Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 21 August 2025

Case Number: T 1671/23 - 3.3.10

Application Number: 17738457.5

Publication Number: 3404006

IPC: C07C17/25, C07C21/18, C07B61/00, C07C17/20

Language of the proceedings: EN

Title of invention:
METHOD FOR PRODUCING TRANS-1-CHLORO-3, 3, 3-TRIFLUOROPROPENE

Patent Proprietor:
Central Glass Company, Limited

Opponent:
ARKEMA FRANCE

Headword:

Relevant legal provisions:
EPC Art. 54, 56, 123(2)
RPBA 2020 Art. 11, 13(2)

Keyword:
Main request - Novelty - (yes)
Main request - Inventive step - (no)
Auxiliary requests 1-3, 1a, 2a, 3a - admission (no)
Auxiliary request 4 - added subject-matter (yes)
Remittal to the department of first instance - (no)

Decisions cited:
G 0009/92, G 0001/99

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0

Case Number: T 1671/23 - 3.3.10

D E C I S I O N
of Technical Board of Appeal 3.3.10
of 21 August 2025

Appellant: (Opponent)	ARKEMA FRANCE 51 Esplanade du Général de Gaulle La Défense 92800 Puteaux (FR)
Representative:	Bandpay & Greuter 11 rue Christophe Colomb 75008 Paris (FR)
Respondent: (Patent Proprietor)	Central Glass Company, Limited 5253 Oaza Okiube Ube-shi Yamaguchi 755-0001 (JP)
Representative:	Manitz Finsterwald Patent- und Rechtsanwaltspartnerschaft mbB Martin-Greif-Straße 1 80336 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 20 July 2023 concerning maintenance of the European Patent No. 3404006 in amended form.**

Composition of the Board:

Chairman	P. Gryczka
Members:	A. Zellner
	F. Blumer

Summary of Facts and Submissions

I. The opponent lodged an appeal against the decision of the opposition division to maintain the European patent No. 3 404 006 in amended form (Article 101(3)(a) EPC).

II. An opposition was filed on the basis of Article 100(a) EPC for lack of novelty and lack of inventive step (Articles 54 and 56 EPC).

III. During the opposition proceedings, the patent proprietor defended its patent in amended form. In the appealed decision, the opposition division held that the method according to claim 1 of the main request was novel in view of the disclosure of document D2, and based on an inventive step considering document D2 as closest prior art.

IV. According to the appellant, the opposition division erred in their decision when acknowledging that the subject-matter claimed in the main request was novel in view of the disclosure of document D2, and that it was based on an inventive step.

V. The following documents are referred to:

D2: GB 2 313 118 A
D3: EP 0 939 071 A1
D4: US 5,811,603 A
D5: US 2014/005446
D6: US 2015/011806 A1
D7: EP 2 341 040 A1
D8: US 6,018,084
D9: US 6,111,150
D10: US 6,198,010 B1

D13: WO 2011/112339 A2

VI. Claim 1 of the **main request** (patent as maintained by the opposition division) reads as follows (emphasis by the board):

"1. A production method of trans-1-chloro-3,3,3-trifluoropropene, comprising reacting a halogenated C_3 hydrocarbon compound represented by the following general formula (1) with hydrogen fluoride in a gas phase in the presence of a solid catalyst and chlorine

$$C_3H_XCl_YF_Z \quad (1)$$

wherein X is 2 or 3; when X = 2, Y is an integer of 1 to 4, Z is an integer of 0 to 3, and Y + Z = 4; and, when X = 3, Y is an integer of 1 to 5, Z is an integer of 0 to 4, and Y + Z = 5; provided that the general formula (1) represents any halogenated C_3 hydrocarbon compound other than trans-1-chloro-3,3,3-trifluoropropene,

wherein the solid catalyst is a metal fluoride containing at least one kind of metal selected from the group consisting of aluminum, chromium, titanium, manganese, iron, nickel, cobalt, copper, magnesium, zirconium, molybdenum, zinc, tin, lanthanum, niobium, tantalum and antimony,

wherein the molar ratio of the halogenated C_3 hydrocarbon compound and chlorine fed into the reaction system is in a range of 1/0.01 to 1/0.05."

VII. Claim 1 of auxiliary requests 1 to 3 have the following wording (emphasis by the board):

- Auxiliary request 1:

"1. A production method of trans-1-chloro-3,3,3-trifluoropropene, comprising reacting a halogenated C_3 hydrocarbon compound represented by the following general formula (1) with hydrogen fluoride in a gas phase in the presence of a solid catalyst and chlorine

$$C_3H_XCl_YF_Z \quad (1)$$

wherein X is 2 or 3; when X = 2, Y is an integer of 1 to 4, Z is an integer of 0 to 3, and Y + Z = 4; and, when X = 3, Y is an integer of 1 to 5, Z is an integer of 0 to 4, and Y + Z = 5; provided that the general formula (1) represents any halogenated C_3 hydrocarbon compound other than trans-1-chloro-3,3,3-trifluoropropene,

wherein the solid catalyst is a metal fluoride containing at least one kind of metal selected from the group consisting of aluminum, chromium, titanium, manganese, iron, nickel, cobalt, copper, magnesium, zirconium, molybdenum, zinc, tin, lanthanum, niobium, tantalum and antimony,

wherein the reaction is performed at a temperature of 100°C to 300°C."

