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Datasheet for the decision of 9 December 2014

Case Number: T 0123/12 - 3.3.05

Application Number: 02757666.9

Publication Number: 1427679

IPC: C03C17/36

Language of the proceedings: EN

Title of invention:
METHODS OF MAKING LOW-E MATCHABLE COATED ARTICLES

Patent Proprietor:
GUARDIAN INDUSTRIES CORP.

Opponent:
SAINT-GOBAIN GLASS FRANCE

Headword:
NiCrNx/GUARDIAN

Relevant legal provisions:
EPC Art. 56, 83, 84, 123(2)

Keyword:
Sufficiency of disclosure - enabling disclosure (yes)
Inventive step -
main and first to sixth auxiliary request (no) -
no improvement - obvious alternative
Clarity - seventh auxiliary request - yes
Amendments - seventh auxiliary request -
extension beyond the content of the application as filed (no)
Inventive step - seventh auxiliary request (yes) - improvement

Decisions cited:
T 0409/91, T 0435/91, T 1743/06

Catchword:

Beschwerdekammern
Boards of Appeal
Chambres de recours

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Case Number: T 0123/12 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 9 December 2014

Appellant: (Opponent)	SAINT-GOBAIN GLASS FRANCE 18, avenue d'Alsace 92400 COURBEVOIE (FR)
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Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 8 December 2011 rejecting the opposition filed against European patent No. 1427679 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	G. Raths
Members:	J.-M. Schwaller
	C. Vallet

Summary of Facts and Submissions

I. The present appeal lies from the decision of the opposition division to reject the opposition against European patent No. 1 427 679, independent claim 1 of which reads as follows:

"1. A method of making a coated article, the method comprising:
depositing at least one first dielectric layer on a glass substrate;
depositing a layer system on the first dielectric layer, the layer system including an infrared (IR) reflecting metal layer of Ag located between and in contact with first and second metal inclusive layers, at least one of the metal inclusive layers comprises $NiCrN_x$ being nitrided to some extent, and
controlling nitrogen gas flow during sputtering of the metal inclusive layer comprising $NiCrN_x$ so that the nitrogen gas flow is from 4-12 sccm/kW; and
depositing at least one second dielectric layer over the layer system;
wherein prior to heat treatment the glass substrate with the layer system thereon has a sheet resistance R_s no greater than 20 ohms/square; and
heat treating the substrate with the layer system thereon so that due to said heat treating the resulting substrate with the layer system thereon has a ΔE^* value (glass side) no greater than 3.5."

II. Among the documents cited during the opposition proceedings, the following are of relevance for the present decision:

D1: US 5 563 734

D4: WO 01/40131 A2

D7: EP 0 691 553 A2.

III. In its decision, the opposition division held the patent as granted to fulfill the requirements of Article 100(a), (b) and (c) EPC.

Regarding inventive step, it argued in essence that starting from D4, the problem was to be seen in improving the durability of the coating without compromising its heat matchability. However, document D1, which disclosed the nitriding of the NiCr layer with a nitrogen gas flow of 22 sccm/kW, did not provide any guidance for using a gas flow as defined in the claims as granted.

IV. With its grounds of appeal, the opponent (hereinafter the "appellant") contested the decision and held that claim 1 as granted did not meet the requirements of Articles 123(2), 83 and 56 EPC. In particular, it argued that the subject-matter of said claim was obvious in the light of the disclosure of document D4 taken in combination with the teaching of document D1.

V. With letter dated 10 August 2012, the respondent submitted its observations on the grounds of appeal along with nine sets of amended claims as auxiliary requests 1 to 9.

Claim 1 of the first auxiliary request reads as follows (differences over claim 1 as granted emphasised by the board):

"1. A method of making a coated article, the method comprising

depositing at least one first dielectric layer on a glass substrate;
depositing a layer system on the first dielectric layer, the layer system including an infrared (IR) reflecting metal layer of Ag located between and in contact with first and second metal inclusive ***barrier*** *layers* ***of or including a Ni inclusive alloy,*** *at least one of the metal inclusive layers comprises* $NiCrN_x$ *being nitrided to some extent, and*
controlling nitrogen gas flow during sputtering of the metal inclusive layer comprising $NiCrN_x$ *so that the nitrogen gas flow is from 4-12 sccm/kW; and*
depositing at least one second dielectric layer over the layer system;
wherein prior to heat treatment the glass substrate with the layer system thereon has a sheet resistance R_s *no greater than 20 ohms/square; and*
heat treating the substrate with the layer system thereon ~~*so that*~~***, wherein*** *due to said heat treating the resulting substrate with the layer system thereon has a* ΔE^* *value (glass side) no greater than 3.5."*

