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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/937,736	09/08/2004	Kenneth M. Ponder	821920-1030	1006

24504 7590 08/08/2011  
THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
400 INTERSTATE NORTH PARKWAY SE  
SUITE 1500  
ATLANTA, GA 30339

EXAMINER
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HARDEE, JOHN R

ART UNIT	PAPER NUMBER
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1761

NOTIFICATION DATE	DELIVERY MODE
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08/08/2011

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

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Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspatents@tkhr.com  
kristen.layton@tkhr.com  
ozzie.liggins@tkhr.com

<b>Notice of Abandonment</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/937,736	PONDER ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	JOHN HARDEE	1761	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

This application is abandoned in view of:

1. ☐ Applicant's failure to timely file a proper reply to the Office letter mailed on \_\_\_\_\_.
  - (a) ☐ A reply was received on \_\_\_\_\_ (with a Certificate of Mailing or Transmission dated \_\_\_\_\_), which is after the expiration of the period for reply (including a total extension of time of \_\_\_\_\_ month(s)) which expired on \_\_\_\_\_.
  - (b) ☐ A proposed reply was received on \_\_\_\_\_, but it does not constitute a proper reply under 37 CFR 1.113 (a) to the final rejection.  
(A proper reply under 37 CFR 1.113 to a final rejection consists only of: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114).
  - (c) ☐ A reply was received on \_\_\_\_\_ but it does not constitute a proper reply, or a bona fide attempt at a proper reply, to the non-final rejection. See 37 CFR 1.85(a) and 1.111. (See explanation in box 7 below).
  - (d) ☐ No reply has been received.
  
2. ☐ Applicant's failure to timely pay the required issue fee and publication fee, if applicable, within the statutory period of three months from the mailing date of the Notice of Allowance (PTOL-85).
  - (a) ☐ The issue fee and publication fee, if applicable, was received on \_\_\_\_\_ (with a Certificate of Mailing or Transmission dated \_\_\_\_\_), which is after the expiration of the statutory period for payment of the issue fee (and publication fee) set in the Notice of Allowance (PTOL-85).
  - (b) ☐ The submitted fee of \$\_\_\_\_\_ is insufficient. A balance of \$\_\_\_\_\_ is due.  
The issue fee required by 37 CFR 1.18 is \$\_\_\_\_\_. The publication fee, if required by 37 CFR 1.18(d), is \$\_\_\_\_\_.
  - (c) ☐ The issue fee and publication fee, if applicable, has not been received.
  
3. ☐ Applicant's failure to timely file corrected drawings as required by, and within the three-month period set in, the Notice of Allowability (PTO-37).
  - (a) ☐ Proposed corrected drawings were received on \_\_\_\_\_ (with a Certificate of Mailing or Transmission dated \_\_\_\_\_), which is after the expiration of the period for reply.
  - (b) ☐ No corrected drawings have been received.
  
4. ☐ The letter of express abandonment which is signed by the attorney or agent of record, the assignee of the entire interest, or all of the applicants.
  
5. ☐ The letter of express abandonment which is signed by an attorney or agent (acting in a representative capacity under 37 CFR 1.34(a)) upon the filing of a continuing application.
  
6. ☒ The decision by the Board of Patent Appeals and Interference rendered on 29 April 2010 and because the period for seeking court review of the decision has expired and there are no allowed claims.
  
7. ☐ The reason(s) below:

/John R. Hardee/  
Primary Examiner, Art Unit 1761

Petitions to revive under 37 CFR 1.137(a) or (b), or requests to withdraw the holding of abandonment under 37 CFR 1.181, should be promptly filed to minimize any negative effects on patent term.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/937,736	09/08/2004	Kenneth M. Ponder	821920-1030	1006
24504 7590 12/23/2010 THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP 600 GALLERIA PARKWAY, S.E. STE 1500 ATLANTA, GA 30339-5994			EXAMINER HARDEE, JOHN R	
			ART UNIT 1761	PAPER NUMBER
			MAIL DATE 12/23/2010	DELIVERY MODE PAPER

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APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
10937736	9/8/2004	PONDER ET AL.	821920-1030

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
600 GALLERIA PARKWAY, S.E.  
STE 1500  
ATLANTA, GA 30339-5994

**EXAMINER**

JOHN R.. HARDEE

ART UNIT	PAPER
1761	20101223

DATE MAILED:

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Commissioner for Patents

/John R. Hardee/  
Primary Examiner, Art Unit 1761



Art Unit: 1761

**DETAILED ACTION**

1. The Notice of Abandonment mailed December 9, 2010 is WITHDRAWN.

/John R. Hardee/  
Primary Examiner  
December 16, 2010



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10/937,736

09/08/2004

Kenneth M. Ponder

821920-1030

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24504 7590 12/09/2010  
THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
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STE 1500  
ATLANTA, GA 30339-5994

EXAMINER

HARDEE, JOHN R

ART UNIT

PAPER NUMBER

1761

MAIL DATE

DELIVERY MODE

12/09/2010

PAPER

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<b>Notice of Abandonment</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/937,736	PONDER ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	JOHN R. HARDEE	1761	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

This application is abandoned in view of:

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5. ☐ The letter of express abandonment which is signed by an attorney or agent (acting in a representative capacity under 37 CFR 1.34(a)) upon the filing of a continuing application.
  
6. ☒ The decision by the Board of Patent Appeals and Interference rendered on 04 October 2010 and because the period for seeking court review of the decision has expired and there are no allowed claims.
  
7. ☐ The reason(s) below:

/John R. Hardee/  
Primary Examiner, Art Unit 1761

Petitions to revive under 37 CFR 1.137(a) or (b), or requests to withdraw the holding of abandonment under 37 CFR 1.181, should be promptly filed to minimize any negative effects on patent term.

**Form 5. Petition for Review or Notice of Appeal of an Order or Decision of an  
AGENCY, BOARD, COMMISSION, OFFICE OR BUREAU.**

**United States Court of Appeals for the Federal Circuit**

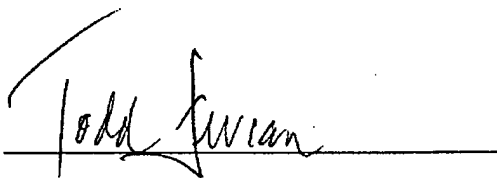
Kenneth M. Ponder, and Steffan Thomas, Jr., Petitioners or Appellants,

v.

**PETITION FOR REVIEW**

United States Patent and Trademark Office,  
Board of Patent Appeals and Interferences, Respondent or Appellee.

Kenneth M. Ponder, and Steffan Thomas, Jr. (name all parties\* bringing the petition or appeal) hereby petition/appeal the court for review of the Decision on Request for Rehearing/ Request for Reopening Prosecution dated October 4, 2010, upholding the Decision on Appeal dated April 29, 2010 (Appeal No. 2009-012229)(describe the order or decision and include decision number) of the United States Patent and Trademark Office, Board of Patent Appeals and Interferences (name the agency, board, office or bureau) entered on October 4, 2010(date), copies of which are attached hereto. The order or decision was received on October 7, 2010.



(Signature of petitioner, appellant or attorney)

Todd Deveau  
Thomas, Kayden, Horstemeyer & Risley, LLP  
600 Galleria Parkway, Suite 1500  
Atlanta, GA 30339  
(770) 933-9500

(Address and phone number of petitioner,  
appellant or attorney)

\* See Fed. R. App. P. 15 for permissible ways of identifying petitioners.

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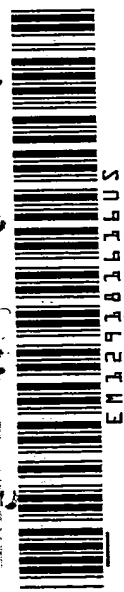
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/937,736	09/08/2004	Kenneth M. Ponder	821920-1030	1006
24504 7590 10/04/2010 THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP 600 GALLERIA PARKWAY, S.E. STE 1500 ATLANTA, GA 30339-5994			EXAMINER HARDEE, JOHN R	
			ART UNIT 1796	PAPER NUMBER
			MAIL DATE 10/04/2010	DELIVERY MODE PAPER

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The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

---

*Ex parte* KENNETH M. PONDER  
and STEFFAN THOMAS JR.

---

Appeal 2009-012229  
Application 10/937,736  
Technology Center 1700

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Before MICHAEL P. COLAIANNI, LINDA M. GAUDETTE, and  
JEFFREY B. ROBERTSON, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON REQUEST FOR REHEARING/ REQUEST FOR  
REOPENING PROSECUTION<sup>1</sup>

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<sup>1</sup> The two-month time period for filing an appeal or commencing a civil action, as recited in 37 C.F.R. § 1.304, or for filing a request for rehearing, as recited in 37 C.F.R. § 41.52, begins to run from the “MAIL DATE” (paper delivery mode) or the “NOTIFICATION DATE” (electronic delivery mode) shown on the PTOL-90A cover letter attached to this decision.

This is in response to a Request, filed June 29, 2010, for rehearing of our decision, decided April 29, 2010, wherein we sustained the § 103 rejection of claims 1-10, 21-25, 27, 29-31, 33-35, and 37-40 over Takigawa (US 6,207,071, issued Mar. 27, 2001).

Appellants seek either to have prosecution reopened based upon what they allege to be new grounds of rejection in the Decision, or, in the alternative to have the appeal reheard based upon what Appellants allege to be errors on the part of the Board in rendering the Decision (Request 1, 4).

Regarding the request to reopen prosecution, Appellants argue that the Board's reliance on "routine experimentation" and new characterizations in the Decision constitute new grounds of rejection (Request 1-3, 6).

Specifically, Appellants contend that the Board's statement that "Takigawa's alkane fluoride that is to be mixed with the HFC-134a and HFC-125 blend may be an additional amount of HFC-134a or HFC-125, rather than a different HFC", constitutes a new characterization of Takigawa not presented by the Examiner (Request 6) (citing Decision 5). Appellants argue that the allegedly new characterization indicates that there is no restriction on the *amount* of HFC-134a and/or HFC-125 which would teach away from the specific weight percentages recited in claims 3, 8, 21, and 23 (Request 6-7).

Appellants argue that the Board's citation to Takigawa's claim 1 in the Decision is a new portion of an existing reference which was not relied upon by the Examiner (Request 7). Appellants contend that this citation suggests that the Board is relying on a new interpretation of Takigawa (*id.*). Appellants argue that the Board's determination that Takigawa would have suggested at least two of the end points of Appellants' claimed ranges is a



new characterization of Takigawa (*id.*). Appellants submit new evidence, the Second Declaration of Kenneth M. Ponder, which they allege shows that the experimentation required is not routine and comparing the claimed refrigerant (i.e., R-421A) to a refrigerant (e.g., R-422B) within the purported teachings of Takigawa (*id.* at 7-8).