- Auxiliary request 2:

"1. A production method of trans-1-chloro-3,3,3-trifluoropropene, comprising reacting a halogenated C_3 hydrocarbon compound represented by the following general formula (1) with hydrogen fluoride in a gas phase in the presence of a solid catalyst and chlorine

$C_3H_XCl_YF_Z$ (1)

wherein X is 2 or 3; when X = 2, Y is an integer of 1 to 4, Z is an integer of 0 to 3, and Y + Z = 4; and, when X = 3, Y is an integer of 1 to 5, Z is an integer of 0 to 4, and Y + Z = 5; provided that the general formula (1) represents any halogenated C_3 hydrocarbon compound other than trans-1-chloro-3,3,3-trifluoropropene,

wherein the solid catalyst is a metal fluoride containing at least one kind of metal selected from the group consisting of aluminum, chromium, titanium, manganese, iron, nickel, cobalt, copper, magnesium, zirconium, molybdenum, zinc, tin, lanthanum, niobium, tantalum and antimony,

wherein the reaction comprises the following steps:

(A) reacting 1,1,1,3,3-pentachloropropane with hydrogen fluoride, thereby obtaining an intermediate product;
(B) forming trans-1-chloro-3,3,3-trifluoropropene by reacting the intermediate product obtained in the step (A) with hydrogen fluoride at a temperature of 100°C to 400°C in a gas phase in the presence of the solid catalyst and chlorine,

wherein, in the step (A), the reacting is performed in a liquid phase in the absence of a catalyst, and

wherein the production method further comprises: recovering, from the step (A), a reaction product gas containing trans-1-chloro-3,3,3-trifluoropropene and a reaction solution; and using, in the step (B), the intermediate product contained in the reaction solution."

- Auxiliary request 3:

"1. A production method of trans-1-chloro-3,3,3-trifluoropropene, comprising reacting a halogenated C_3 hydrocarbon compound represented by the following general formula (1) with hydrogen fluoride in a gas phase in the presence of a solid catalyst and chlorine

$$C_3H_XCl_YF_Z \quad (1)$$

wherein X is 2 or 3; when X = 2, Y is an integer of 1 to 4, Z is an integer of 0 to 3, and Y + Z = 4; and, when X = 3, Y is an integer of 1 to 5, Z is an integer of 0 to 4, and Y + Z = 5; provided that the general formula (1) represents any halogenated C_3 hydrocarbon compound other than trans-1-chloro-3,3,3-trifluoropropene,

wherein the solid catalyst is a metal fluoride containing at least one kind of metal selected from the group consisting of aluminum, chromium, titanium, manganese, iron, nickel, cobalt, copper, magnesium, zirconium, molybdenum, zinc, tin, lanthanum, niobium, tantalum and antimony,

wherein the reaction comprises the following steps:

(A) reacting 1,1,1,3,3-pentachloropropane with hydrogen fluoride, thereby obtaining an intermediate product;
(B) forming trans-1-chloro-3,3,3-trifluoropropene by reacting the intermediate product obtained in the step (A) with hydrogen fluoride at a temperature of 100°C to 400°C in a gas phase in the presence of the solid catalyst and chlorine,

wherein, the intermediate product contains at least 1,3,3-trichloro-1,1-difluoropropane."

VIII. Claim 1 of **auxiliary requests 1a, 2a and 3a** is based on claim 1 of auxiliary requests 1 to 3, respectively, and has the following additional feature:

"... wherein the molar ratio of the halogenated C_3 hydrocarbon compound and chlorine fed into the reaction system is in a range of 1/0.01 to 1/0.05."

IX. Claim 1 of **auxiliary request 4** has the following wording (emphasis by the board):

"1. A production method of trans-1-chloro-3,3,3-trifluoropropene, comprising reacting a halogenated C_3 hydrocarbon compound represented by the following general formula (1) with hydrogen fluoride in a gas phase in the presence of a solid catalyst and chlorine

$$C_3H_XCl_YF_Z \quad (1)$$

wherein X is 2 or 3; when X = 2, Y is an integer of 1 to 4, Z is an integer of 0 to 3, and Y + Z = 4; and, when X = 3, Y is an integer of 1 to 5, Z is an integer of 0 to 4, and Y + Z = 5; provided that the general formula (1) represents any halogenated C_3 hydrocarbon compound other than trans-1-chloro-3,3,3-trifluoropropene,

wherein the halogenated C3 hydrocarbon compound contains at least 1,1,3,3- tetrachloro-1-fluoropropane, 1,3,3-trichloro-1,1-difluoropropane and 3,3-dichloro-1,1,1- trifluoropropane,

wherein the solid catalyst is a metal fluoride

containing at least one kind of metal selected from the group consisting of aluminum, chromium, titanium, manganese, iron, nickel, cobalt, copper, magnesium, zirconium, molybdenum, zinc, tin, lanthanum, niobium, tantalum and antimony, ***and***

wherein the molar ratio of the halogenated C_3 hydrocarbon compound and chlorine fed into the reaction system is in a range of 1/0.01 to 1/0.05."

