

PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, DC

In the Matter of

**CERTAIN R-134a COOLANT
(OTHERWISE KNOWN AS 1,1,1,2-
TETRAFLUOROETHANE)**

Investigation No. 337-TA-623

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COMMISSION OPINION

Background

This Opinion is issued on review of the Remand Initial Determination (“RID”) of the presiding administrative law judge (“ALJ”) (Judge Luckern) in this investigation.

On January 30, 2009, the Commission remanded-in-part the ALJ’s Final Initial Determination (“final ID”) in this investigation, with instructions to consider, *inter alia*, respondents’ arguments relating to anticipation and obviousness based on certain patents and other references (the “remand references”).^{1 2} On April 1, 2009, the ALJ issued the RID. The RID rejected the arguments of respondents Sinochem Modern Environmental Protection Chemicals (Xi’an) Co. Ltd.; Sinochem Ningbo Ltd.; Sinochem Environmental

¹ The remand references are: European Patent Application Nos. 0 449 614 and 0 449 617; a 1982 article by Luigi Marangoni (“Marangoni” or “the Marangoni reference”) (RX-169); U.S. Patent Nos. 2,005,710 (“the ‘710 patent”), 2,885,427 (“the ‘427 patent”), 4,129,603 (“the ‘603 patent”), 4,158,675 (“the ‘675 patent”), and 4,922,037 (“the ‘037 patent”); and GB Patent Nos. 819,849 (“GB ‘849”), 1,589,924 (“GB ‘924”), and 2,030,981 (“GB ‘981”).

² The final ID contains a detailed technical background, general information regarding the only asserted claim in the investigation, claim 1 of U.S. Patent No. 5,559,276 (“the ‘276 patent”), and a full procedural history of the investigation. That information is not repeated herein.

Protection Chemicals (Taichang) Co. Ltd.; and Sinochem (U.S.A.) Inc's (hereinafter referred to collectively as "Sinochem")³ that claim 1 of the '276 patent is anticipated or rendered obvious in light of the remand references. The RID concluded that Sinochem had not sufficiently raised below, and had therefore waived, the anticipation and obviousness arguments presented in its brief on remand and, even assuming the arguments were sufficiently raised, that they had no merit.

On June 1, 2009, the Commission determined to review the RID in its entirety, and directed the parties to respond to certain briefing questions regarding the ALJ's waiver conclusions and regarding arguments made by Sinochem relating to alleged admissions made by Ineos or its witnesses. Specifically, the Commission requested further briefing on the following questions:

1. Based upon the undisputed scope and content of the prior art as set forth in the '276 patent specification and as presented by the expert witnesses at trial, what differences exist between the prior art and claim 1 of the '276 patent?
2. Based on your answer to question (1), would claim 1 have been obvious in light of the remand references to a person of ordinary skill in the art under *KSR International, Co. v. Teleflex Co.*, 550 U.S. 398 (2007)?
3. Are the ALJ's conclusions regarding waiver consistent with Commission Rule 210.14(c)? If not, what is the effect on the ALJ's conclusions in the remand determination?
4. Does the exception to the ALJ's ground rule reciting that "contentions of which a party is not aware and could not be aware in the exercise of reasonable diligence at the time of filing the pre-hearing statements" apply to Respondents' contentions regarding admissions elicited during the hearing? If so, what is the effect on the ALJ's conclusions in the remand determination?

³ Complainants INEOS Fluor Holdings Ltd., INEOS Fluor Ltd., and INEOS Fluor Americas L.L.C. will be referred to hereinafter collectively as "Ineos" and the Commission investigative attorney as the "IA."

Having reviewed the record, including the submissions by the parties, the Commission has determined to reverse the RID's conclusion that claim 1 of the '276 patent is not obvious. We conclude that the claim would have been obvious to one of ordinary skill in the art at the time of invention.