Claim 1 of the second auxiliary request reads as follows:

"1. A method of making a coated article, the method comprising
depositing at least one first dielectric layer on a glass substrate;
depositing a layer system on the first dielectric layer, the layer system including an infrared (IR) reflecting metal layer of Ag located between and in contact with first and second metal inclusive layers, at least one of the metal inclusive layers comprises $NiCrN_x$ *being nitrided to some extent, and*

*controlling nitrogen gas flow during sputtering of the metal inclusive layer comprising $NiCrN_x$ so that the nitrogen gas flow is from **6-10** sccm/kW; and*
depositing at least one second dielectric layer over the layer system;
wherein prior to heat treatment the glass substrate with the layer system thereon has a sheet resistance R_s no greater than 20 ohms/square; and
*heat treating the substrate with the layer system thereon ~~so that~~, **wherein** due to said heat treating the resulting substrate with the layer system thereon has a ΔE* value (glass side) no greater than 3.5."*

Claim 1 of the third auxiliary request reads as follows:

"1. A method of making a coated article, the method comprising:
depositing at least one first dielectric layer on a glass substrate;
*depositing a layer system on the first dielectric layer, the layer system including an infrared (IR) reflecting metal layer of Ag located between and in contact with first and second metal inclusive **barrier** layers **of or including a Ni inclusive alloy**, at least one of the metal inclusive layers comprises $NiCrN_x$ being nitrided to some extent, and*
*controlling nitrogen gas flow during sputtering of the metal inclusive layer comprising $NiCrN_x$ so that the nitrogen gas flow is from **6-10** sccm/kW; and*
depositing at least one second dielectric layer over the layer system;
wherein prior to heat treatment the glass substrate with the layer system thereon has a sheet resistance R_s no greater than 20 ohms/square; and

*heat treating the substrate with the layer system thereon ~~so that~~, **wherein** due to said heat treating the resulting substrate with the layer system thereon has a ΔE* value (glass side) no greater than 3.5."*

Claim 1 of the fourth auxiliary request reads as follows:

"1. A method of making a coated article, the method comprising
depositing at least one first dielectric layer on a glass substrate;
depositing a layer system on the first dielectric layer, the layer system including an infrared (IR) reflecting metal layer of Ag located between and in contact with first and second metal inclusive layers, at least one of the metal inclusive layers comprises $NiCrN_x$ being nitrided to some extent, and
controlling nitrogen gas flow during sputtering of the metal inclusive layer comprising $NiCrN_x$ so that the nitrogen gas flow is from 4-12 sccm/kW; and
depositing at least one second dielectric layer over the layer system;
wherein prior to heat treatment the glass substrate with the layer system thereon has a sheet resistance R_s no greater than 20 ohms/square; and
*heat treating the substrate with the layer system thereon ~~so that~~, **wherein** due to said heat treating the resulting substrate with the layer system thereon has a ΔE* value (glass side) no greater than **3.0 and a Δa* (glass side) no greater than 2.0**."*

Claim 1 of the fifth auxiliary request reads as follows:

"1. A method of making a coated article, the method comprising
depositing at least one first dielectric layer on a glass substrate;
depositing a layer system on the first dielectric layer, the layer system including an infrared (IR) reflecting metal layer of Ag located between and in contact with first and second metal inclusive ***barrier*** *layers* ***of or including a Ni inclusive alloy****, at least one of the metal inclusive layers comprises* $NiCrN_x$ *being nitrided to some extent, and*
controlling nitrogen gas flow during sputtering of the metal inclusive layer comprising $NiCrN_x$ *so that the nitrogen gas flow is from 4-12 sccm/kW; and*
depositing at least one second dielectric layer over the layer system;
wherein prior to heat treatment the glass substrate with the layer system thereon has a sheet resistance R_s *no greater than 20 ohms/square; and*
heat treating the substrate with the layer system thereon ~~so that~~, ***wherein*** *due to said heat treating the resulting substrate with the layer system thereon has a ΔE* value (glass side) no greater than* ***3.0 and a Δa* (glass side) no greater than 2.0.***"

