dissipation of thermal energy.

The roof tile of D1/2 does disclose passageways for fluid. However the passageways are the spaces between comb shaped fins and therefore they are technically remote from the tubes of the solar collector of D2 in both shape and purpose, and thus the skilled person would not understand that their position could be used for the tube of D2.

Even if the skilled person did combine the teaching of D2 and D1/2, they would not arrive at the solution as claimed for the following reasons:

With respect to the objective technical problems, D1/2 offers no solutions beyond those offered by D1/1.

Combining the teaching of D2 with that of D1/2, the skilled person would realise that both solar collectors require exposure to solar radiation. If they combined the teachings in a single unit, they would therefore arrive at a roof tile comprising a solar collector according to D2 and a solar collector according to D1/2 side by side. They would not arrive at the roof tile of the invention. (9 marks)

Clarity (1 mark):

The expression "above" in claim 1, previously claim 5, for the position of the metal plate in the roof tile has been replaced by the wording "between the fluid-tight passageway and the transparent cover". The position of the metal plate in relation to the other components in the roof tile is now clearly defined, regardless of the orientation of the individual tile.

(Signature of the Agent)