Analysis

As indicated in the Commission's June 1, 2009 notice, 74 Fed. Reg. 27048-49, the Commission determined to review the RID to more fully consider what Sinochem argued were "admissions" made by Ineos and its experts. The ALJ did not consider Sinochem's arguments relating to the alleged admissions or to the "state of the prior art at the time of invention" in the RID because he found such arguments to be an attempt to "revisit topics that are not the subject of the remand" in the context of the "state of the prior art at the time of invention." RID at 4 n.3. He therefore found that these arguments were not relevant to the enumerated prior art references that were the subject of the remand and concluded that the first "40-plus pages" of Sinochem's remand brief "need not and should not be considered." *Id.* at 4.

Although the ALJ is correct that the remand order directed him to consider only certain references, we conclude that, in considering those references, it is necessary to consider Sinochem's arguments relating to the admissions and the "state of the prior art" because the admissions and background are relevant to a key factor in the obviousness analysis – "the scope and content of the prior art" under *Graham v. John Deere Co.*, 383 U.S. 1 (1966). Put another way, because an obviousness analysis is conducted from the perspective of one of ordinary skill in the art, arguments relating to the state of the prior art are relevant to the analysis of the references themselves. *See* 35 U.S. § 103(a); *see*

also *KSR Int'l, Co. v. Teleflex Co.*, 550 U.S. 398, 427 (2007) (Advances in technology “define a new threshold from which innovation starts once more.”). Furthermore, in conducting an obviousness analysis, “[v]alid prior art may be created by the admissions of the parties” in the context of analyzing the scope and content of the prior art.

Riverwood Int'l Corp. v. R.A. Jones & Co., 324 F.3d 1346, 1354 (Fed. Cir. 2003). We conclude that the ALJ should have considered arguments and evidence relating to the state of the prior art at the time of invention in conjunction with his analysis of the specific remand references.⁴ We conduct this analysis below.

Under the Supreme Court’s guidelines for analyzing obviousness, set forth in *Graham v. John Deere Co.*, 383 U.S. at 17, the question of obviousness is one of law based upon “several basic factual inquiries.” *Graham* provides these inquiries, and a procedure for analyzing obviousness based upon them:

Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the art to be resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.

383 U.S. at 17. At the outset, it is worth noting that the ALJ previously determined, in a finding not reviewed by the Commission, that

A person of ordinary skill in the technology of the ‘276 patent at the time of its filing would be a person who had some education in chemistry, probably at least a Master’s degree, or possibly in chemical engineering as well, and preferably a Ph.D. That person would have worked with the chemistry that’s involved with fluorinated hydrocarbons, such as R-12 or 133a or 134a, and would have experience on handling hydrogen fluoride,

⁴ We note that this point is applicable to the final ID as well, in which the ALJ simply found that certain references asserted by Sinochem did not constitute prior art.

the raw materials that are needed for conversion to fluorinated products, the catalyst systems that are known, both liquid phase and vapor phase, and the type of equipment that works well.

Final ID at 7. Furthermore, the ALJ did not make a finding concerning any secondary considerations that would constitute indicia of nonobviousness, and we do not find the existence of secondary considerations that would be relevant to the obviousness analysis.

We turn, then, to the remaining inquires under *Graham*: the scope and content of the prior art, and the differences between the prior art and the claimed invention.

Scope and Content of the Prior Art

Claim 1 reads:

1. In a method for the production of 1,1,1,2-tetrafluoroethane in two separate reaction zones involving (1) reaction of trichloroethylene and hydrogen fluoride to produce 1,1,1-trifluoro-2-chloroethane in reaction zone (1) and (2) reaction of the 1,1,1-trifluoro-2-chloroethane and hydrogen fluoride to produce 1,1,1,2-tetrafluoroethane in reaction zone (2) wherein both reactions are carried out at superatmospheric pressure, reaction (2) is carried out at a temperature in the range of 250-450° C., reaction (1) is carried out at a temperature in the range of 200-400° C. but below that used in reaction (2) and unconverted 1,1,1-trifluoro-2-chloroethane is recycled for further reaction with hydrogen fluoride.