Claim 1 of the sixth auxiliary request reads as follows:

"1. A method of making a coated article, the method comprising
depositing at least one first dielectric layer on a glass substrate;
depositing a layer system on the first dielectric layer, the layer system including an infrared (IR) reflecting metal layer of Ag located between and in contact with first and second metal inclusive ***barrier***

*layers **of or including a Ni inclusive alloy**, at least one of the metal inclusive layers comprises $NiCrN_X$ being nitrided to some extent, and*
*controlling nitrogen gas flow during sputtering of the metal inclusive layer comprising $NiCrN_X$ so that the nitrogen gas flow is from **6-10** sccm/kW; and*
depositing at least one second dielectric layer over the layer system;
wherein prior to heat treatment the glass substrate with the layer system thereon has a sheet resistance R_S no greater than 20 ohms/square; and
*heat treating the substrate with the layer system thereon ~~so that~~, **wherein** due to said heat treating the resulting substrate with the layer system thereon has a ΔE* value (glass side) no greater than **3.0 and a Δa* (glass side) no greater than 2.0.***"

Claim 1 of the seventh auxiliary request reads as follows:

"1. A method of making a coated article, the method comprising
depositing at least one first dielectric layer on a glass substrate;
*depositing a layer system on the first dielectric layer, the layer system including an infrared (IR) reflecting metal layer of Ag located between and in contact with first and second metal inclusive layers, **wherein the bottom layer of the first and second** ~~at least one of the~~ metal inclusive layers comprises $NiCrN_X$ being nitrided to some extent **and wherein the top layer of the first and second metal inclusive layers is metallic**, and*
controlling nitrogen gas flow during sputtering of the metal inclusive layer comprising $NiCrN_X$ so that the nitrogen gas flow is from 4-12 sccm/kW; and

depositing at least one second dielectric layer over the layer system;
wherein prior to heat treatment the glass substrate with the layer system thereon has a sheet resistance R_s no greater than 20 ohms/square; and
heat treating the substrate with the layer system thereon wherein due to said heat treating the resulting substrate with the layer system thereon has a ΔE value (glass side) no greater than 3.5.*"

VI. Further observations from the parties were received as follows:

- Appellant: letters dated 1 October 2014 and 14 November 2014

- Respondent: letter dated 7 November 2014.

VII. During the oral proceedings, which took place on 9 December 2014, the inventive step issue was extensively discussed with respect to the main and first to seventh auxiliary requests. Further, with respect to auxiliary request 7, the issues raised by the appellant were discussed under Articles 123(2), 83 and 84 EPC.

VIII. After closing the debate, the chairman established the parties' requests as follows:

The appellant requested that the decision under appeal be set aside and that the patent be revoked.

The respondent requested that the appeal be dismissed or, alternatively, that the patent be maintained in amended form on the basis of one of the sets of claims according to auxiliary requests 1 to 9 dated 10 August 2012.

Reasons for the Decision

1. Main request - inventive step

By applying the problem-solution approach, the board came to the conclusion that the subject-matter of claim 1 as granted does not involve an inventive step for the following reasons:

1.1 The alleged invention relates to a process of making a low-E coated article that has approximately the same colour characteristics as viewed by the naked eye both before and after heat treatment (see paragraph [0001] of the contested patent).

1.2 The parties agreed that the closest prior art was represented by document D4 which, in claim 19, discloses a method of making a glass article comprising:
sequentially sputter-coating onto a surface of at least one glass substrate a heat-treatable layer system which comprises from the glass substrate outwardly:

- a layer of silicon nitride;
- a substantially metallic layer of nickel or nickel alloy having a nickel content of at least about 10% by weight Ni, said layer being substantially free of a nitride or oxide of said metal;
- a substantially metallic layer of silver;
- a substantially metallic layer of nickel or a nickel alloy having a nickel content of at least about 10% by weight Ni, said layer being substantially free of a nitride or an oxide of said metal; and
- a layer of silicon nitride;

with the relative thicknesses of said layers resulting in a coated article (when viewed from a glass side) having a ΔE^*_{ab} no greater than 3.0 and a Δa^* less than 0.7;
and subjecting said coated substrate to a heat treatment which increases the visible transmittance.