We have fully considered Appellants' arguments, however, we do not agree that our findings and determinations in the Decision amount to new grounds of rejection. Contrary to Appellants' arguments, the Board's position with respect to "routine experimentation" is not a new ground of rejection. Rather, the Examiner stated that optimizing the desired amounts of 40% or more of tetrafluoroethane and/or pentafluoroethane "amounts to routine experimentation" (Ans. 5-6). Appellants concede that the Examiner's Answer explains that the claimed weight percentages would have been a matter of routine experimentation (Request 2). Though Appellants now argue that the Examiner did not rely on routine experimentation in the Final Office Action (Request 6), Appellant did not complain that the Examiner's position in the Answer was a new ground of rejection in their Reply Brief or petition the Director to have prosecution reopened. In other words, Appellants had a full and fair opportunity to respond to the Examiner's position, but elected not to do so in a timely manner. Our reliance on routine experimentation, in the same manner as the Examiner, does not constitute a new ground of rejection.

We are unpersuaded by Appellants' argument that the Board's citation to Takigawa's claim 1 to explain that Takigawa's column 8 disclosure (i.e., there is no restriction on the hydrofluorocarbons (HFC) that are to be mixed with Takigawa's HFC-134a and HFC-125 blend) means that no additional

HFC need be added constitutes a new ground of rejection because the explanation presents a new interpretation of the Takigawa reference (Request 1, 4-5, 7). Our discussion in the Decision of Takigawa's column 8 disclosure cited by the Examiner merely explained the Examiner's position on page 5 of the Answer and responded to Appellants' argument. The Examiner plainly states that Takigawa's column 8 disclosure means that "*no other alkyl fluoride at all* need be mixed with the tetrafluoroethane and/or pentafluoroethane" such that the simplest binary mixture includes a 40% or more tetrafluoroethane and 40% or more pentafluoroethane blend (Ans. 5). Citing to portions of a reference (e.g., Takigawa's claim 1) to explain why Appellants' arguments are ineffective to overcome a rejection does not constitute a new ground of rejection. *In re Noznick*, 391 F.2d 946, 949 (CCPA 1968).

Furthermore, our citation to claim 1 to underscore the Examiner's finding that the simplest binary refrigerant composition is a blend of HFC-134a and HFC-125 merely elaborates on Takigawa's teachings relied upon by the Examiner and thus does not constitute a new ground of rejection. *In re DBC*, 545 F.3d 1373, 1382 n. 5 (Fed. Cir. 2009) (Board's reliance on an example in an English translation did not constitute a new ground of rejection because it merely elaborated on a teaching in the abstract, which was relied upon by the Examiner).

The thrust of the Examiner's rejection remains the same in the Board's Decision and Appellants do not complain that the Examiner's interpretation of Takigawa's column 8 disclosure on page 5 of the Answer constitutes a new ground of rejection in the Reply Brief. In other words,

Appellants had a full and fair opportunity to respond to the Examiner's stated case. *In re Kronig*, 539 F.2d 1300, 1303 (CCPA 1976).

Appellants allege that the Board's determination that Takigawa would have suggested at least two of the end points of Appellants' claimed range (i.e., 40% HFC-134a and 60% HFC-125), is new to the proceedings and thus constitutes a new ground of rejection (Request 1, 7). However, this position is not new to the proceedings. Rather, the Examiner finds that Takigawa's teachings indicate that the simplest binary mixture includes HFC-134a in an amount of 40 wt.% more and HFC-125 in an amount of 40 wt.% or more (Ans. 3, 5-6). As the simplest binary mixture, when 40 wt.% of HFC-134a is used in the blend, the balance must be 60 wt.% HFC-125 as the Examiner finds (Ans. 3). Accordingly, our discussion on pages 5-6 of the Decision merely explained the Examiner's stated position that Takigawa's disclosure that 40 wt.% or more of HFC-134a and HFC-125 in the simplest binary composition would have suggested a blend falling within the claimed refrigerant ranges.

Because our Decision does not enter any new grounds of rejection, we deny Appellants' request to reopen prosecution and we will treat Appellants' request as a request for rehearing. As such, Appellants' newly submitted Second Declaration of Kenneth M. Ponder has not been considered. 37 CFR 41.52(a)(1)(2007).

Regarding the Request for Rehearing, Appellants argue that the Decision's reliance on routine experimentation overlooks "the Examiner's admission 'that different blends of pentafluoroethane and tetrafluoroethane will have very different properties and that one such composition would not render another such composition obvious'" (Request 9) (citing Ans. 7).

Appellants contend that this concession indicates that any refrigerant composition not anticipated by Takigawa would not have been rendered obvious by Takigawa (Request 9).

Appellants argue that the Examiner's concession that one refrigerant would not have rendered obvious another refrigerant contravenes the Board's holding that determining acceptable refrigerant compositions would have been a matter of routine experimentation (Request 9). Appellants argue that there can be no reasonable expectation of success by such purported experimentation and the results from such experimentation would not have been predictable (*id.*).

While the Examiner concedes that different blends of tetrafluoroethane and pentafluoroethane have different properties such that one refrigerant composition would not have rendered another such composition obvious (Ans. 7), the Examiner's concession is made regarding the Gbur Declaration's comparison of various refrigerants, none of which are similar to Takigawa's simplest binary composition. The Examiner correctly explains that Takigawa would have rendered the R-421A refrigerant composition (i.e., the claimed refrigerant) obvious. In other words, the Examiner's stated case is based on the teachings of the prior art (i.e., Takigawa) and what those teachings would have suggested to one of ordinary skill in the art, and not based on whether a particular refrigerant from Appellants' ASHRAE list would have rendered another refrigerant composition obvious.

Therefore, we find Appellants' arguments that the claimed refrigerant composition would not have been obvious to be without merit. As correctly found by the Examiner (Ans. 3), Takigawa teaches a binary refrigerant

composition that may include 40 wt.% HFC-134a at a minimum; the balance (i.e., 60 wt.%) being HFC-125. Based upon Takigawa's teachings, one of ordinary skill in the art would have had a reasonable expectation of achieving the claimed composition by routine experimentation as determined by the Examiner.

Appellants contend that results from such experimentation would not be sufficiently predictable to support the holding of "routine experimentation" (Request 9). However, such an argument overlooks that Takigawa teaches a refrigerant composition that includes as the simplest binary mixture a combination of 40 wt.% HFC-134a; balance (i.e., 60 wt.%) being HFC-125. Accordingly, the experimentation required would be targeted per Takigawa's teachings such that a composition falling within the claimed ranges having similar properties would have predictably resulted.

Appellants contend that the Board mischaracterizes Appellants' argument regarding Appellants' own US patent 7,320,763, which Appellants contend should have been obvious if only routine experimentation is required to determine acceptable refrigerant compositions, as stated in the Decision at page 6 and the Examiner's Answer (Request 10). Appellants' argument, however, mischaracterizes the Board's determinations.

On page 6 of the Decision, we stated that "we agree with the Examiner that given the guidance provided by Takigawa, determining acceptable refrigerant gas concentration ranges would have been a matter of routine experimentation." Appellants omitted the first portion of the citation that our determination is based on "the guidance provided by Takigawa." Accordingly, the fact that Appellants were granted a patent for an 85/15 refrigerant blend, does not undermine our determination based on the facts

of the present appeal that Takigawa's teachings would have guided one of ordinary skill to the claimed compositions through routine experimentation.

Appellants further argue that the Decision lacks articulated reasoning with some rational underpinning to support a conclusion of obviousness of the pending claims based on routine experimentation (Request 10).

Appellants contend that the Board's reliance on routine experimentation is merely conclusory and the Board failed to identify what guidance in Takigawa would have suggested that the experimentation would have been routine (Request 11). Appellants contend that Takigawa would not direct one skilled in the art to determine acceptable refrigerant concentrations and Takigawa's teaching that there is "no restriction" as to the kind of HFC means that there is no limit on the amount of refrigerant to be mixed (*id.*). Appellants contend that the teachings of Takigawa contradict the Board's determination that Takigawa teaches the exclusion of all HFCs other than HFC-134a and HFC-125b (*id.* at 12 n.2).

Appellants' arguments mischaracterize and quote out of context our Decision. Our determination that the claimed refrigerant composition would have resulted from routine experimentation is based upon the guidance provided by Takigawa as correctly stated by Appellants; not a mere conclusory statement. However, contrary to Appellants' argument, we cite the portions of Takigawa we rely on as providing such guidance. The sentences preceding our conclusion on page 6 of the Decision explain that the Examiner correctly finds that Takigawa teaches the simplest binary refrigerant composition includes HFC-134a and HFC-125 in amounts that include 40 wt.% HFC-134a with the balance (i.e., 60 wt.%) being HFC-125 (Decision 5-6).

Appellants' argument that Takigawa's teaching that there is "no restriction" to the kind of HFC to be mixed means that there is no limit on the *amount* of HFC is contrary to the teaching of Takigawa. As noted *supra*, Takigawa teaches particular weight percentages for the HFCs of the composition. In particular HFC-134a is present in an amount from 40 wt.% or more and HFC-125 is preferably present in an amount from 40 wt.% or more (Decision 7). So, Takigawa plainly limits the amounts of the HFC's. The "no restriction" language in Takigawa is directed to the "kind" of HFC.

Contrary to Appellants' arguments, we did not construe Takigawa's disclosure as excluding all HFCs other than HFC-134a and HFC-125b. Rather, we agreed with the Examiner's interpretation of Takigawa's unrestricted disclosure of the HFCs to be added to the blend means that additional amounts of HFC-134a or HFC-125 may reasonably constitute the added HFCs (Decision 5).

Appellants argue for the first time the features of claims 3, 4, 9, 8, 23, and 25 (Request 12; 20). Because these claims were either not argued at all (i.e., claims 3, 8, and 23) or not substantively argued in the Appeal Brief other than merely stating the subject matter of claims 4, 9, and 25, we shall not consider arguments regarding these claims in this request for rehearing. 37 CFR § 41.52(a)(1)(2009).

Appellants argue that the Board's statement that the reason for modifying Takigawa need not be the same as Appellants' reason for making the modification overlooks that the Examiner has not provided any reason for modifying Takigawa to arrive at the claimed invention (Request 12). We disagree.