X. The board issued a communication with its preliminary opinion on the legal and factual issues of the case.

XI. Oral proceedings were held on 21 August 2025. At the end of the proceedings, the decision was announced.

XII. The appellant's arguments can be summarised as follows:

The method according to claim 1 of the main request is not novel, and not based on an inventive step in view of the disclosure of document D2. Auxiliary requests 1 to 3 are not to be admitted into the appeal proceedings, because of the principle of prohibition of *reformatio in peius*. Auxiliary requests 1a, 2a and 3a should not be admitted into the proceedings, because they were late filed and there were no exceptional circumstances justifying their filing at this late stage of the proceedings. Auxiliary request 4 was not allowable because it did not meet the requirements of Article 123(2) EPC.

XIII. The respondent's arguments can be summarised as follows:

The method according to claim 1 of the main request is novel, and is also based on an inventive step in view

of the disclosure of document D2. The differing features led to an improvement of the production of the target compound 1233zd. This improvement could not have been foreseen and the claimed method is thus inventive. Auxiliary requests 1 to 3 have already been submitted at the beginning of the opposition proceedings and were thus already part of the proceedings. Not admitting them would violate the respondent's right to be heard. Auxiliary requests 1a, 2a and 3a were a reaction to the board of appeal's preliminary opinion expressed in the board's communication under Article 15(1) RPBA, and should thus be admitted into the appeal proceedings. These requests did also overcome the issue of prohibition of *reformatio in peius*. Auxiliary request 4 was allowable. Amended claim 1 was based on the application as filed.

XIV. The appellant (opponent) requests that the decision under appeal be set aside and that the European patent No. 3 404 006 be revoked. The appellant further requests that none of the auxiliary requests 1 to 3, 1a, 2a and 3a be admitted into the proceedings.

XV. The respondent (patent proprietor) requests

- that the appeal be dismissed (*i.e.* that the patent be maintained as maintained by the opposition division);
- as an auxiliary measure, that the case be remitted to the opposition division;
- as further auxiliary measures, that the patent be maintained on the basis of one of auxiliary requests 1 to 4, filed with the response to the grounds of appeal, or one of auxiliary requests 1a, 2a and 3a, filed on 23 July 2025.

The respondent further requests that the inventive step attacks based on D4, D5 and D6 as closest prior art as well as the novelty and inventive step objections against auxiliary requests 1 to 4 not be admitted into the proceedings.

Reasons for the Decision

1. The appeal is admissible.

Main request (patent as maintained by the opposition division)

Novelty (Article 54 EPC)

2. The opposition division came to the conclusion that claim 1 of the main request was novel in view of the disclosure of document D2. The opposition division in particular referred to the method for the production of 1233zd from 240fa, as disclosed in claim 20 of D2. According to the opposition division, the skilled person had to perform two selections in order to arrive at the claimed method, *i.e.* select the *"mixed catalyst"* disclosed in claim 28, and select chlorine rather than oxygen, including the molar ratio of the halogenated C_3 hydrocarbon compound to chlorine as disclosed on page 10, lines 21 to 24 and claim 27 of D2.

3. The appellant submitted, in particular by reference to pages 7 to 9 document D2, that claim 1 of the main request was not novel. According to the appellant, D2 disclosed that the fluorination catalysts (either chromium oxide or mixed catalysts containing chromium oxide and nickel fluoride) used in the reaction step were activated with hydrogen fluoride. This converted the metal oxides to the corresponding metal fluorides (pages 8 to 9, examples 1 to 7 and 8 to 12 of D2). The

appellant concluded, by reference to paragraphs [0050], [0051] and [0069] of the patent in dispute, that both types of catalysts disclosed in D2 were catalysts according to claim 1 of the main request, because the HF activation inevitably led to a metal fluoride catalyst containing at least one of the metals listed in claim 1, *i.e.* nickel fluoride or chromium fluoride. As a consequence, no catalyst selection was necessary. The only choice to be made was that chlorine rather than oxygen should be present in the reaction step. The appellant further argued, by reference to page 10, line 21 to page 11, line 1 of D2, that the selection of chlorine would necessarily also result in the molar ratio of the C_3 hydrocarbon to chlorine according to claim 1 of the main request, and that the range according to claim 1 of the main request did overlap to a large extent with the range disclosed in D2.

4. The respondent argued that the skilled person had to select between two distinctive types of catalysts, to select whether a gas should be present in the reaction, and whether the gas should be chlorine rather than oxygen. A further selection had to be made with respect to the molar ratio of the halogenated C_3 hydrocarbon to chlorine (after having selected this gas). Due to these multiple selections, D2 did not disclose the method according to claim 1 of the main request. The respondent further argued, by reference to paragraph [0050] of the disputed patent, that the activation by HF did not necessarily lead to a fully fluorinated catalyst.

5. The board comes to the following conclusions:

5.1 Document D2 discloses a 2-step process for the preparation of 1,1,1,3,3-pentafluoropropane (245fa) by

fluorination of 1,1,1,3,3-pentachloropropane (240fa). In the first step of the process, 240fa (a compound of formula (1) according to claim 1 of the main request) is converted to trans-1-chloro-3,3,3-trifluorpropene (1233zd) - which is the final product of the method according to claim 1 of the main request - by catalytic fluorination with HF (see page 6, lines 23 to 28, page 7, lines 9 to 19 and page 7, lines 19 to 23). This was undisputed.