In the examples, the metallic layer is made of a nickel-chromium alloy (page 31, lines 17 to 20; page 37, line 12).

Prior to heat treatment, the coated glass is described as having a sheet resistance R_s of preferably 15.5 to 18.5 ohms/square and after heat treatment a ΔE^*_{ab} of preferably less than 4.0.

1.3 According to the contested patent (paragraph [0010]) the problem underlying the invention was to provide a low-E coated article that combines high visible transmission characteristics, good durability before and/or after heat treatment and good colour stability upon heat treatment.

1.4 As a solution to this problem, the contested patent proposes the process according to claim 1, which is in particular characterised in that at least one of the metal inclusive layers comprises $NiCrN_x$, and in that the nitrogen gas flow is controlled during sputtering of said metal inclusive layer comprising $NiCrN_x$ so that the nitrogen gas flow is from 4 to 12 sccm/kW.

1.5 For the board, the problem identified in point 1.3 above has not been solved over the whole breadth of claim 1 as granted for the following reasons.

By comparing the samples in examples 9 and 10 of the patent, in which the NiCr layer is not nitrided - as in document D4 - with the sample in example 11 as originally filed - which was prepared according to the claimed subject-matter (namely with a nitrogen gas flow of 8 sccm/kW), it can be seen that no improvement in terms of durability - as measured by the tape, brush, scratch and acid boil tests - is to be detected.

The respondent explained that the poor durability of the sample in example 11 was due to the very thin layer of NiCr. Evidence for this argument was found in examples 1 and 2, the samples of which were prepared in the same manner as in example 11 and had excellent durability due to the thicker NiCr layer.

For the board, this argument is not convincing since the thickness of the NiCr layer is not a feature limiting the scope of claim 1 as granted. Furthermore, figures 3 and 4 of the patent show that best results in terms of colour stability - i.e. a ΔE^* of about 3 or less - are obtained when the nitrogen gas flow is zero, i.e. when the NiCr layer is not nitrided, as in document D4.

It follows from the above considerations that the claimed subject-matter does not give rise to an improvement over document D4 over the whole scope of protection of the patent as granted, with the consequence that the problem is to be reformulated in the provision of an alternative process for preparing a low-E coated article having high visible transmission characteristics, good durability before and/or after heat treatment and good colour stability upon heat treatment.

1.6 As to the question of obviousness, it has to be determined whether the proposed solution is derivable from the prior art, in particular document D1 which, similarly to the claimed subject-matter, discloses (column 1, line 54, to column 2, line 10) the preparation of a durable, low-emissivity interference filter which transmits visible light while reflecting infrared radiation.

At column 1, line 61, to column 2, line 4, of D1, the filter is described as comprising a transparent substrate onto which is deposited a first dielectric layer, followed by a metal layer - preferably silver - and a second dielectric layer. In between each of the dielectric and metal layers is deposited a precoat layer preferably made of a thin $NiCrN_x$ film.

According to table 1 of D1, the $NiCrN_x$ film is deposited with a nitrogen gas flow of 22 sccm/kW.

For the board, the skilled person seeking for an alternative to the coated article of D4 gains a strong incentive from document D1 to nitride the NiCr layers, since as explained at column 6, lines 32 to 40, "the film so produced is amorphous, chemically resistant, electrically conductive, and extremely hard and durable". It is true - as argued by the respondent - that D1 discloses the use of a nitrogen gas flow higher than that defined in claim 1 of the granted patent, however, there is no reason to believe that the nitrogen gas flow is strictly limited to the sole value of 22 sccm/kW explicitly disclosed in document D1. And even if this were the case, the skilled person knows that by varying the value of the nitrogen gas flow within the range of from 0 (as in D4) to 22 sccm/kW (as in D1) a product with intermediate properties between

those achieved with the lower and the upper limits of the range, i.e. a product with a NiCr layer which is "nitrided to some extent", is to be expected.