The Examiner's stated case is based on Takigawa's teachings to use the two claimed refrigerants (HFC-134a and HFC-125) in amounts (i.e., 40% or more) that overlap the claimed ranges (i.e., about 40 to about 45% tetrafluoroethane and about 55% to about 60% pentafluoroethane) (Ans. 3-4). The Examiner's reason for modifying is based on the overlap between the claimed ranges and Takigawa's ranges. Indeed, the Examiner further properly finds that Takigawa's teaching to use 40% or more HFC-134a (i.e., tetrafluoroethane) in the simplest binary mixture with HFC-125 (i.e., pentafluoroethane) would require the amount of HFC-125 to be 60% by weight (Ans. 3, 5). Accordingly, it would appear the only modification of Takigawa required would have been to select the amount of HFC-134a to be 40%, which is explicitly taught by Takigawa. Once that selection is made, the balance of the binary mixture of HFC-134a and HFC-125 would be 60%, which falls within Takigawa's preferred range disclosed for HFC-125 (i.e., 40% or more).

Contrary to Appellants' argument, the guidance for determining acceptable refrigerant ranges is not extrinsic to the Takigawa reference (Request 12-13). As explained above, Takigawa provides the guidance for determining an acceptable refrigerant composition.

Appellants argue that the Board overlooked that refrigerants having different compositions have vastly different properties as evidenced by the ASHRAE evidence and the Ponder and Gbur Declarations, such that a 40% HFC-134a and 60% HFC-125 refrigerant could not be expected to be used in place of a 60% HFC-134a and 40% HFC-125 refrigerant blend (Request 13-14). Appellants further argue that the Board overlooked that Takigawa does not recognize that different ratios of pentafluoroethane and tetrafluoroethane



can result in refrigerant gas compositions for different temperature applications such that there is no showing of how Takigawa would use routine experimentation to arrive at the claimed refrigerant (Request 13). Appellants contend that without providing a reason to modify Takigawa to arrive at the claimed invention, the Examiner's position regarding routine experimentation amounts to taking Official Notice (Request 14).

All of these arguments are unpersuasive because we have considered the evidence presented in the Ponder and Gbur Declarations, but we do not find that evidence relevant to whether the claimed composition would have been obvious over Takigawa's disclosures. Even if different refrigerants have different properties, such does not address what Takigawa's teachings would have suggested. As discussed above, we agree with the Examiner that Takigawa's disclosures would have directed one of ordinary skill in the art to the claimed composition. As the Examiner finds, Takigawa discloses a binary mixture of HFC-134a and HFC-125. Takigawa further teaches that the amount of HFC-134a may be 40% or more. Accordingly, one of ordinary skill would have been directed to 40% by weight of HFC-134a as the starting point for the refrigerant composition. The balance of such a binary composition would have been 60% by weight HFC-125 as found by the Examiner (Ans. 3). The Examiner's findings are based on the teachings of the reference, not Official Notice or some other theory argued by Appellants.

Appellants' argument regarding the "level of skill" in the *Graham v. John Deere* inquiries with regard to routine experimentation was not raised in the Brief (Request 15). As acknowledged by Appellants, the Examiner raised the routine experimentation rationale in the Answer (*id.*), however,

Appellants did not make this argument in the Reply Brief. Therefore, this new argument shall not be considered in this request for rehearing. 37 CFR § 41.52(a)(1)(2009).

Appellants argue that the Board overlooked and failed to address the underlying analysis and facts presented in the Ponder and Gbur Declarations (Request 15). Appellants argue that the Board mischaracterized declarant Ponder's statement in the declaration, which, when fully considered, states that Takigawa does not teach or suggest a refrigerant composition composed of tetrafluoroethane and pentafluoroethane to the exclusion of other refrigerant gases *"having a temperature/pressure profile that provides superior properties for use in high and medium temperature applications"* (Request 16). Appellants contend that the Ponder declaration controverts the Board's holding that determining acceptable refrigerant concentrations would have been a matter of routine experimentation (Request 16).

Appellant further argues that "there is no recognition in Takigawa of any need or desire to address the issue of a refrigerant composition having a temperature-pressure profile that provides superior properties for use in high and medium temperature applications for the replacement of R-22" (Request 16).

With regard to the Gbur Declaration, Appellants contend the Board misapprehended the contents of the declaration (Request 17). Appellants contend that the Board mischaracterized the Gbur Declaration in that declarant Gbur does not rest his conclusion on Takigawa's failure to exemplify a blend of only HFC-134a and HFC-125 as stated in the Decision (Request 17 and 18). Appellants contend that declarant Gbur draws upon his

experience and knowledge to determine that Takigawa would not have rendered obvious the claimed composition (Request 18).

We have fully considered and analyzed the evidence provided in the Ponder and Gbur Declarations as is evident from pages 7-8 of the Decision and we adhere to our positions and statements contained therein. Contrary to Appellants' arguments regarding the Ponder Declaration, we did not mischaracterize declarant Ponder's opinion evidence. Rather, based on our consideration of the evidence, we stated that both declarant Ponder and declarant Gbur state that the claimed refrigerant would not have been obvious from Takigawa (Decision 7). While Appellants argue that the Ponder declaration evinces that more than routine experimentation would be required to achieve the claimed invention having the superior high and medium temperature properties, we note that these properties are not claimed.

Moreover, we addressed this refrigerant property issue in the paragraph bridging pages 6-7 of the Decision. We stated that Takigawa's teachings would have suggested a refrigerant having the claimed concentrations of HFC-134a and HFC-125, such that Appellants' disclosed high and medium temperature properties would naturally flow from Takigawa's composition. Accordingly, we are not persuaded by Appellants' evidence that our decision based upon the Examiner's findings regarding Takigawa is in error.

As with the Ponder Declaration, we are unpersuaded by Appellants' arguments regarding the Gbur Declaration. We fully appreciate declarant Gbur's experience and knowledge in the refrigerant field and have fully considered the evidence provided in the Gbur Declaration. However, based

upon the facts presented on this record, we conclude that Takigawa would have rendered obvious the claimed refrigerant composition for the reasons discussed *supra*.

Appellants contend that the Board overlooked the ASHRAE evidence included in Appendix C, which Appellants contend shows that blends with different amounts of the same compounds have different properties (Request 18-19). We have fully considered the ASHRAE evidence as discussed by Appellants on pages 12-14 of the Appeal Brief (Decision 7). Even though blends having the same compounds in different amounts have different properties, we remain of the view that the Takigawa's teachings discussed earlier would have rendered obvious the claimed composition having the claimed HFC-134a and HFC-125 in the claimed amounts.

Appellants argue that the Board overlooked the genus-species argument where Appellants contend that Takigawa's disclosure does not restrict the type or amount of hydrofluorocarbon (HFC) to be mixed with HFC-134a and HFC-125 such that the possible combinations are in the hundreds or thousands and Takigawa does not direct one of ordinary skill to any particular specie within the genus (Request 19).

Contrary to Appellants' argument, we considered and addressed the genus-species argument made by Appellants in the Appeal Brief. Appellants' genus-specie argument in the Appeal Brief concerned the selection of Appellants' ranges for the tetrafluoroethane and pentafluoroethane (App. Br. 9-10). Though Appellants cite *In re Baird*, 16 F.3d 380 (Fed. Cir. 1994) as part of the argument, this citation was provided to analogize between selecting a narrower range (i.e., a specie) from a larger range (i.e., a genus) (App. Br. 10) and did not appear to be made regarding

the perceived breadth of Takigawa's disclosure of compounds. In any event, Appellants do raise the issue of the breadth of Takigawa's disclosure on page 4 of the Reply Brief.

Regardless, we addressed either interpretation of Appellants' genus-specie argument (Decision 5-6). With regard to the breadth of compounds disclosed argument, we noted that the Examiner correctly finds that the simplest binary composition taught by Takigawa is a blend of HFC-134a and HFC-125, which is simply underscored by Takigawa's claim 1.

Accordingly, Takigawa's selection of a narrower range from a broader range likewise would have been suggested by Takigawa's disclosure of a binary blend of 40 wt.% or more HFC-134a and preferably 40 wt.% or more HFC-125. Therefore, as found by the Examiner (Ans. 3), selecting 40 wt.% as the concentration of HFC-134a in Takigawa's blend would require the balance of HFC-125 to be 60 wt.%, which are concentrations falling within the claimed ranges. In other words, narrower ranges emerge from Takigawa's teachings.

Appellant further contends that the Board's position that Takigawa teaches at least two end points of Appellants' claimed ranges (i.e., 40% HFC-134a and 60% HFC-125) is contravened by the Examiner's concession on page 5 of the Answer that the rejection is under § 103 not § 102 (Request 20).

The Examiner's statement referenced on page 5 is in rebuttal to Appellants' argument that the composition limited by the transitional phrase "consisting of" is not taught or suggested by Takigawa (Ans. 5). However, the Examiner continues in the same paragraph by determining that Takigawa's simplest binary composition contains most preferably 40% or

more tetrafluoroethane and 40% or more pentafluoroethane (Ans. 5). In other words, the Examiner's finding and our adoption of it, is not contravened by conceding that the rejection is under § 103. To the contrary, as noted throughout our Decision and this Decision on rehearing, Takigawa teaches the binary composition and provides guidance for selecting the values within the claimed ranges within the meaning of § 103.

For the above reasons, the Request for Reopening Prosecution and the Request for Rehearing are denied.

DENIED

bar

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
600 GALLERIA PARKWAY, S.E.  
STE 1500  
ATLANTA, GA 30339-5994

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In Re Application of:

Docket No.: 821920-1030

PONDER, K., et al.,

Art Unit: 1796

Serial No.: 10/937,736

Examiner: John R. Hardee

Filing Date: September 8, 2004

Confirmation No.: 1006

For: **Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant**

**REQUEST FOR REOPENING OF PROSECUTION, OR IN THE ALTERNATIVE FOR  
REHEARING OF DECISION ON APPEAL**

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

Appellants hereby request reopening of prosecution under 37 CFR 41.50(b)(1), or in the alternative, if reopening is denied, rehearing under 37 C.F.R. 41.52 of the Decision on Appeal mailed April 29, 2010. This request is timely submitted being submitted within the two month period provided for in Section 41.52(a)(1).

In support for the request of opening prosecution, Appellants respectfully submit that the Decision raises a number of new grounds of rejection, warranting a reopening of prosecution on the merits.