Before considering the scope and content of the individual remand references, it is useful to set out the areas of the parties' agreement regarding what one of ordinary skill in the art would know about production of R-134a. First, no party disagrees with the ALJ's finding that the two reactions at issue were known in the prior art and that it was recognized that the reactions could be performed in sequence to create R-134a. *See* RID at 5. As the ALJ points out, the '276 patent itself acknowledges this fact. *Id.* The specified temperature ranges for each reaction were also known for each individual reaction, and it was known to conduct each reaction at superatmospheric pressure. The '276 patent also discloses that the concept of recycling a portion of the product stream

was known in the prior art, albeit with reference to a different method of production of R-134a. RID at 5 n.4 (citing the '276 patent at 1:18-35); *see also Sjolund v. Musland*, 847 F.2d 1573, 1577-79 (Fed. Cir. 1988) (when the patent specification admits certain matter as prior art, it must be “accepted as prior art, as a matter of law”). It is also undisputed that a person of ordinary skill in the art would have had a reason to recycle unconverted 1,1,1-trifluoro-2-chloroethane for further reaction with hydrogen fluoride. Tr. at 1296-97. Furthermore, we conclude that the ALJ’s recognition that it was known that the reactions could be performed in sequence demonstrates knowledge in the art of the general statement in the preamble of claim 1, “a method for the production of 1,1,1,2-tetrafluoroethane.”

It was disputed, however, whether it was known in the art to perform the method in two separate reaction zones, and it was further disputed whether it was known to perform reaction (1) at a temperature “below that used in reaction (2).”⁵ The IA and Ineos also dispute whether it was known to “integrate” the process or whether an “integrated” process for the production of R-134a was known.

The parties dispute whether carrying out the reaction sequence in two separate reaction zones was known in the prior art. We conclude that it was. The ALJ construed reaction zones (1) and (2) to be where reactions (1) and (2) take place and construed the reaction-zone limitation to require that the reactions take place “in different areas.” Final ID at 17. Here, we find that the knowledge of one skilled in the art “that the reactions could be performed in sequence to create R-134a,” *see* RID at 5, necessarily means that one skilled in the art would also know that the reactions could take place “in different

⁵ *See* Office of Unfair Import Investigations’ Subm. in Resp. to Commission Questions Upon Review of the RID (“IA Subm.”) at 14.

areas,” such as in different reactors. Complainants’ expert acknowledged that it was known to conduct the two reactions in separate reactors: “In general, HCFC – 133a is isolated as an intermediate and fed to a second reactor where the conversion of HFC – 134a is conducted.” Tr. at 1327. Moreover, the references described in the ‘276 patent that separately disclose each of the two reactions show that the reactions may be performed separately; *i.e.*, in different reaction zones. *Compare* the ‘276 patent at (1:18-26) (“production of [R-134a] . . . by fluorination of [R-133a] which is itself obtainable by the fluorination of trichloroethylene”) *with* the ‘276 patent at (1:32-36) (“conversion of trichloroethylene to [R-134a] wherein the two-stage reactions are carried out in a single reaction zone.”). We therefore conclude that it was known in the art to conduct the two reactions in different areas.

The parties further dispute whether one of ordinary skill in the art would have known to run reaction (1) at a temperature lower than reaction (2). Initially, we note that running the two reactions with reaction (1) at a lower temperature than reaction (2) is one of only three possible temperature relationships: reaction (1) can be at a higher, lower, or the same temperature as reaction (2). The record contains several pieces of evidence that clearly show that the claimed temperature relationship was known to one skilled in the art. First, as pointed out by Sinochem and the IA, the known temperature ranges for the two reactions overlap such that there are numerous points within each known range in which the temperature of reaction (1) is lower than the temperature of reaction (2).⁶ *See* Tr. at

⁶ As Sinochem points out, where a claimed range falls within or overlaps a range disclosed in the prior art, as the range of respective temperatures that meets the relative-temperature limitation does here, there is a presumption that the patent is obvious. *In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003); *Iron Grip Barbell Co. v. USA Sports*,

1312-13. Second, the references described in the '276 patent disclose the claimed temperature relationship.⁷ Third, both parties' experts testified that reaction (1) would generally be run at lower temperatures to prevent the undesired by-product 1122, and because reaction (1) is exothermic. *See* Tr. at 1396-99 (Dr. Manzer's testimony); Tr. at 717, 958 (Dr. Gumprecht's testimony). We therefore find that the claimed relationship between the reaction temperatures of reactions (1) and (2) was part of the scope and content of the prior art.