Since in the case at issue the claimed nitrogen gas flow range does not - as explained above - give rise to any unexpected improvement or effect over the product known from D4, the range of from "4 to 12 sccm/kW" defined in claim 1 as granted is nothing other than an arbitrary choice of a range of values that the skilled person can derive in an obvious manner from the broader range (of from 0 to 22 sccm/kW) derivable from the combined teachings of prior-art documents D1 and D4.

1.7 Therefore, the subject-matter of claim 1 as granted does not involve an inventive step within the meaning of Article 56 EC.

2. Auxiliary request 1 - inventive step

Claim 1 of this request differs from claim 1 as granted in that the first and second metal inclusive layers are defined as being "barrier layers of or including a Ni inclusive alloy".

As this feature is also part of the coated articles known from prior-art documents D1 and D4, the subject-matter of claim 1 of this request lacks inventive step for the same reasons as claim 1 as granted (see in this respect points 1.1 to 1.6 above).

3. Auxiliary request 2 - inventive step

Claim 1 of this request differs from claim 1 as granted in that the nitrogen gas flow is restricted to "6-10 sccm/kW".

The board notes that the nitrogen gas flow in example 11 still falls within this newly defined range, such that the reasons indicated in points 1.1. to 1.6 for claim 1 as granted apply *mutatis mutandis* to the subject-matter of claim 1 of this request.

4. Auxiliary request 3 - inventive step

Claim 1 of this request combines the amendments to claim 1 of the first and second auxiliary requests. As the combination of these amendments does not give rise to any unexpected effect or advantage, the reasons indicated in points 1.1 to 1.6 above apply also to claim 1 of this request.

5. Auxiliary requests 4 to 6 - inventive step

Claim 1 of auxiliary requests 4, 5 and 6 corresponds respectively to claim 1 of the main request, the first auxiliary request and the second auxiliary request, with the following amendment in each claim 1: "*wherein due to said heat treating the resulting substrate with the layer system thereon has a ΔE* value (glass side) no greater than ~~3.5~~ 3.0 and a Δa* (glass side) no greater than 2.0*".

As already mentioned for the main request (see point 1.5 above), Figures 3 and 4 of the patent show that when the coated layer is prepared according to the teaching of document D4, i.e with the NiCr layer being not nitrided, ΔE* is about 3 or less than 3. The coated article according to document D4 furthermore has a Δa* of less than 0.8, preferably less than 0.5 (see D4: last line of the Table on page 33). It follows that the amendments to claim 1 of the three requests at issue represent subject-matter known from D4, with the

consequence that the subject-matter of these three claims is obvious to the skilled person for the reasons indicated in points 1.1 to 1.6 above and therefore the subject-matter of the respective claim 1 of these three requests does not involve an inventive step under Article 56 EPC.

6. Auxiliary request 7 - amendments

6.1 Claim 1 of this request differs from that of the main request in that *"the bottom layer of the first and second metal inclusive layers comprises $NiCrN_x$ being nitrided to some extent, and the top layer of the first and second metal inclusive layers is metallic"*.

For the board, the subject-matter of this claim has a basis in claim 26 and in the passages at page 6, line 19 to page 7, line 6, and page 35, lines 5 to 10, as well as in examples 12 and 13 of the application as filed.

Claim 26 as filed discloses in generic terms a method of making a coated article, comprising depositing a layer system on a glass substrate, the layer system including an infrared (IR) reflecting metal layer located between and in contact with the first and second metal inclusive layers, at least one of the metal inclusive layers being nitrided to some extent, wherein prior to heat treatment the glass substrate with the layer system thereon has a sheet resistance R_s of no greater than 20 ohms/square, and heat-treating the substrate with the layer system thereon so that due to said heat treatment the resulting substrate with the layer system thereon has a ΔE^* value (glass side) of no greater than 3.5.

The cited passage bridging pages 6 and 7 discloses - in generic terms - the coated substrate of the invention as comprising a first dielectric layer on said substrate; an IR-reflecting layer sandwiched between a first and a second barrier layer; said IR-reflecting layer and said barrier layers overlying said first dielectric layer; a second dielectric layer overlying said system of a first dielectric layer, first and second barrier layers and an IR-reflecting layer; wherein at least one of said barrier layers comprises a metal nitride that is nitrided to some extent, such that the coated article has a ΔE* value (glass side) of no greater than 3.5 after or due to heat treatment (HT), with one or both of the barrier layers comprising $NiCrN_x$.