1) The Decision overlooks the fact that each of the findings that: a) "determining acceptable gas concentration ranges would have been a matter of routine experimentation" (Decision, page 6, lines 5-6); b) "Takigawa's alkane fluoride that is to be mixed with the HFC-134a and HFC-125 blend may be an additional amount of HFC-134a or HFC-125, rather than a different HFC" (Decision, page 5, lines 12-14); c) "Takigawa's Claim 1 recites that the refrigerant includes 'at least one of HFC-134a and HFC-125, which underscores that the simplest refrigerant composition mixture claimed by Takigawa includes the binary mixture of HFC-134a and HFC-125" (Decision, page 5, lines 16-19); and d) "Takigawa's disclosure would have suggested that [sic] at least two of the end points of Appellant's claimed ranges (i.e., 40% HFC-134a and 60% HFC-125" (Decision, page 6, lines 1-3) constitutes a new ground of rejection,

warranting a reopening of prosecution on the merits if such grounds of rejection are to be properly presented in a manner allowing Appellants a full and fair opportunity to respond to these grounds.

In support of the request for reopening prosecution, Appellants submit herewith the Second Declaration of Kenneth M. Ponder addressing some of the new grounds of rejection.

In the alternative, if the request for reopening is denied, in support of this request for rehearing, Appellants respectfully submit that the following points have been misapprehended and/or overlooked by the Board in rendering the Decision.

2) The holding in the Decision that the pending claims are obvious, and, in particular, the finding that “determining acceptable refrigerant gas concentration ranges would have been a matter of routine experimentation” on page 6, lines 5-6, upon which the holding of obviousness is based, overlooks and is contravened by the Examiner’s concession that “different blends of pentafluoroethane and tetrafluoroethane will have very different properties and that one such composition would not render another such composition obvious” on page 7, lines 16-19 of the Examiner’s Answer and, thus, the composition of the pending claims is not rendered obvious. The issue of “routine experimentation” is not presented in the Final Office Action and instead is first raised in the Examiner’s Answer. The point that this concession is an admission that the claimed composition is nonobvious over the single cited reference Takigawa is set forth in the Reply Brief on page 12, lines 10-22.

3) The holding that the pending claims are obvious, and, in particular, the finding that “determining acceptable refrigerant concentration ranges would have been a matter of routine experimentation” (Decision, page 6, lines 5-6) upon which the holding of obviousness is based, overlooks that this finding is unsupported by articulated reasoning as required by KSR. The point that the rejection of the pending claims lacks the articulated reasoning required by KSR is presented in the Appeal Brief, pages 6-7, for example.

4) Further, the Decision states “while Declarants Ponder’s in Gbur’s views that the claimed invention would not have been obvious over Takigawa are not afforded any consideration as they are directed to the ultimate legal conclusion, the underlying analyses that lead to their conclusions in the declarations have been considered”, at page 7, line 21 – page 8, line 3. The Decision, however, completely overlooks the underlying analyses that lead to their



conclusions. There is no discussion whatsoever of the underlying analyses presented in their declarations. Furthermore, the statement in the Decision that “the Ponder declaration merely states that the Declarant found no teaching or suggestion in Takigawa to make a refrigerant composition consisting of tetrafluoroethane and pentafluoroethane as claimed” on page 8, lines 3-6, misapprehends the Ponder declaration. Additionally, the statement in the Decision at page 8, lines 9-11, that “the Gbur Declaration filed May 16, 2008, like the Ponder Declaration, rests its conclusion of non-obviousness on Takigawa’s failure to exemplify a blend of only HFC-134a and HFC-125” is a misapprehension and misstatement of the Gbur Declaration.

5) The Decision further completely overlooks the ASHRAE evidence presented by Appellants as Exhibit C to the Appeal Brief, for example, at pages 12-14, discussed in the Declarations of Ponder and Gbur, and also discussed in the Reply Brief, pages 7-10, which evidence shows that “determining acceptable refrigerant concentration ranges” would not have been a matter of “routine experimentation”.

6) The holding in the Decision affirming the Examiner’s rejection of the pending claims over Takigawa further overlooks the genus-species argument in the Appeal Brief, presented, for example, at pages 9-10.

7) The finding in the Decision that “Takigawa’s disclosure would have suggested that [sic] at least two of the end points of Appellants’ claimed ranges (i.e., 40% HRF-134a and 60% HFC-125)” on page 6, lines 1-3, which is not argued by the Examiner and which first appears in the Decision, overlooks and is contraverted by the Examiner’s concession that “the rejection was made under 103 rather than 102” on page 5, lines 13-14 of the Examiner’s Answer and further overlooks and is contraverted by the Examiner’s admission that “[t]his reference [Takigawa] differs from the claimed subject matter in that it does not disclose a composition which reads on applicant’s claims with sufficient specificity to constitute anticipation” (emphasis added) (Office Action mailed December 17, 2007, page 3, lines 4-6, which is incorporated by reference in the Final Office Action mailed June 27, 2008 on page 2, paragraph 1.

In view of the foregoing, as further detailed below, Appellants respectfully request that:

a) in view of the new grounds of rejection, the Decision be vacated, the Final Office Action withdrawn and prosecution on the merits re-opened, with the file remanded to the Examiner for further action allowing Appellants full and fair opportunity to respond to the new grounds of

rejection; or b) in the alternative, if the request for reopening is denied, the matter be reheard, the Decision vacated and the rejection of the pending claims be reversed.

#### Background – The Decision

The Decision holds that the single cited reference in support of the rejection of the claims under 35 U.S.C 103(a), namely US Patent No. 6,207,071 to Takigawa, discloses a binary refrigerant composition including HFC-134a (tetrafluoroethane) in an amount of 40-60% by weight and HFC-125 (pentafluoroethane) in a an amount of 60-40% by weight. The Decision acknowledges, however, that such holding does not read on the cited claims at issue which recite about 40 to about 45% HFC-134(a) and about 55 to about 60% HFC-125. To conclude that Takigawa teaches the claimed ranges in the pending claims, the Decision inconsistently relies on the holding that “given the guidance provided by Takigawa, determining acceptable refrigerant gas concentration ranges would have been a matter of routine experimentation” (see, Decision, page 6, lines 5-6) which holding is a new ground for rejection and further is contravened by the Examiner’s concession, among others, that the refrigerant gas composition recited in the pending claims would not be rendered obvious by another composition of the same refrigerant gases. This holding concerning “routine experimentation” lacks articulated reasoning as to how or why such would have been a matter of “routine experimentation”. Nor is any such explanation provided by the Examiner. In fact, there is no mention of or reliance whatsoever upon “routine experimentation” in the Final Office Action mailed June 27, 2008 to support the final rejection of the pending claims.

Further, to conclude that Takigawa teaches the claimed ranges in the pending claims, the Decision relies on the finding that “Takigawa’s disclosure would have suggested at least two of the end points of Appellants’ claimed ranges (i.e., 40% HFC-134a and 60% HFC-125)”, which is also a new ground for rejection being a new interpretation of Takigawa not previously argued by the Examiner, and which is further contravened by the Examiner’s concession that “[t]his reference [Takigawa] differs from the claimed subject matter [which includes claims 3, 8 and 23 that recite a refrigerant composition of about 40% HFC-134a and about 60% HFC-125] in that it does not disclose a composition which reads on applicant’s claims with sufficient specificity to constitute anticipation.” (Office Action mailed December 17, 2007, page 3, lines 4-6, and incorporated by reference in the Final Office Action, page 2, paragraph 1; emphasis added).

The Decision also construes for the first time that “Takigawa’s alkane fluoride that is to be mixed with the HFC-134a and HFC-125 blend may be an additional amount of HFC-134 or

HFC-125, rather than a different HFC (Decision, page 5, lines 12-14) and that “Takigawa’s claim 1 recites that the refrigerant includes at least one of HFC-134a and HFC-125, which underscores that the simplest refrigerant composition claimed by Takigawa includes that binary mixture of HFC-134a and HFC-125” (Decision, page 5, lines 16-19). Both of these statements are new to the proceedings, constituting a position or rationale new to the proceedings and a new inference drawn from an existing reference.

### Argument

Appellants first address the request for reopening of prosecution, followed by their alternative request for rehearing in detail below.

### A – Request for Reopening of Prosecution

1) The Decision introduces a number of new grounds of rejection. A new ground of rejection is any position or rationale new to the proceedings, including new evidence, citation to a new portion of existing evidence, a new inference drawn from an existing reference, a new legal theory, or a new application of law to facts. *In re DeBlauwe*, 736 F.2d 699, 706, 222 USPQ 191, 197 (Fed. Cir. 1984) (interpreting “new ground” in 37 CFR 1.196(b)); *In re Kronig*, 539 F.2d 1300, 1302-03, 190 USPQ 425, 426 (CCPA 1976); *In re Eynde*, 480 F.2d 1364, 1370-71, 178 USPQ 470, 474 (CCPA 1973) (“We do agree with appellants that where the board advances a position or rationale new to the proceedings... the appellant must be afforded an opportunity to respond to that position or rationale by the submission of contradicting evidence. This court so held in *In re Moore*, [444 F.2d 572, 170 USPQ 260 (CCPA 1971)], and we expressly reaffirm that view. The board’s refusal to consider evidence which responds to such a new rationale is error.”); *Ex parte Teeple*, Appeal No. 97-0943, 1997 WL 1883925 at \*2-3, <http://www.uspto.gov/go/dcom/bpail/decisions/fd970943.pdf> at 7, 9 (BPAI Feb. 17, 1998) (new explanation for § 112 ¶ 2 rejection of same claim language is “new ground” of rejection); MPEP § 1207.03(III) (8th Ed. Rev. 3, August 2005) (deferring to the *Kronig* line of case law for the definition of the term “new ground”); MPEP § 1208.01 (7th Ed. and 8th Ed. Jul. 1998-May 2004) (likewise deferring to *Kronig*); Final Rule, 62 FR 53132, 53168 (Oct. 10, 1997) (likewise deferring to *Kronig*).

A “new ground of rejection” is a procedural, not a substantive, issue under 37 CFR 1.104(c)(2). Accordingly, while a reference may be good for all it contains, an action, whether it be an Office Action or a Board decision, may not rely on the fact that the same reference was relied upon in a previous action in order to make a rejection final. Further, a new ground of rejection is

presented even in circumstances where the Examiner changes position in response to Applicants arguments. In *re Kumar*, 418 F.3d 1361, 1367, 76 USPQ2d 1048, 1051-1052 (Fed. Cir. 2005); *In re DeBlauwe*, 736 F.2d 699, 705-706, 222 USPQ 191, 196-197 (Fed. Cir. 1984). Applicants must be given an opportunity to react to the substance of any new ground. *Kronig*, 539 F.2d at 1303, 190 USPQ at 426, regardless of the time in which the “new position or rationale” arises.

Here, the reliance on “routine experimentation” for the rejection of the pending claims is a new ground of rejection. No reference to or reliance upon “routine experimentation” is presented in the Final Office Action having a mailing date of June 27, 2008. Thus the Applicants have been denied full and fair opportunity to rebut this allegation.