5.2 The parties also agreed that document D2 does not disclose an example for the production method of 1233zd in the presence of either chlorine or oxygen. Document D2 does disclose that it may be advantageous to operate with a small amount of oxygen or chlorine (see page 10, lines 21 to page 11, line 8 and claim 27). The document also discloses that the presence of oxygen or chlorine may be advantageous with certain catalysts under certain conditions. The document does not disclose, however, which gas may be selected for which type of catalyst and for which reaction conditions (see page 10, lines 21 to 24).

5.3 A first selection thus has to be made in order to arrive at the claimed method, *i.e.* the selection of chlorine.

5.4 The parties disagreed whether the combination of chlorine and *"... the molar ratio of the halogenated C_3 hydrocarbon compound and chlorine fed into the reaction system (...) in a range of 1/0.01 to 1/0.05 ..."* was disclosed in document D2, or not.

5.5 The board comes to the conclusion that the feature relating to the molar ratio of the halogenated C3 hydrocarbon compound to chlorine fed into the rector

does not contribute to novelty. Document D2 discloses that the amount of oxygen or chlorine used, with respect to the 240fa feeding into the reaction, can vary between 0.1 and 5 molar % (see page 10, line 24 to page 11, line 1). This, undisputedly, corresponds to a molar ratio of 240fa to chlorine in a range of 1/0.001 to 1/0.05. The corresponding range according to claim 1 of the main request is 1/0.01 to 1/0.05. The claimed range falls completely within the range disclosed in D2. It furthermore covers most of the range disclosed in D2. Furthermore, the endpoint of 1/0.05 is explicitly disclosed in D2.

5.6 The molar ration defined in the claim is thus disclosed in document D2 in combination with the presence of chlorine, and is thus not a differentiating feature.

5.7 The parties also disagreed whether all of the catalysts disclosed in document D2 fall within the definition according to claim 1 of the main request, *i.e.* a solid catalysts which is a metal fluoride containing at least one kind of metal selected from a list.

5.8 The board notes that D2 differentiates between several types of catalysts, either with respect to the prior art cited therein, or concerning the catalysts used in the invention according to D2. Such a catalyst is in particular a catalyst based on chromium oxide, or a mixed catalyst containing chromium oxide and nickel fluoride (see claim 28 and page 8, line 17 to page 9, line 3). It is correct, as submitted by the appellant, that D2 discloses the activation of all catalysts by fluorination with HF. Document D2 also discloses that during this activation, the metal oxides can be partially or completely converted to the corresponding fluorides (see page 9, lines 10 to 14). Activation thus

converts the metal oxide either to only partially fluorinated metal oxides, or to a metal fluoride. This disclosure of D2 is in line with paragraph [0049] of the patent in dispute (see also paragraphs [0050], [0051] and [0069]). Accordingly, document D2 teaches that, although the metal catalysts, such as chromium or nickel oxide according to claim 28, are activated by HF, this does not necessarily convert them completely to a metal fluoride, but can also lead to partially fluorinated metal oxides. Claim 1 of the main request, however, requires a catalyst which **is** a metal fluoride containing at least one kind of metal selected from a list. A partially fluorinated metal oxide catalyst is different from a metal fluoride catalyst.

5.9 As a result, a catalyst according to claim 1 of the main request has to be selected from the catalysts disclosed in the description of document D2. The selection of chlorine, the selection of a catalyst according to claim 1, and the combination of these features leads to a method which is novel in view of the method disclosed in document D2.

6. The board thus comes to the conclusion that the main request meets the requirements of Article 54 EPC.

Inventive step (Article 56 EPC)

7. The opposition division held that claim 1 of the main request was based on an inventive step considering the disclosure of document D2 as closest prior art. Two differing features were identified, *i.e.* the catalyst and the presence of chloride in the molar ratio according to claim 1. Since no technical effect was shown for these features, the technical problem was considered to provide an alternative process for the

manufacturing of trans-1-chloro-3,3,3-trifluoropropene. The opposition division concluded that the solution provided according to claim 1 was inventive considering the technical teaching of D2 alone, or in combination with the disclosure of documents D4 to D10 and D13.

8. The appellant argued that either of documents D2 or D3 could be considered closest prior art. Considering D2, the differing features were only those identified by the opposition division. The appellant also concurred with the opposition division that no technical effect was shown and that the technical problem was the provision of an alternative method for the preparation of trans-1-chloro-3,3,3-trifluoropropene (1233zd). The appellant concluded that the skilled person would consider the presence of chlorine in the process disclosed in example 1 of document D2, and would thus provide a method according to claim 1 following the suggestion on page 10, lines 22 to 24 of D2. The appellant further argued that, even if a technical effect - such as an increase in the yield of 1233zd - was caused by the presence of chlorine, the solution according to claim 1 was still obvious, because D2 (page 11, lines 3 to 8) suggested to add chlorine as deactivation inhibitors for the catalysts used in the process.