The cited passage on page 35 discloses more specifically that "*good matchability combined with high visible transmission and/or good durability both before and after HT can be obtained when the N flow during sputtering of the* ***lower barrier*** layer *5 is from 0-16 sccm/kW, more preferably from* ***4-12 sccm/kW*** *(most preferably 6-10 sccm/kW), and the N flow during sputtering of the* ***upper barrier layer*** *9 is from* ***0****-16 sccm/kW, more preferably from* ***0****-8 sccm/kW, and most preferably from* ***0****-4 sccm/kW*". Eventually, more specifically, in examples 12 and 13 the nitrogen gas flow during sputtering of the bottom and top NiCr layers is disclosed to be 8 and 0 sccm/kW, respectively.

The appellant argued that the passage on page 35 disclosed neither the presence of NiCr in both layers nor the combination of the range 4-12 sccm/kW with the specific value of 0 sccm/kW. For the board, even if the presence of NiCr in both layers is not disclosed in the

above passage, the feature that the upper and lower barrier layers both consist of NiCr is directly and unambiguously derivable from the patent taken as a whole because, in each and every specific embodiment disclosed in the patent, NiCr is disclosed as being **the** constituent of both layers. The specific combination of the preferred range "4-12" with the specific value "0" is, for the board, directly and unambiguously derivable from the above passage in combination with examples 12 and 13.

It follows from the above considerations that the subject-matter of claim 1 of this request derives directly and unambiguously from the subject-matter of claim 26 taken in combination with the above passages and examples 12 and 13 of the application as filed.

6.2 Claims 2 to 5 have a basis in claims 27 to 30 as filed, respectively.

Claims 6 and 7 have a basis in claims 33 and 34 as filed, respectively.

Claim 8 has a basis in the passage at page 35, lines 5 to 10, of the application as filed.

6.3 Consequently the subject-matter of the claims of the request at issue does not extend beyond the content of the application as filed, and so meets the requirements of Article 123(2) EPC.

7. Auxiliary request 7 - clarity

For the board, the skilled person unambiguously understands from the reading of the patent, in particular from the passage at page 35, lines 5 to 15,

in combination with the figures and the examples that the "bottom layer of the first and second metal inclusive layers" can only be the layer close to the glass substrate and, *a fortiori*, the top layer is the other metal inclusive layer. Therefore the appellant's objection that the reader would not understand the meaning of the words "bottom" and "top" cannot be accepted. Consequently, the claims of this request cannot be seen as infringing the requirements of Article 84 EPC.

8. Auxiliary request 7 - disclosure of the invention

It is established jurisprudence that the requirements for sufficiency of disclosure are met if the invention as defined in the claims could be performed at the filing date of the application by a person skilled in the art in the whole area claimed without undue burden, using common general knowledge and having regard to further information given in the patent in suit (see e.g. T 409/91, OJ 1994, 653, reasons 3.5; T 435/91, OJ 1995, 188, reasons 2.2.1; T 1743/06, reasons 1.1).

In the case at issue, the claimed invention relates to a method of making a coated article having a sheet resistance R_s no greater than 20 ohms/square prior to heat treatment and a ΔE^* value (glass side) no greater than 3.5 after heat treatment.

Regarding the question of whether the above invention could be performed at the filing date of the application by a person skilled in the art, the board observes that the patent specification (paragraphs [0037] to [0039]) discloses ample details regarding the production of a coated article having the properties defined in the claimed subject-matter. Furthermore, in

examples 1, 2, 12, 13 and 15, the preparation of specific articles falling under the terms of the claimed-subject matter is extensively described.

The appellant's argument regarding an error in the figures (namely that figure 3 concerns the overcoat and figure 4 the undercoat) does not concern Article 83 EPC, since this error does not hinder the skilled person from reproducing the invention as detailed in paragraphs [0037] to [0039]. The appellant's remark concerning an alleged lack of improvement in terms of durability over the whole breadth of the claim also is not an issue of sufficiency of disclosure but is to be taken into consideration under the success of the solution when assessing inventive step. "Durability" furthermore is not a feature of the claim. The argument that the feature "sccm/kW" has no technical link with the degree of nitriding has not been supported by any technical evidence, and therefore it cannot be accepted.