Not only is the reference to and reliance upon “routine experimentation” a “new ground of rejection”, but so are the new characterizations of Takigawa presented in the Decision.<sup>1</sup> The Decision comments “in other words, Takigawa’s alkane fluoride that is to be mixed with the HFC-134a and HFC-125 blend may be an additional amount of HFC-134a or HFC-125, rather than a different HFC.” This sentence constitutes a new characterization of Takigawa. This argument had not been previously presented by the Examiner in either the Final Office Action or the Examiner’s Answer. Additionally, besides rendering the particular sentence nonsensical, this interpretation of Takigawa actually teaches away from the recited compositions of the claims. This newly presented interpretation in the Decision suggests that the particular sentence in effect states that there is no restriction as to the amount of HFC-134a that can be mixed with HFC-134a and likewise no restriction on the amount of HFC-125 that can be mixed with HFC-125. Additionally, the teaching that there is no restriction as to the amount of HFC-134a and HFC125 that can be added is contrary to the recitations in the claims. To the contrary, the claims recite a significant restriction to the amounts of HFC-125 and HFC-134a are quite limited. The claims recite that there is a distinct limit as to the amount of HFC-134a and HFC-125 that can be present. In the case of claims 3, 8 and 23, the recited amount of HFC-134a is about 40% and not more. The above interpretation described above and presented in the Decision teaches away from such recitation, that the amount of HFC-134a can be more,

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<sup>1</sup> In this regard, Appellants note the statement in the Decision at page 5 that Appellants’ argument that “consisting of” excludes additional refrigerants overlooks the Examiner’s position that Takigawa’s unrestricted disclosure of HFCs that may be mixed with the refrigerant means that no additional HFC need be added to the HFC-134a and HFC-125 blend. The Examiner’s reliance on Takigawa is based on the citation at column 8, lines 20+ which includes at lines 29-31 the contradictory statement “there is no restriction as to the kind of HFC (hydrofluorocarbon) to be mixed with HFC-134a and/or HFC-125” (emphasis added). The word “may” does not appear in this sentence.

much more than 45% as recited in claim 21, let alone the about 40% recited in claims 3, 8 and 23.

Appellants also note the reference to Takigawa's claim 1 in the Decision on page 5 is new to the proceedings. It is a citation to a new portion of the existing reference Takigawa. No reliance is made by the Examiner, however, to Takigawa's claim 1 in neither the Final Office Action or the Examiner's Answer, suggesting again that the Decision is relying on a new interpretation of the cited reference Takigawa not previously presented or relied upon.

Furthermore, the statement in the Decision on page 6, that "Takigawa's disclosure would have suggested that [sic] at least two of the end points of Appellants' claimed ranges (i.e., 40% HFC-134a and 60% HFC-125)" also is new to the proceedings. This also is a new characterization of Takigawa. This argument had not been previously presented by the Examiner in either the Final Office Action or the Examiner's Answer.

Each of the four above referenced statements individually introduces a new ground of rejection. Each is a position or rationale new to the proceedings. Additionally, the reference to "routine experimentation" is a reference to a new legal theory. The reference to claim 1 for further interpretation of Takigawa constitutes a citation to a new portion of the existing evidence. The remaining two points additionally constitute a new inference drawn from an existing reference. Each on its own, thus, constitutes a new ground of rejection permitting reopening of prosecution.

The Second Declaration of Kenneth M. Ponder submitted herewith shows that here would be nothing routine about the experimentation admittedly required experimentation to modify Takigawa in order to arrive at the claimed refrigerant composition. Takigawa is not a refrigerant designing a patent, meaning that Takigawa shows no interest in and presents no teaching as to how one would select from the large class of HFC refrigerants referenced in the patent any one or more particular refrigerant gases or any particular concentrations or ranges of the gases to design a refrigerant composition for use in a refrigeration system. Instead, Takigawa is a lubricant design patent, meaning that the purpose of Takigawa is to determine or design a lubricant for use with any and all refrigerants in the large class and range of HFC refrigerant gases, which covers hundreds if not thousands of potential refrigerant compositions.

Ponder also declares that there is a large number of properties that need to be evaluated when selecting and designing a refrigerant composition, including: 1) molar mass, 2) normal boiling point or bubble point, 3) blend dew point, 4) saturated liquid density, 5) saturated vapor density, 6) NBP latent heat of vaporization, 7) saturated vapor pressure at one

temperature, 8) saturated vapor pressure at another temperature, 9) critical point temperature, 10) critical point pressure, 11) ozone depletion potential (ODP), 12) global warming potential (GWP), 13) concentration limit, 14) capacity, 15) coefficient of performance (COP); and 16) fractionation quality. The large number of properties that need to be evaluated further shows that there is nothing routine about designing a refrigerant composition in view of Takigawa. None of these considerations are mentioned in Takigawa.

Further, attached to the Second Declaration of Kenneth M. Ponder is a report comparing Appellants' R-421A refrigerant gas composition that is the subject of the pending claims to the gas composition R-422B which is a combination of 55% pentafluoroethane (HFC-125), 42% tetrafluoroethane (HFC-134a) and 3% R-600A (isobutene). This R-422B gas composition, thus, is a refrigerant gas composition having both HFC-125a and HFC-134a within the range of 40-60%. The R-422B refrigerant gas composition, thus, is a refrigerant gas composition that falls within the purported teachings of Takigawa described in the Decision. The report shows, however, that R-421A of the presently pending claims is superior R-422B. Furthermore, Ponder's declaration shows that the refrigerant gas composition of the pending claims achieved unexpected results in the form of achieving the best fractionation quality in the industry, meaning that it fractionates less than any other known refrigerant and it is the best known substitute for R-22. It also shows R-421A better matches R-22 and has a better coefficient of performance than the others, including in particular R-422B that also has HFC-125 and HFC-134a in the ranges of 40%-60%.

This new evidence in the form of the Second Declaration of Kenneth M. Ponder shows that the rejection of the pending claims should be withdrawn and the pending claims allowed.

#### B- Alternative Request for Rehearing

In the alternative, should Appellants' request for reopening prosecution be denied, Appellants hereby request rehearing, as detailed below. In support of Appellant's alternative request for rehearing, Appellants show the following. It should be noted that if any of the arguments presented below is considered to be a new argument, that the new argument is presented as a result of the new grounds of rejection discussed above.

As shown below, the Decision overlooks and/or misapprehends a number of points which materially effect the holding of the Decision and show that the Decision should be vacated, the rejection of the claims withdrawn, and ultimately the claims allowed. The

discussion below also demonstrates that the rejection of pending claims in the Final Office Action is a matter of impermissible hindsight, not foresight.

2) The holding and reliance upon “routine experimentation” overlooks and is contravened by the Examiner’s admission “that different blends of pentafluoroethane and tetrafluoroethane will have very different properties and that one such composition would not render another such composition obvious”. (See, Examiner’s Answer, page 7, lines 16-19; emphasis added). How can something be a matter of “routine experimentation” when it is conceded that different blends of the two refrigerants in question, namely pentafluoroethane and tetrafluoroethane will have very different properties and that one such composition would not render another such composition obvious? This concession concedes the non-obviousness of the pending claims in view of Takigawa. This concession concedes that any composition not anticipated by Takigawa is not rendered obvious by Takigawa. And the Examiner conceded the rejection is not based on anticipation under Section 102 (see Examiner’s Answer, page 5, lines 13-14).

Furthermore, the Examiner concedes “the behavior profiles of various refrigeration mixtures made according to the reference will be vastly different.” Id. lines 3-4 (emphasis added). This, too, is overlooked. How can something be a matter of “routine experimentation” when it is conceded that the behavior profiles of various refrigeration mixtures made according to the reference will be vastly different?

These concessions by the Examiner contravene the holding that “determining acceptable refrigerant gas concentration ranges would have been a matter of routine experimentation”. These concessions are addressed, for example, in the Reply Brief, page 12, lines 10-22. In view of these concessions, the purported experimentation required would be far from routine. These concessions acknowledge that there can be no reasonable expectation of success by such purported experimentation. Nor would the results from any such experimentation necessarily be sufficiently predictable to support the holding of “routine experimentation”.

These concessions by the Examiner were made in view of the evidence presented by the Appellants, which evidence included “ASHRAE evidence” and the Declarations of Ponder and Gbur (Exhibits A-C to Appellant’s Appeal Brief). This evidence shows that there would be nothing routine about such purported experimentation, as discussed in more detail below under Sections 3 and 4 below.

Appellants further respectfully submit that the Decision mischaracterizes Appellant's argument relying on Appellants' own US Patent No. 7,320,763, which patent is directed to a composition of about 85% HFC-125 (pentafluoroethane) and about 15% HFC-134a (tetrafluoroethane). If, as asserted in the Examiner's Answer and in the Decision that "determining acceptable refrigerant gas concentration ranges would have been a matter of routine experimentation" rendering the claims obvious, then such would also apply to the 85/15 blend of pentafluoroethane to tetrafluoroethane in the '763 patent. The Office, however, has already concluded exactly the opposite. The Office Action has already found that the 85/15 blend of the '763 patent is not the subject of "routine experimentation" and is not obvious. The statement that "determining acceptable refrigerant gas concentration ranges would have been a matter of routine experimentation" is not limited to any particular ranges as being a matter of routine experimentation, particularly in view of the lack of articulated reasoning concerning what constitutes routine experimentation and why, as shown below. It, thus, can not be distinguished from the contradictory conclusion that the 85/15 blend of Appellants' '783 patent is not obvious.

3) Both the Examiner's Answer and the Decision lack the "articulated reasoning with some rational underpinning" to support the holding of obviousness of the pending claims based on "routine experimentation" required by KSR. And, of course, the Final Office Action lacks such required articulated reasoning since it makes no reference whatsoever to "routine experimentation". This renders the reliance of "routine experimentation" a new ground of rejection, as demonstrated below. The issue of lack of articulated reasoning is presented, for example, in the Appeal Brief, pages 6-7.

As stated in KSR Int'l Co. v. Teleflex Inc., 119 Fed. Appx. 282 (2007):

Following these principles may be more difficult in other cases than it is here because the claimed subject matter may involve more than the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement. Often, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicit. See *In re Kahn*,



441 F. 3d 977, 988 (CA Fed. 2006) (“[R]ejections on the obviousness grounds cannot be sustained by mere conclusory statements; instead there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”).