9. The respondent argued that document D3 was more distant to the claimed invention that D2. The respondent further argued, by reference to comparative example 1, examples 5 and 6 and figures 2 and 3 of the patent in dispute, that the presence of chlorine during the reaction led to an increased yield of 1233zd. This was due to maintaining the catalytic activity of the catalyst over a longer time in case chlorine was present. Table 4 (comparative example 1) furthermore

not only taught that the amount of 1233zd dropped as soon as the supply of chlorine into the reaction stopped, but also that starting material (243fa, 242fa and 241fa) was consumed at a lower rate, which indicated side reactions. The technical problem was thus the provision of an improved method to efficiently form 1233zd, having increased selectivity, from a mixture of starting materials of low reactivity. Reference was made to paragraphs [0034] and [0035] of the patent in dispute. The claimed solution was inventive, because document D2 did not provide any hint why the specific catalysts should be used, and why chlorine should be added during the reaction. The document was rather vague with respect to the use of specific catalysts under certain conditions, as disclosed in lines 21 to 22 on page 10. The respondent further argued, by reference to page 11, lines 3 to 8 of D2, that the use of chlorine was known to have disadvantages, and D2 furthermore disclosed in lines 19 to 24 of page 14 the use of chlorine for specific catalysts only, which were different from the catalysts used in the claimed method. The respondent also submitted that there was no link between example 1 of document D2 and the addition of chlorine during the reaction.

10. The board comes to the following conclusions:

The patent in dispute

10.1 The patent relates to a method for producing trans-1-chloro-3,3,3-trifluorpropene (1233zd) from a halogenated C3 hydrocarbon compound of formula (1), such as 1,1,1,3,3-pentachloropropane (240fa), in a fluorination process catalysed by a solid catalyst and in the presence of chlorine (see paragraphs [0001],

[0006], [0012] and [0013]). The patent addresses the possibility of using products of low reactivity as starting materials while preventing a decrease of catalytic activity, and thus allowing to achieve the target product in an efficient way (see paragraphs [0034] and [0035]).

The closest prior art

10.2 Both parties concur with the opposition division that document D2 is suitable as closest prior art. The board sees no reason to differ. The document relates *i.a.* to the fluorination of 1,1,1,3,3-pentachloropropane (240fa, a compound of formula (1) according to claim 1 of the main request) to obtain trans-1-chloro-3,3,3-trifluorpropene (1233zd), the final product of the method according to claim 1 of the main request, by catalytic fluorination with HF (see page 6, lines 23 to 28, page 7, lines 9 to 19 and page 7, lines 19 to 23).

The differing feature

10.3 The method according to claim 1 of the main request differs from the disclosure of document D2 in that it requires the selection of a solid metal fluoride catalyst and the presence of chlorine during the reaction (see point 5.9 of this decision).

The technical problem

10.4 The board notes that no particular technical effect has been shown or relied upon by the respondent with respect to the catalyst used in the claimed method.

10.5 The respondent argued, by reference to comparative example 1 and examples 5 and 6 of the patent in

dispute, that the presence of chlorine during the reaction led to retaining the catalytic activity of the solid catalyst over a longer time period and thus to an increase in yield of 1233zd.

10.6 The patent in dispute discloses in comparative example 1 (see paragraphs [0111] and [0112]) the preparation of 1233E (1233zd) from a composition comprising compounds of formula (1) by fluorination with HF in the presence of chlorine. The supply of chlorine was stopped after one hour. According to table 4, the initial amount of 1233zd during the first hour of the reaction, *i.e.* in the presence of chlorine, of 74.35 GC area% is reduced to 69.67 and 61.78 GC area% after 8 and 16 hours, respectively. Further, the amount of starting compounds of formula (1), *i.e.* 243fa and 242fa, in the reaction product mix increases after no more chloride was supplied to the reaction.

10.7 Furthermore, the patent in dispute discloses in examples 5 and 6 that the yield of 1233zd remains constant over a period of 60 or 50 hours, respectively, if chlorine is supplied to the reaction mixture (see figures 2 and 3).

10.8 These results demonstrate that, due to the presence of chlorine during the fluorination reaction, the production of 1233zd remains at the initial level over a certain period of time, and thus to an overall increase in the production of 1233zd, compared to a reaction where chlorine is supplied only for a limited time.

10.9 The technical problem can thus be seen in the provision of an improved production method for 1233zd.

The claimed solution

10.10 The board notes that it has not been shown the technical problem as defined above is solved by the presence of the selected catalyst, i.e. *"...a solid catalyst which is a metal fluoride containing at least one kind of metal selected from the group consisting of aluminum, chromium, titanium, manganese, iron, nickel, cobalt, copper, magnesium, zirconium, molybdenum, zinc, tin, lanthanum, niobium, tantalum and antimony ..."*, since there is no evidence for any influence of such a catalyst (see point 10.4 of this decision). This feature is therefore not part of the claimed solution.

10.11 Therefore the solution according to claim 1 of the main request, is a production method of 1233zd characterised by the presence of chlorine.

10.12 The claimed solution solves the technical problem, as demonstrated by comparative example 1 and examples 5 and 6 of the patent in dispute (see above).

Obviousness of the claimed solution

10.13 Document D2 discloses that it may be advantageous to operate the reaction of 240fa with HF (see page 9, line 19 ff) in the presence of oxygen or chlorine in an amount according to claim 1 of the main request (see point 5.5 of this decision). D2 further discloses that the presence of such gases improves the lifetime of the catalyst (see page 10, lines 21 to page 11, line 1). It was undisputed that this leads to a more consistent formation of 1233zd over a longer period, such as demonstrated for examples 5 and 6 of the patent in dispute (see also figures 2 and 3). Considering this teaching of D2, the skilled person can be expected to

provide a production method comprising reacting a halogenated C_3 hydrocarbon compound of formula (1) with hydrogen fluoride in a gas phase - as disclosed in document D2 - in the presence a catalyst in an amount as defined in claim 1, and in the presence of chlorine, when looking for a method for solving the technical problem defined above.