Finally, Ineos and the IA contend that claim 1 of the '276 patent requires an "integrated" process. *See, e.g.*, IA Subm. at 6; Complainants' Opening Br. in Resp. to the Notice of Review of the RID at 17-18. Nothing in the language of claim 1, however, suggests that the claim covers only an "integrated" process. Claim 1 refers to two separate reaction zones and the parties agreed that the reactions can be carried out in two separate reactors as either a continuous or a batch process. SX-3. The ALJ's construction of claim 1 does not require "integration." In our view, therefore, claim 1 is not limited to "integrated" processes. In any event, we conclude that performing the reactions in sequence to obtain R-134a would meet any requirement that the process be "integrated."

The same response applies to Ineos's objection to Sinochem's assertion that the reaction zones need not be "connected." *See* Complainants' Reply Brief at 13-14.

Inc., 392 F.3d 1317, 1322 (Fed. Cir. 2004). We do not believe that Ineos has overcome this presumption.

⁷ *See* '276 patent at (1:18-26) (stating that 1,1,1,-trifluoro-2-chloroethane is "obtainable by the fluorination of trichloroethylene [reaction (1)] as described in" United Kingdom Patent Specification No. 1,307,224 ("GB '224") and that production of R-134a is described in GB '924). GB '224 discloses conducting reaction (1), the fluorination of trichloroethylene, at 290 degrees. RX-155, at SINO0002252 (Table IV, ex. 22). GB '924 describes preferred temperatures for reaction (2) of between 300 and 400 degrees.

Ineos's expert contradicted any argument that the invention requires the two reaction zones to be physically attached, *see* Tr. at 584:20-585:5 (“there is no requirement in [the ‘276 patent] for the product of one reaction to pass to a second . . . reaction zone.”); 577; 595-98, and the ALJ's construction does not require any type of connection. Moreover, even if the zones were required to be connected, one of skill in the art would have an understanding, as part of his background knowledge, of how to connect two reactors. *See* Final ID at 7 (finding that one of ordinary skill in the art would probably have “at least a Master's degree, or possibly in chemical engineering as well, and preferably a Ph.D” and would know “the type of equipment that works well”).

Therefore, without even consulting any of the remand references, one of ordinary skill in the art would have knowledge of all of the elements in claim 1, and would know how to combine the known elements to produce R-134a. This conclusion is based on the background knowledge established above, which “defined the threshold” from which the alleged invention began. *See KSR*, 550 U.S. at 418.

Differences Between the Prior Art and the Claimed Invention

Based on the discussion and findings above, we find virtually no difference between the scope and content of the prior art and the claimed invention. As the IA pointed out, the only areas of dispute were the reaction-zone limitations, whether the prior art disclosed an “integrated” sequence of reactions, and the relative-temperature limitation. IA Subm. at 14. As discussed above, we find that the concepts of a two-reaction-zone sequential reaction and carrying out reaction (1) at a lower temperature than reaction (2) were known in the art. We therefore find that all the elements of the claim were known in the art at the time of invention.

Conclusion

We find that the evidence demonstrates that one of ordinary skill in the art would not only be aware of the elements, but would also know how to combine all the elements in the claimed manner. We therefore conclude that claim 1 of the '276 patent would have been obvious to one of ordinary skill in the art based upon the scope and content of the prior art, the trial testimony, most of which was undisputed, and the disclosures in the '276 patent itself.

Because we find the claim obvious without even consulting the specific remand references, it is unnecessary for us to address the issues of obviousness or anticipation in light of those references or whether arguments on those issues were waived.⁸ We therefore decline to reach those issues.