The finding that “determining acceptance refrigerant gas concentration ranges would have been a matter of routine experimentation” is a mere conclusory statement, lacking the articulated reasoning required to support the finding. In particular, the Decision references “the guidance provided by Takigawa” to support the statement. The Decision, however, fails to identify what guidance is provided by Takigawa to suggest that the admittedly required experimentation would be “routine”. No other reasoning, let alone any articulated reasoning, is provided to support the statement that “determining acceptable refrigerant gas concentration ranges would have been a matter of routine experimentation”.

The “guidance provided by Takigawa” is not at all directed to how one skilled in the art would select one or more refrigerant gases for a refrigerant composition from the multitudes of HFC gases identified, or once selected how one skilled in the art would select the desired concentration ranges or ratios of the selected gases. Instead, the problem to which Takigawa is directed is solving which lubricant should be included with any of a large number of HFC refrigerant gases and combination of gases. In this regard, contrary to the statement in the Examiner's Answer and in the Decision, the problem to which Takigawa is directed is relevant in that it shows that Takigawa provides no guidance on how to determine acceptable refrigerant gas concentration ranges, let alone which gases to select among the large class of unrestricted HFCs “to be mixed”. Therefore, Takigawa provides no guidance for “determining acceptable refrigerant gas concentration ranges”.

In fact, Takigawa teaches exactly the opposite, namely that there is no need to determine acceptable refrigerant gas concentration ranges. As conceded by the Examiner in the Answer at page 3, lines 11-12, Takigawa discloses that there is “no restriction as to the kind of HFC to be mixed with” the disclosed refrigerants. (See also Takigawa, col. 8, lines 28-31; emphasis added). This teaches, and the Examiner concedes, that there is no limit to the acceptable amount of refrigerant gas to be mixed. Nor is there any limit whatsoever to the kind

of HFC gas to be mixed.<sup>2</sup> In the event that the statement in the Decision that “Takigawa’s alkane fluoride that is to be mixed with the HFC-143a and HFC-125 blend may be an additional amount of HFC-134a or HFC-125, rather than a different HFC” (Decision, page 5, lines 12-14) is accepted then Takigawa teaches, and the Examiner concedes, that there is no restriction to the amount of HFC-134a and/or HFC-125 to be added. This is the complete opposite of the recitation in the pending claims. The pending claims recite a very specific and narrow range for HFC-134a and HFC-125. The pending claims recite exactly the opposite – that there is a definite restriction as to the kind and amount of HFC to be mixed.

A review of claims 3, 8 and 23 further shows that Takigawa fails to support a finding that “determining acceptable refrigerant gas concentration ranges would have been a matter of routine experimentation”. Claims 3, 8 and 23 recite a refrigerant composition having about 40% HFC-134 and about 60% HFC-125. The Examiner argues that Takigawa teaches refrigerants including “alkane fluorides containing 40% or more of R134a” (see Examiner’s Answer, page 3, line 9). The interpretation in the Decision that Takigawa teaches that the HFC “to be mixed” can include an additional amount of HFC-134a, considering Takigawa’s admitted teaching that there is no restriction as to the amount to be added, then teaches away from a composition having only about 40% HFC-134a and no more HFC-134a than about 40%. The same applies to claims 4, 9 and 25 that recite about 42% HFC-134a to about 58% HFC-125, and claims 5, 10 and 24 that recite about 45% HFC-134a to about 55% HFC-125.

The Decision comments that Appellants’ argument that Takigawa is directed to solving a different problem is unpersuasive “because the Examiner’s reason for modifying the prior art to arrive at the claimed invention need not be the same as Appellant’s reason for making the claimed invention.” This statement, however, overlooks that no reason is provided by the Examiner for modifying Takigawa to arrive at the ranges for HFC-134a and HFC-125 recited in the pending claims – other than hindsight application of Appellants’ teachings. This again violates KSR’s requirement that the rejection on obviousness be based on “articulated reasoning”.

If the “guidance” for “determining acceptable refrigerant gas concentration ranges” would have been a matter of routine experimentation” is to be found outside Takigawa, again the

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<sup>2</sup> In this regard, Appellants still maintain that Takigawa fails to teach a refrigerant composition “consisting of” pentafluoroethane and tetrafluoroethane to the exclusion of any other refrigerant gases. Takigawa teaches “there is no restriction as to the kind of HFC (hydrofluorocarbon) to be mixed.” (Column 8, lines 29-30). The plain and ordinary meaning of the phrase “no restriction as to the kind of HFC to be mixed” contradicts the interpretation of Takigawa provided in the Decision that Takigawa teaches the exclusion of any and all HFCs other than HFC-134a (tetrafluoroethane) and HFC-125b (pentafluoroethane).

Examiner's Answer and the Decision fail to identify or cite to any such "guidance". No citation is provided at all as to where such guidance can be found outside Takigawa. The Decision cites to the Examiner's Answer "3, 5-6". There is, however, no citation to any such "guidance" at any of those pages of the Examiner's Answer.

The Decision goes on to comment that "Takigawa would have suggested the claimed refrigerant composition such that there is a reasonable expectation of successfully achieving the claimed refrigerant composition, which would necessarily have the same properties as Appellant's claim composition" (Decision, page 6, line 24 – page 7, line 2). This statement overlooks and is contravened by the Examiner's concessions identified above. In particular, as conceded, a composition of 40% HFC-134a and 60% HFC-125 would have a vastly different behavior profile and very different properties than the reverse composition of 60% HFC-134a and 40% HFC-125. And as shown by the ASHRAE evidence and the Declarations of Ponder and Gbur, a 40/60 ratio of HFC-134a to HFC-125 could not be reasonably expected to be used in place of or as a suitable replacement for 60% HFC-134a and 40% HFC-125.

The Decision further overlooks that there is no recognition in Takigawa that different ratios of pentafluoroethane to tetrafluoroethane can result in refrigerant gas compositions for different temperature applications, where one composition has vastly different properties to another such composition. Thus, there is no teaching or suggestion in Takigawa showing how one would apply "routine experimentation" to combine pentafluoroethane to tetrafluoroethane, as recited in the pending claims, to create a refrigerant gas composition having a temperature/pressure profile the provides superior properties for use in high and medium temperature applications for replacement of R-22, as argued in the Appeal Brief at pages 10, 12-14.

As stated in In re Dow Chemical Company, 837 F.2d 469, 476 (Fed. Cir. 1988), both the suggestion and expectation of success must be founded in the prior art, not in Applicant's disclosure. Stated another way, obviousness, particularly in the form of "routine experimentation", is determined as a matter of foresight, not hindsight. In the present case, the record shows that neither the suggestion for creating a refrigerant gas composition having a temperature/pressure profile that provides superior properties for use in high and medium temperature applications, nor the expectation of success of developing such a refrigerant gas composition, is founded in the prior art, particularly in Takigawa.

The reference, therefore, to "routine experimentation" amounts to no more than a conclusory statement in violation of KSR. There is simply no explanation or articulated

reasoning in either the Decision or the Examiner's Answer as to how the purported experimentation would be "routine" in view of the Examiner's concessions that 1) "different blends of pentafluoroethane and tetrafluoroethane will have very different properties and that one such composition would not render another such composition obvious"; and 2) that "the behavior profiles of various refrigeration mixtures made according to the reference will be vastly different" (emphasis added).

In view of the failure to provide articulated reasoning as to why "determining acceptable refrigerant gas concentration ranges would have been a matter of routine experimentation". This statement amounts to nothing more than the equivalent of "official notice". The Manual of Patent Examining Procedure (MPEP) defines the standard for taking official notice. As provided in MPEP § 2144.03:

Official notice without documentary evidence to support an examiner's conclusion is permissible only in some circumstances. While "official notice" may be relied on, these circumstances should be rare when an application is under final rejection or action under 37 CFR 1.113. Official notice unsupported by documentary evidence should only be taken by the examiner where the facts asserted to be well-known, or to be common knowledge in the art are capable of instant and unquestionable demonstration as being well-known. As noted by the court in *In re Ahlert*, 424, F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970), the notice of facts beyond the record which may be taken by the examiner must be "capable of such instant and unquestionable demonstration as to defy dispute" (citing *In re Knapp Monarch Co.*, 296 F.2d 230, 132 USPQ 6 (CCPA 1961)).

As provided in MPEP § 2144.03 (emphasis added):

If applicant adequately traverses the examiner's assertion of official notice, *the examiner must provide documentary evidence in the next Office action* if the rejection is to be maintained. See 37 CFR 1.104(c)(2).

In the instant case, Appellants respectfully submit that, as shown by the record on this appeal, determining acceptable refrigerant gas concentration ranges is not a matter of routine experimentation and is not known so as to be capable of instant and unquestionable demonstration. Accordingly, Appellants respectfully submit that they have traversed the reliance upon "routine experimentation", requiring that continued reliance on "routine experimentation" requires presentation of documentary evidence, or in the alternative an

affidavit under 37 USC 1.104, both of which are lacking in the record. Since they are lacking the “official notice” of “routine experimentation” should be withdrawn.

Lastly, a holding of obviousness requires an evaluation of the Graham v. John Deere factors, in particular, the level of skill in the art. There is no evaluation in either the Decision or the Examiner's Answer as to the level of skill in the art or how any purported level of skill in the art would apply to a determination of whether or not “determining acceptable refrigerant gas concentration ranges would have been a matter of routine experimentation” in the present case. This further demonstrates the lack of articulated reasoning required by KSR to support the holding. See, for example, Ex parte Whalen II, Appeal No. 2007-4423, (BPAI July 23, 2008.) (Examiner's statement “it would have been obvious to optimize the viscosity range of [the known] compositions by routine experimentation” insufficient to support the rejection).

4) The Decision also misapprehends the declarations of Ponder and Gbur, which declarations show that there would be nothing routine about the purported experimentation admittedly required of Takigawa to render the pending claims obvious. The Decision fails to address the underlying analysis and facts presented in their declarations and thus overlooks their declarations.

For example, the Ponder Declaration, page 1, paragraph 3 (Exhibit A to Appeal Brief), shows that the refrigerant of the present application, referred to as R-421A is marketed toward different applications to meet different customer needs than Appellants refrigerant composition referred to as R-421B having 85% pentafluoroethane and 15% tetrafluoroethane. The Ponder Declaration further states that: “The industry has not yet found a single refrigerant composition that could replace R-22 for use over the entire array of temperatures over which R-22 is used. As a result, the industry has had to come up with multiple refrigerant compositions covering different ranges of temperatures.” Id. at paragraph 5. The Ponder Declaration further states that Appellants' R-421A and R-421B refrigerants were developed to address different uses in the marketplace, in particular, to address different temperature applications. Id. at paragraph 6. The Ponder Declaration further states that the refrigerant of the present application, R-421A, is superior to R-421B in high and medium temperature applications. Id. at paragraph 7. The Ponder Declaration ends with the statement:

I have read U.S. Patent No. 6,207,071 (Takigawa et al.) and do not find any mention or suggestion in Takigawa of combining pentafluoroethane with tetrafluoroethane to create a composition including refrigerant gases consisting

of pentafluoroethane and tetrafluoroethane to the exclusion of other refrigerant gases except for impurities ordinarily associated with those two gases having a temperature-pressure profile that provides superior properties for use in high and medium temperature applications, as described above. (emphasis added).