10.14 The respondent argued, by reference to page 11, lines 3 to 8, that document D2 dissuaded the skilled person from using chlorine or oxygen, because this was not without disadvantages for the selectivity of the reaction due to their effect as catalyst deactivation inhibitors. The document also suggested to use these gases in amounts as low as possible.

10.15 This argument is not convincing. It is correct that document D2 suggests to use either chlorine or oxygen in small amounts. It is also correct, however, that the document suggests an amount from which the amount according to claim 1 does not differ (see point 5.5 of this decision). It is also correct that D2 suggests that the use of chlorine or oxygen is not without disadvantages for the selectivity of the reaction. This teaching, however, will merely make the skilled person aware to add the gases mentioned with care, and in the specified amount, but not completely avoid using them.

11. The method according to claim 1 of the main request is, for these reasons, not based on an inventive step starting from document D2 as closest prior art. The main request is not allowable (Article 56 EPC). It is therefore not necessary to also evaluate inventive step considering the disclosure of document D3 as closest prior art.

Request for remittal to the opposition division

12. The respondent requested to remit the case to the opposition division if the main request cannot be granted. Although, as submitted by the respondent, the auxiliary requests contain additional features which may not have been taken into account by the opposition division when deciding on novelty and inventive step, the board does not consider this to be a special reason within the meaning of Article 11 RPBA for remitting the case to the opposition division. The board comes to the conclusion that the request for remittal cannot be granted.

Auxiliary requests 1 to 3

13. Auxiliary requests 1 to 3 were first filed during the opposition proceedings on 29 November 2021, and refiled with the respondent's reply to the statement setting out the grounds of appeal. Since the opposition division decided that the main request fulfilled the requirements of the EPC, it did not have to take a decision on the admissibility and allowability of these requests.

14. The appellant, by reference to G 9/92, argued that these requests should not be admitted into the proceedings, as their admittance would violate the principle of the prohibition of *reformatio in peius*, because the appellant would be put in a worse position than if they had not appealed. The appellant further argued that the respondent's main request was allowed by the opposition division and that there is no reason to defend the patent in a broader form during the appeal proceedings than the main request then pending.

15. The respondent argued that auxiliary requests 1 to 3 were already filed during the opposition proceedings and that there was no legal basis for not admitting them into the appeal proceedings. There was no case law of the Enlarged Board of Appeal covering the present situation, *i.e.* a situation where the patent proprietor was not adversely affected by the decision of the opposition division and could thus not file an appeal. The respondent submitted that a referral to the Enlarged Board of Appeal could thus be envisaged. The respondent furthermore submitted that it should be allowed to file a limited cross-appeal, and that its right to be heard would be violated in case the board refused to examine the auxiliary requests on their merits.

16. The board comes to the following conclusions:

16.1 Claim 1 of auxiliary requests 1 to 3 differs from claim 1 of the main request - on the basis of which the patent has been maintained by the opposition division - in that the feature

*"... wherein the molar ratio of the halogenated C_3 hydrocarbon compound and chlorine fed into the reaction system is in a range of 1/0.01 to 1/0.05 ..." (**main request**)*

has been deleted and replaced by the features:

"... wherein the reaction is performed at a temperature of 100°C to 300°C ..." (**auxiliary request 1**), or

"... wherein the reaction comprises the following steps:
(A) reacting 1,1,1,3,3-pentachloropropane with hydrogen

fluoride, thereby obtaining an intermediate product; (B) forming trans-1-chloro-3,3,3-trifluoropropene by reacting the intermediate product obtained in the step (A) with hydrogen fluoride at a temperature of 100°C to 400°C in a gas phase in the presence of the solid catalyst and chlorine,
wherein, in the step (A), the reacting is performed in a liquid phase in the absence of a catalyst, and wherein the production method further comprises: recovering, from the step (A), a reaction product gas containing trans-1-chloro-3,3,3-trifluoropropene and a reaction solution; and using, in the step (B), the intermediate product contained in the reaction solution ..." (**auxiliary request 2**), or

"... wherein the reaction comprises the following steps:
(A) reacting 1,1,1,3,3-pentachloropropane with hydrogen fluoride, thereby obtaining an intermediate product; (B) forming trans-1-chloro-3,3,3-trifluoropropene by reacting the intermediate product obtained in the step (A) with hydrogen fluoride at a temperature of 100°C to 400°C in a gas phase in the presence of the solid catalyst and chlorine,
wherein, the intermediate product contains at least 1,3,3-trichloro-1,1-difluoropropane ..." (**auxiliary request 3**), respectively.

16.2 Each of the claims of the auxiliary requests 1 to 3 is directed to a method wherein a feature of claim 1 of the main request has been deleted. As a consequence, the claimed methods are less limited in a certain aspect, in particular with respect to the molar ratio of the halogenated C_3 hydrocarbon compound and chlorine fed into the reaction system. This was undisputed.