Since the burden of proof is upon the opponent (here the appellant) to show that a skilled person was unable to carry out the invention, and since in the present case none of the examples have been reworked by the appellant to identify any information gap, in the absence of any evidence to the contrary the board has no reason to believe that the claimed method does not meet the requirements of Article 83 EPC.

9. Auxiliary request 7 - inventive step

Unlike the other requests on file, the board came to the conclusion that the subject-matter of the claims of this request involves an inventive step for the following reasons.

9.1 As to the definition of the invention, the closest prior art and the problem underlying the invention, see points 1.1 to 1.3 of the main request.

9.2 The solution to said problem consists in this request, as proposed in claim 1 at issue, of a process which in particular is characterised in that the bottom layer of the first and second metal inclusive layers comprises $NiCrN_x$ which is nitrided to some extent and that the top layer of the first and second metal inclusive layers is metallic.

9.3 As regards the success of the solution, by comparing the durability data of the samples in examples 9 and 10 (tape test: 0; brush test: 5 and 4, respectively; acid boil test: 5 and 5, respectively; scratch test: 2.5 and 2, respectively), which were prepared without nitriding the NiCr layer as in document D4, with those of the sample in example 12 (tape test: 0; brush test: 0; acid boil test: 3; scratch test: 1.5), which was prepared according to the claimed subject-matter, an improvement in terms of durability - the lower the values, the better the durability - is obtained. Table 5 of the patent furthermore displays good transmission values for the sample of example 12 and according to figure 3 a good colour stability is obtained (see the colour change on the Y-axis by taking 8 sccm/kW on the X-axis). It follows that the problem underlying the invention has effectively been solved.

9.4 As to the question of obviousness, it has to be determined whether the proposed solution was obvious to the skilled person in the light of the prior art, in particular in view of document D7, which the appellant held to be highly relevant at the oral proceedings.

D7 (page 2, line 56, to page 3, line 5) discloses a method for producing a durable thin-film contrast-improving filter on a transparent substrate. The method comprises the steps of sputtering a first dielectric layer onto the substrate; depositing a precoat layer; depositing a metal layer to a thickness such that the metal layer is substantially transmissive to visible light; depositing a postcoat layer; sputtering a second protective dielectric layer comprising silicon nitride onto the second metal precoat layer; and reactively sputtering a substantially transparent low-index material onto the second substantially transparent protective dielectric layer.

In the passage at page 3, line 55 to page 4, line 4, of D7, the pre- and postcoat layers are described as comprising an alloy of nickel and chromium, and in a preferred embodiment the precoat is described as comprising $NiCrN_x$.

The appellant argued that the description of a preferred embodiment in these specific terms implied that the postcoat would be metallic. For the board, this interpretation is not acceptable because nowhere in D7 has the combination of a precoat of $NiCrN_x$ with a metallic postcoat been disclosed. D7 moreover describes as a preferred embodiment the combination of a $NiCrN_x$ precoat with a $NiCrN_x$ postcoat (page 4, lines 40 to 45), and so it teaches away from the solution proposed in claim 1 at issue.

The other document cited in the appeal proceedings, namely D1, discloses (see point 1.6 above) the preparation of a durable, low-emissivity interference filter, but with **both** Ni-CrN_x films being nitrided.

So document D1 also teaches away from the solution proposed in claim 1 at issue.

For the board, the other documents in the proceedings do not disclose or suggest the solution as defined in claim 1 at issue.

9.5 For the reasons indicated above, the subject-matter of claim 1 and by the same token that of dependent claims 2 to 8, which include all the features of claim 1, involve an inventive step within the meaning of Article 56 EPC.

10. It follows from the above considerations that auxiliary request 7 complies with the EPC.

Since auxiliary request 7 is allowable, there is no need to deal with auxiliary requests 8 and 9.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the opposition division with the order to maintain the patent in amended form on the basis of auxiliary request 7 filed on 10 August 2012, the description and the figures having to be adapted as necessary.

The Registrar: The Chairman:

C. Vodz G. Raths

Decision electronically authenticated