As seen from above, it is misstatement in the Decision to say “the Ponder Declaration merely states that the Declarant found no teaching or suggestion in Takigawa to make a refrigerant composition consisting of tetrafluoroethane and pentafluoroethane as claimed” (Decision, page 8, lines 3-6). To the contrary, the Ponder Declaration states that he does not find any mention or suggestion in Takigawa of a refrigerant composition consisting of pentafluoroethane with tetrafluoroethane, to the exclusion of other refrigerant gases except for impurities ordinarily associated with those two gases, having a temperature/pressure profile that provides superior properties for use in high and medium temperature applications, as described in his declaration.

The Ponder Declaration, therefore, contraverts the holding that “determining acceptable refrigerant gas concentration ranges would have been a matter of routine experimentation”. There is no recognition anywhere in Takigawa of what experimentation or how experimentation would be used to develop a refrigerant composition consisting of pentafluoroethane and tetrafluoroethane having a temperature/pressure profiles that provides superior properties for use in high and medium temperature applications. Further, there is no explanation as to how or why any such experimentation would have been routine.

“Where the prior art [gives] either no indication of which parameters [are] critical or no direction as to which of many possible choices is likely to be successful.” *In re O’Farrell*, 853 F.2d 894, 903 (Fed. Cir. 1988). In such cases, ‘courts should not succumb to hindsight claims of obviousness.’” Thus, Takigawa fails to render obvious the recitations of the pending claims. Additionally, an exception to obviousness is where the parameter optimized by the inventors is not recognized in the prior art as one that would affect the results. *In re Antonie*, 559 F.2d 618, 620 (CCPA 1977).

As shown from the foregoing, such is the case here. More particularly, there is no recognition in Takigawa of any need or desire to address the issue of a refrigerant composition having a temperature-pressure profile that provides superior properties for use in high and medium temperature applications for the replacement of R-22. Nor is there any indication in Takigawa of which parameters are critical, or any direction as to arrive at a refrigerant

composition having a temperature-pressure profile that provides superior properties for use in high and medium temperature applications for the replacement of R-22.

Similarly, the Decision misapprehends the Gbur Declaration filed May 16, 2008 (Exhibit B to Appeal Brief). The statement in the Decision that “the Gbur Declaration filed May 16, 2008, like the Ponder Declaration, rests its conclusion of non-obviousness on Takigawa’s failure to exemplify a blend of HFC-134a and HFC-125 (Gbur Dec. 2)<sup>3</sup>”, page 8, lines 9-11, is an incorrect statement that misapprehends the Gbur Declaration. In his statement, Mr. Gbur states that he served on the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (“ASHRAE”) Standard Project Committee 34 from 2002 to 2007 and the work of this committee included review and issuance of ASHRAE Standards. *Id.* at paragraph 5. He further states that his committee recognized that blends of refrigerant gases having this same components in different proportions can produce different blend compositions having different refrigerant properties, as typically reflected by differences in temperature/pressure profiles of the refrigerant blend compositions.

He further states that ASHRAE gives each different refrigerant blend a distinct designation number, or Refrigerant Number, and in the case of blends having the same components but differing only in the proportions of the components the differences are identified by designating each refrigerant blend with the same Refrigerant Number to show the blends have the same components but with a different uppercase letter to recognize that different blends result in different refrigerants. He gives an example that ASHRAE has granted different refrigerant designation numbers to refrigerant compositions consisting of difluoromethane (HFC-132), pentafluoroethane (HFC-125) and tetrafluoroethane (HFC-134a) where these three refrigerant components are present in different proportions as evidenced by designation numbers R-407A (a 20-40-40 proportion blend), R-407B (a 10-70-20 proportion blend), R-407C (a 23-25-52 proportion blend), R-407D (a 15-15-70 proportion blend), and R-407E (a 25-15-60 proportion blend) citing the ASHRAE Standard 34-2001 (2003) which is included as Exhibit C to the Appeal Brief. *Id.* paragraph 6.

In the closing paragraph of his Declaration, Mr. Gbur comments that he has reviewed the Takigawa reference. Mr. Gbur also states:

Further, in view of the different designations by ASHRAE of even the same refrigerant gas components provided in different proportions (such as R407A, R407B, etc.) in my opinion it would not be obvious to one skilled in the art of

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<sup>3</sup> It should be noted that no such statement appears in paragraph 2 of this Gbur Declaration.

refrigerant gas compositions to produce a refrigerant gas composition containing only about 40% to about 45% by weight tetrafluoroethane and about 55% to about 60% by weight pentafluoroethane from the teachings in the Takigawa patent. Id. at paragraph 7.

Thus, it is seen that, contrary to the statement in the Decision, the Gbur Declaration does not merely rest its conclusion of non-obviousness on Takigawa's failure to exemplify a blend of only HFC-134a and HFC-125. His conclusion is also based on his background and experience on the ASHRAE Standards Committee that determines when a refrigerant composition is entitled to a new designation and ASHRAE's recognition that different designations of even the same refrigerant gas components provided in different proportions (such as R-407A, R-407B, etc.) shows that it would not be obvious to one skilled in the art of refrigerant gas compositions to produce a refrigerant gas composition containing only about 40% to about 45% by weight tetrafluoroethane and about 55% to about 60% by weight pentafluoroethane from the teachings in the Takigawa reference.

As shown from the foregoing, the Decision, like the Examiner's Answer, does not address in any detail the actual bases and statements presented in the Ponder and Gbur Declarations. As noted in Ex parte Malone, Appeal 2009-003894 (BPAI August 27, 2009), this is improper. As stated by the Board in that case:

Whether the claimed invention would have been obvious can not be determined without considering evidence attempting to rebut the prima facie case. Manifestly, the Examiner's consideration and treatment of the Nikirk Declaration is improper, since the Examiner has not reweighed the entire merits of the matter. Rather, he has dismissed the evidence of non-obviousness in a cursory manner. Since the Examiner did not properly consider the submitted evidence, the rejection can not be sustained. (pages 4-5).

5) In addition to overlooking and misapprehending the declarations of Ponder and Gbur, the Decision completely overlooks the ASHRAE evidence submitted with and discussed in the Appeal Brief, Exhibit C. The issuance of different ASHRAE designations demonstrates that the industry recognizes that the presence or absence of even a small amount of refrigerant gas materially affects the basic properties of a given refrigerant composition. As demonstrated by the different ASHRAE designations for refrigerant blends "consisting of" the same refrigerant gas components but in different concentrations, such as those discussed above, discussed in



the Ponder and Gbur Declarations, and in the Appeal Brief, pages 12-14, and in the Reply Brief, pages 7-10, one skilled in the art would not expect the properties of one refrigerant composition with one set of proportions would be similar to the properties of another refrigerant composition, even when having the same gas components but in different proportions.

The Decision, therefore, overlooks this evidence, for example, the blend of 23%/25%/52% of HFC-132, HRF-125 and HFC-134a, respectively, is given the Refrigerant Number that is R-407C, while a blend of 25%/15%/60% of the same components is given the Refrigerant Number R-407E by ASHRAE recognizing that these two blends represent significantly different refrigerant compositions, even though there is only a 2% difference in HFC-132, a 10% difference in HFC-125, and an 8% difference in HFC-134a. Similarly, even Takigawa references at column 8, lines 51-53 a refrigerant R-410A, a 50/50 blend of HFC-32/HFC-125, and R-410B, a 45/55 blend of HFC-32/HFC-125, that have only a 5% difference but yet are recognized by ASHRAE to be significantly different to warrant each having its own Refrigerant Number.

6) The holding in the Decision affirming the Examiner's rejection of the pending claims over Takigawa further overlooks the genus-species argument in the Appeal Brief, presented, for example, at pages 9-10. Here, Takigawa discloses:

The refrigerants used for a refrigerating machine together with the refrigerating machine oil this invention, include an alkane fluoride having one to three carbon atoms, preferably one to two carbon atoms and containing 40% by weight or more of 1,1,1,2-tetrafluoroethane (HFC-134a) and/or an alkane fluoride having 1 to 3 carbon atoms, preferably 1 to 2 carbon atoms and containing 20% by weight or more, preferably 30% by weight or more, preferably 40% by weight or more pentafluoroethane (HFC-125).

There is no restriction as to the kind of HFC (hydrofluorocarbon) to be mixed with HFC-134a and/or HFC-125. See column 8, lines 20-31.

There is, therefore, no limit to either the type or amount of HFC (hydrofluorocarbons) to be mixed with HFC-134 and/or HFC-125. The possible combinations, thus disclosed by Takigawa, literally ranges in the hundreds, if not thousands, if not more. Since Takigawa is concerned with selecting a lubricant to be used with any of this large class of HFCs, there is no teaching in Takigawa to select a particular species within this large genus.

7) Additionally, the holding that “Takigawa’s disclosure would have suggested that [sic] at least two of the end points of Appellants’ claimed ranges (i.e., 40% HFC-134a and 60% HFC-125)” overlooks and is contravened by the Examiner’s concession that “the rejection was made under 103 rather than 102” (See, Examiner’s Answer, page 5, point 2). More particularly, the Examiner concedes that: “This reference [Takigawa] differs from the claimed subject matter in that it does not disclose a composition which reads on Applicant’s claimed with sufficient specificity to constitute anticipation” in the Office Action mailed December 17, 2007. The reasons of the December 17, 2007 Office Action are incorporated by reference in the Final Office Action, page 2, paragraph 1. At the time of the mailing of the December 17, 2007 Office Action, claims 3, 8 and 23 were already pending, corresponding to presently pending claims 3, 8 and 23, which recite “said pentafluoroethane [HFC-125] is present in the ratio of about 60% by weight to said tetrafluoroethane [HFC-134a] present in an amount of about 40% by weight”.

The Examiner’s concession that Takigawa “does not disclose a composition which reads on Appellants’ claims with sufficient specificity to constitute anticipation” included claims 3, 8 and 23. The Examiner’s acknowledgement that Takigawa does not anticipate, therefore, claims 3, 8 and 23 constitutes a concession that Takigawa’s disclosure does not disclose a refrigerant composition having 40% HFC-134a and 60% HFC-125. The Examiner’s concession, thus, contravenes the holding that “Takigawa’s disclosure would have suggested that [sic] at least two of the end points of Appellant’s claimed ranges (i.e., 40% HFC-134a and 60% HFC-125)”.