We note, however, that consideration of the various references would provide additional support for the Commission's conclusion that the claim would have been obvious to one of ordinary skill in the art at the time of the invention. We therefore conclude in the alternative that, if the remand references were specifically considered, Marangoni alone renders the claim obvious when combined with the background knowledge of one of ordinary skill in the art. First, Marangoni discloses the claimed

⁸ Commissioner Deanna Tanner Okun notes that the ALJ found in the RID "that respondents did not raise in their prehearing statement the issues regarding obviousness," including allegations involving the Marangoni reference alone or in combination with one or more secondary references. RID at 14 and 21. While the ALJ rejected respondents' arguments as not properly raised, the issue of obviousness was undisputedly presented to the Commission, and evidence submitted by Sinochem relating to that issue, including the remand references testimony by expert witnesses regarding those references, was properly filed and contained in the record of this proceeding. Therefore, while I join my colleagues' alternative analysis below, I have considered the Marangoni reference in reaching my conclusion that the claim would have been obvious to one of ordinary skill in the art at the time of the invention.

relative-temperature relationship between the reactions. Specifically, Marangoni discloses reaction (1) taking place at 325 degrees, and reaction (2) taking place at 350 degrees. RX-169; Tr. at 836-37 (Dr. Gumprecht's testimony); 1312-14, 1415-16 (Dr. Manzer's testimony). Therefore, while the ALJ is correct that Marangoni does not disclose that the relationship is *required*, RID at 30-31, Marangoni nonetheless discloses the relative-temperature limitation. The ALJ is also correct that Marangoni does not disclose recycling the product stream, but both parties' experts testified the recycling step would have been within the knowledge of one of ordinary skill in the art at the time of invention and Dr. Manzer testified that such a person would have motivation to do so. *See* Tr. at 929-30 (Dr. Gumprecht's testimony); Tr. at 1295-97 (Dr. Manzer's testimony). Finally, we find that one of ordinary skill in the art, knowing the general reaction sequence, would have found it obvious to use the intermediate compound in Marangoni's disclosure of reaction (1) as a reagent in the disclosed reaction (2). One of ordinary skill in the art, therefore, would find the claimed invention obvious in light of Marangoni.

Sinochem's Motion to Strike

Sinochem filed a motion to strike portions of Ineos's Response to its submission and for leave to file a reply to that submission. Both Ineos and the IA oppose the motions as inconsistent with the Commission's rules and the Commission notice of review of the RID. We agree with Ineos and the IA that Sinochem's motion should be denied. The motion does not even allege, much less demonstrate, that good cause exists for filing it. Moreover, Sinochem's motion follows a pattern of unnecessary litigation tactics that have imposed unnecessary burdens on the Commission, the ALJ, and the parties. We therefore deny Sinochem's motion.

Sinochem's Motion To Conform Pleadings to Evidence Taken

While the RID was on review, Sinochem moved to amend the pleadings to conform them to evidence taken throughout the investigation under Commission Rule 210.14(c). Sinochem notes in its motion that it does not believe that the motion was necessary procedurally or substantively, but was filed out of an abundance of caution. Ineos and the IA oppose Sinochem's motion.

Commission Rule 210.14(c) provides that:

When issues not raised by the pleadings or notice of investigation, but reasonably within the scope of the pleadings and notice, are considered during the taking of evidence by the express or implied consent of the parties, they shall be treated in all respects as if they had been raised in the pleadings and notice. Such amendments of the pleadings and notice as may be necessary to make them conform to the evidence and to raise such issues shall be allowed at any time, and shall be effective with respect to all parties who have expressly or impliedly consented.

Commission Rules 210.12 and 210.13 make clear that only the complaint and the answer constitute "the pleadings." Because we agree that the motion was unnecessary to the ultimate disposition of the investigation, and because Sinochem has not identified what they wish to amend in the pleadings, Sinochem's motion is denied.

By Order of the Commission.



Marilyn R. Abbott
Secretary to the Commission

Issued: September 18, 2009

CERTAIN R-134a COOLANT (otherwise known as 1,1,1,2-tetrafluoroethane)

337-TA-623

PUBLIC CERTIFICATE OF SERVICE

I, Marilyn R. Abbott, hereby certify that the attached **PUBLIC OPINION** has been served by hand upon the Commission Investigative Attorney, Thomas S. Fusco, Esq., and the following parties as indicated, on September 21, 2009.



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