16.3 Since the method according to claim 1 of auxiliary requests 1 to 3 is broader than the claimed method as maintained by the opposition division, admitting these requests in the appeal proceedings would be contrary to the principle of prohibition of *reformatio in peius*. These requests are therefore not admitted in the appeal proceedings.

16.4 The respondent submitted that there was no case law of the Enlarged Board of Appeal covering the present situation, *i.e.* a situation where the patent proprietor was not adversely affected by the decision of the opposition division and could thus not file an appeal, a referral to the Enlarged Board of Appeal could thus be envisaged. The respondent did not suggest a particular wording for a question to be referred to the Enlarged Board of Appeal.

16.5 The board notes that the question whether the situation referred to by the respondent has already been dealt with by the Enlarged Board of Appeal in G 9/92 (see Headnote 2) and thus does not deem it necessary to refer a question to the Enlarged Board of Appeal.

16.6 The respondent furthermore submitted that it should be allowed to file a limited cross-appeal, and that its right to be heard would be violated in case the board refused to examine the auxiliary requests on their merits.

16.7 The board notes, as acknowledged by the respondent, that the EPC does not provide a basis for a patent proprietor, who has not filed an appeal and is therefore only party as of right to the proceedings under Article 107 EPC, to file a cross-appeal without limit of time (see G 9/92, point 16 of the reasons for

the decision). The respondent in the present case is not adversely affected by the decision of the opposition division.

16.8 The respondent also submitted, by reference to G 1/99, that there were exceptions to the prohibition of *reformatio in peius*, and that this principle was not enshrined in the EPC.

16.9 The board notes that the exceptions referred to by the respondent and set out in G 1/99 only concern amendments made to the patent during opposition proceedings (in particular, the addition of features) which were allowed by the opposition division but found to be unallowable under Article 123(2) EPC during appeal proceedings. In G 1/99, the Enlarged Board only addressed the question whether and under what circumstances a deletion of a limiting feature added during opposition proceedings is permissible (Reasons, point 2.3; see also Headnote paragraph 1).

16.10 In the present case, however, the substantive issues in relation to the auxiliary requests do not concern amendments as addressed in G 1/99. The feature removed from claim 1 in auxiliary requests 1a, 2a and 3a has not been objected to under Article 123(2) EPC in the appeal proceedings.

16.11 Even if G 1/99 was applicable to the deletion of the molar ratio in the present case, said deletion could not be allowed in view of the Enlarged Board's decision. The three conditions under which G 1/99 allows exceptions from the prohibition of *reformatio in peius* are subject to a strict hierarchy. A deletion which would constitute a *reformatio in peius* can be allowed under G 1/99 (emphasis by the board):

- **in the first place**, for an amendment introducing one or more originally disclosed features which limit the scope of the patent as maintained;
- **if such a limitation is not possible**, for an amendment introducing one or more originally disclosed features which extend the scope of the patent as maintained, but within the limits of Article 123(3) EPC;
- **finally, if such amendments are not possible**, for deletion of the inadmissible amendment, but within the limits of Article 123(3) EPC.

The respondent chose the third option without giving any explanation why the first and second options were not possible.

16.12 The board also notes that, although there are no provisions for the prohibition of *reformatio in peius* in the EPC, the board does not see any reason not to follow the decision G 9/92 of the Enlarged Board of Appeal in this respect.

17. The respondent's submissions concerning the alleged violation of its right to be heard will be dealt with in point 21. of this decision.

Auxiliary requests 1a, 2a and 3a

18. Auxiliary requests 1a, 2a and 3a were filed on 23 July 2025 and thus after the board issued a communication pursuant to Article 15(1) RPBA. According to Article 13(2) RPBA, any amendment to a party's case made after notification of a communication under Article 15(1) RPBA shall, in principle, not be taken into account unless there are exceptional circumstances, which have been justified with cogent reasons by the party

concerned.

19. In the present case there are - for the following reasons - no exceptional reasons which would justify the admittance of auxiliary requests 1a, 2a or 3a.

19.1 Claim 1 of auxiliary requests 1a, 2a and 3a differs from claim 1 of auxiliary requests 1 to 3, respectively, in that the feature "*... wherein the molar ratio of the halogenated C_3 hydrocarbon compound and chlorine fed into the reaction system is in a range of 1/0.01 to 1/0.05 ...*", which is present in claim 1 of the main request, has been re-introduced. According to the respondent, auxiliary requests 1a, 2a and 3a were filed as a reaction to the appellant's objection regarding the prohibition of *reformatio in peius* with respect to auxiliary requests 1 to 3.

19.2 This objection, however, has already been raised for the first time in the appellant's letter submitted on 12 July 2024 in reply to the respondent's reply to the statement setting out the grounds of appeal submitted on 15 March 2024.

19.3 In reaction to this objection, the respondent submitted on 14 October 2024 that the objection was not justified. No auxiliary requests were filed at that stage of the proceedings.

19.4 Only after the board's communication pursuant to Article 15(1) RPBA, containing the board's preliminary opinion that the patent may not be maintained on the basis of any of auxiliary requests 1 to 3 due to the principle of prohibition of *reformatio in peius* (see point 25 of the board's communication of 11 July 2025), did the respondent file the auxiliary requests 1a, 2a

and 3a. Filing of these requests at this stage of the appeal proceedings cannot be seen as a timely reaction to the appellant's objection.

20. The board, for these reasons, decides not to admit auxiliary requests 1a, 2a and 3a into the appeal proceedings (Article 13(2) RPBA).

Objection under Rule 106 EPC - auxiliary requests 1 to 3, 1a, 2a and 3a - right to be heard

21. The respondent submitted that the non-admittance of auxiliary requests 1 to 3 and auxiliary requests 1a, 2a and 3a into the proceedings violated its right to be heard.

22. The respondent's right to be heard is not violated. The board considered the parties' arguments concerning the auxiliary requests 1 to 3, 1a, 2a and 3a and came to the conclusion that a patent can not be maintained on the basis of auxiliary requests 1 to 3, and that auxiliary requests 1a, 2a and 3a cannot be admitted into the proceedings (see above). A party's right to be heard is not violated merely because a board does not examine a particular request on its merits, but only questions of admissibility or the prohibition of *reformatio in peius*, as in the present case.

Auxiliary request 4 - Amendments (Article 123(2) EPC)

23. Claim 1 of auxiliary request 4 differs from claim 1 as filed (reference in the following is made to the application as published, *i.e.* EP 3 404 006 A1) in that it contains the additional features:

"...wherein the halogenated C_3 hydrocarbon compound

contains at least 1,1,3,3- tetrachloro-1-fluoropropane, 1,3,3-trichloro-1,1-difluoropropane and 3,3-dichloro-1,1,1- trifluoropropane, ...",

"... wherein the solid catalyst is a metal fluoride containing at least one kind of metal selected from the group consisting of aluminum, chromium, titanium, manganese, iron, nickel, cobalt, copper, magnesium, zirconium, molybdenum, zinc, tin, lanthanum, niobium, tantalum and antimony, and ..."

"... wherein the molar ratio of the halogenated C_3 hydrocarbon compound and chlorine fed into the reaction system is in a range of 1/0.01 to 1/0.05."

It differs from claim 1 of the main request only by the first of these features, *i.e.*

"...wherein the halogenated C_3 hydrocarbon compound contains at least 1,1,3,3- tetrachloro-1-fluoropropane, 1,3,3-trichloro-1,1-difluoropropane and 3,3-dichloro-1,1,1- trifluoropropane, ...".

24. The appellant argued that claim 1 of auxiliary request 4 did not find a basis in the application as filed. The appellant in particular referred to the combination of the features relating to the C_3 hydrocarbon compound and to the molar ratio of the halogenated C_3 hydrocarbon and chlorine fed into the reaction system.

25. The respondent submitted that claim 1 was based on claims 1, 2 and 4 as filed, as well as table 1 of the description, which provided a pointer to the combination of halogenated C_3 hydrocarbons.

26. The board comes to the following conclusions:

26.1 Claim 1 of auxiliary request 4 contains the features of claims 1 and 2, as well as paragraph [0071] of the application as filed. This combination of features is identical to claim 1 of the main request, and - undisputedly - finds support in the application as filed.

26.2 In addition, the claim also contains the feature directed to the nature of halogenated C_3 hydrocarbons. The respondent referred to table 1 and claim 4 of the application as filed.

26.3 Table 1 discloses a composition *"Fraction"* containing 3.93 GC area% 243fa (3,3-dichloro-1,1,1-trifluoropropane), 54.80 GC area% 242fa (1,3,3-trichloro-1,1-difluoropropane) and 25.84 GC area% 241fa (1,1,3,3- tetrachloro-1-fluoropropane) (see paragraphs [0097] and [0017]). This composition is used as a raw material (*i.e.* a liquid composition containing a halogenated C_3 hydrocarbon) in the examples of the patent in dispute (see paragraph [0096]).

26.4 Neither claim 4 nor table 1, however, provide a basis for claim 1 of auxiliary request 4. According to claim 4 of the application as filed, the halogenated C_3 hydrocarbon compound used in the production method is at least one selected from the group consisting of a large number of compounds. This list contains the three compounds 243fa, 242fa and 241fa. However, there is no disclosure for the selection of at least these three compounds, and their combination. Table 1, on the other hand, provides a basis for the selected compounds, but only in a certain ratio. Furthermore, claim 1 of auxiliary request 4 does not limit the halogenated C_3

hydrocarbon compounds to only those disclosed in table 1, since the halogenated C_3 hydrocarbon compounds contain at least 243fa, 242fa and 241fa, but is not limited to the combination of these compounds. The claim does thus not exclude compositions comprising further halogenated C_3 hydrocarbon compounds, which is not the case for the *"Fraction"* referred to in table 1.

27. Auxiliary request 4 is, for these reasons, not allowable (Article 123(2) EPC).

Conclusion

28. Since the main request does not meet the requirements of Article 56 EPC, auxiliary requests 1 to 3, 1a , 2a and 3a are not admitted into the appeal proceedings, and since auxiliary request 4 does not meet the requirements of Article 123(2) EPC, the patent cannot be maintained on the basis of any of these requests. Furthermore, the respondent's request for remittal to the opposition division cannot be granted. The patent thus has to be revoked.

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:

C. Rodríguez Rodríguez P. Gryczka

Decision electronically authenticated