### CONCLUSION

In view of the foregoing, Appellant's respectfully submit that reopening of prosecution is in order in view of the new grounds of rejection in the Decision and respectfully request reopening of prosecution to consider the new evidence considered herewith. In the alternative, should the Board deny Appellants' request for reopening of prosecution, Appellants respectfully submit that rehearing is in order in view of the points enumerated in detail above that are overlooked and/or misapprehended by the Decision, which points materially effect the holding of obviousness of the pending claims in view of Takigawa and the affirmance of the rejection of all of the pending claims. They show, for example, that the finding of "routine experimentation" is unsupported by the record. These points and the arguments presented herewith demonstrate that the holding of obviousness should be withdrawn and reversed and the pending claims allowed.

Respectfully Submitted,

**THOMAS, KAYDEN, HORSTEMEYER  
& RISLEY, L.L.P.**

By

  
Todd Deveau, Reg. No. 29,526

600 Galleria Parkway, Suite 1500  
Atlanta, Georgia 30339  
(770) 933-9500

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	7921326
<b>Application Number:</b>	10937736
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1006
<b>Title of Invention:</b>	Refrigerant with lubricating oil for replacement of R22 refrigerant
<b>First Named Inventor/Applicant Name:</b>	Kenneth M. Ponder
<b>Customer Number:</b>	24504
<b>Filer:</b>	Todd Deveau./Virginia Keenan
<b>Filer Authorized By:</b>	Todd Deveau.
<b>Attorney Docket Number:</b>	821920-1030
<b>Receipt Date:</b>	29-JUN-2010
<b>Filing Date:</b>	08-SEP-2004
<b>Time Stamp:</b>	22:05:32
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Affidavit/Dec/Exhibit after Notice of Appeal	01180267.PDF	634835 547fd13a5e50abc7d4d16e3a6024e8d2b9b50ad3	no	19

### Warnings:

### Information:

2	Request for Rehearing of BPAI Decision	18Cpy.PDF	1205944 6fde7331c3cd325ed4a0911d64c5a7a0e8a74053	no	21
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>				1840779	
<p><b>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  <b>If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</b></p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  <b>If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</b></p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  <b>If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</b></p>					

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In Re Application of:

Docket No.: 821920-1030

PONDER, K., et al.,

Confirmation No.: 1006

Serial No.: 10/937,736

Group Art Unit: 1751

Filing Date: September 8, 2004

Examiner: John R. Hardee

For: **Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant**

**SECOND DECLARATION OF KENNETH M. PONDER**

I, Kenneth M. Ponder, hereby declare as follows:

1. I am the President of RMS of Georgia, LLC and am a co-inventor named on the above application.
2. RMS of Georgia, LLC sells and distributes refrigerants and reclaims most refrigerants.
3. As I previously stated, among the refrigerants that RMS of Georgia, LLC sells and distributes are refrigerants known under ASHRAE designations R-421A and R-421B and SNAP approved by the EPA for different uses. The refrigerant having the ASHRAE designation R-421A is a refrigerant composition that is a mixture of R-125(pentafluoroethane) and R-134a (1,1,1,2-tetrafluoroethane) blended with a lubricant in which R-125 is present in an amount of about 58% by weight and R-134a is present in an amount of about 42% by weight of the refrigerant gases. R-421B, on the other hand, is also a mixture of R-125(pentafluoroethane) and R-134a (1,1,1,2-tetrafluoroethane) blended with a lubricant. R-421B, however, includes pentafluoroethane in the amount of about 85% by weight and 1,1,1,2-tetrafluoroethane in the amount of about 15% by weight of the refrigerant gases.

4. As I previously stated, our R-421B refrigerant comprised of about 85% by weight pentafluoroethane and about 15% tetrafluoroethane by weight of the refrigerant gases is covered by U.S. Patent No. 7,320,763 on which I am named as a co-inventor.

5. As I previously stated, our R-421A refrigerant was developed as a replacement for R-22 refrigerant that consists of chlorodifluoromethane. R-22 refrigerant could cover a wide array of temperatures. The industry has not yet found a single refrigerant composition that could replace R-22 for use over the entire array of temperatures over which R-22 was used. As a result, the industry has had to come up with multiple refrigerant compositions covering different arrays of temperatures.

6. As I previously stated, our R-421A and our R-421B refrigerants were developed to address different uses in the marketplace. In particular, R-421A was developed to address a higher temperature or (medium temp) application in the industry. By high or medium temperature applications I mean approximately -5°F to +45 °F. In contrast, R-421B was developed as a long term option for low temperature applications in the industry. By low temperature applications, I mean applications below about 0°F and generally in the range of below about -5°F to about -40°F. Accordingly, R-421A and R-421B are marketed by us and used by our customers for different applications to meet different needs, depending upon whether a high and medium temperature application or a low temperature application is the specified use by our customer.

7. As previously stated, our refrigerant R-421A that includes 58% pentafluoroethane and 42% tetrafluoroethane, which would be covered by the presently pending claims in this application, is superior to R-421B that consists of 85% pentafluoroethane and 15% tetrafluoroethane in high and medium temperature applications because it has a different temperature-pressure profile than R-421B and because the temperature-pressure profile of R-421A is superior to that of R-421B for high and medium temperature applications.

8. I have read and reviewed US Patent No. 6,207,071 (Takigawa et al.).

Takigawa is what I would refer to as a lubricant design patent, meaning that the purpose of Takigawa is to determine or design a lubricant for use with a large class and range of HFC refrigerant gases. Takigawa is not a refrigerant designing patent, meaning that Takigawa shows no interest in and presents no teaching as to how one would select among the large class of HFC refrigerants referenced in the patent to select any one or more particular refrigerant gases or any particular concentrations or ranges of the gases to design a refrigerant composition for use in a refrigeration system.

9. Takigawa teaches that there is no restriction as to the kind of HFC (hydrofluorocarbon) to be mixed in the refrigerant gas compositions that he is considering for use with his lubricant. See, column 8, lines 29-30. This covers hundreds if not thousands of potential refrigerant compositions.

10. Attached is a report entitled "Properties and Efficiencies of R-410A, R-421A, R-422B, and R-422D" dated July 30, 2008. The R-421A referenced in the paper is the combination of 58% pentafluoroethane (HFC-125) and 42% tetrafluoroethane (HFC-134a) claimed in my above-identified patent application. The R-422B is a refrigerant composition comprising 55% R-125, 42% R-134a and 4% R-600A (isobutane). The R-422B, thus, is a refrigerant composition having HFC-125 within the range of 40-60% and HFC-134a also within the range of 40-60%. The report shows that my R-421A is superior to R-422B.

11. The report also includes a list of properties that were evaluated, including: 1) molar mass, 2) normal boiling point or bubble point, 3) blend dew point, 4) saturated liquid density, 5) saturated vapor density, 6) NBP latent heat of vaporization, 7) saturated vapor pressure at one temperature, 8) saturated vapor pressure at another temperature, 9) critical point temperature, 10) critical point pressure, 11) ozone depletion potential (ODP), 12) global warming potential (GWP), and 13) concentration limit. Each



of these properties are significant in selecting and designing a refrigerant composition. Other considerations include: 14) capacity, meaning the ability of the refrigerant gas composition to absorb heat over the desired temperature performance range, 15) coefficient of performance (COP); and 16) fractionation quality.

12. The number of properties that are evaluated for a refrigerant composition shows that there is nothing routine about designing a refrigerant composition, and in particular that any experimentation based on Takigawa's teachings would not be routine. All of these properties generally need to be considered when selecting one or more refrigerant gases for a refrigerant composition, and further, in selecting the amount or concentration of refrigerant gases in a composition having two or more such gases.


13. One of the properties that is evaluated that needs to be considered in designing a refrigerant composition is "fractionation quality". This refers to the ability or likelihood of a multi-component refrigerant gas composition to separate or fractionate during operation. The refrigerant composition as claimed in my patent application, in particular, R-421A, has demonstrated the best fractionation quality in the industry, meaning that it fractionates less than any other known refrigerant. For example, my fractionation quality is better than that of R-422B. This is an unexpected result received with my particular refrigerant blend.

14. Referring back to the attached report, the purpose of the report is the compare the properties and efficiencies of R-410A, my R-421A, R-422B, and R-422D as substitutes for R-22. The report shows that my R-421A is the best substitute of the refrigerant gases compared in the report for R-22. The report also shows my R-421A matches more closely to R-22 than the other refrigerant compositions and that my R-421A has a better coefficient of performance than the other compositions. These are additional another unexpected results of my claimed refrigerant composition.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of this patent.

Respectfully submitted,

Date: 6/29/2010

  
Kenneth M. Ponder

**PROPERTIES AND EFFICIENCIES  
OF R-410A, R-421A, R-422B, AND R-422D  
COMPARED TO R-22**

**2008.07.30**

prepared by

**James M. Calm, P.E.**  
**Engineering Consultant**  
10887 Woodleaf Lane  
Great Falls, VA 22066-3003 USA

for

**Refrigerant Management Services of Georgia (RMS of Georgia)**  
610 McFarland / 400 Drive  
Alpharetta, GA 30004 USA

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Please refer questions or comments on this document to:

James M. Calm, P.E.  
Engineering Consultant  
10887 Woodleaf Lane  
Great Falls, VA 22066-3003 USA

phone/fax: +1 (703) 636-9500  
e-mail: [jmc@JamesMCalm.com](mailto:jmc@JamesMCalm.com)

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## PROPERTIES AND EFFICIENCIES OF R-410A, R-421A, R-422B, AND R-422D COMPARED TO R-22

prepared by

James M. Calm, P.E.  
Engineering Consultant

### SUMMARY

This report addresses selected properties for four refrigerant blends marketed as alternatives for R-22 for use in air-conditioning and in medium- and high-temperature residential, commercial, and industrial refrigeration applications. They include R-410A, R-421A, R-422B, and R-422D. The report compares representative properties, pressure-temperature (PT) relationships, and thermodynamic efficiency limits for the blends to those for R-22.

### REFRIGERANTS EXAMINED

R-22, currently the most widely used refrigerant on a global basis, is a single-compound refrigerant with the chemical name chlorodifluoromethane, formula  $\text{CHClF}_2$ , and Chemical Abstract Service (CAS) registry number 75-45-6. R-22 production (other than for use as a chemical intermediate) is pending phaseout as an ozone-depleting substance. R-22's molar mass is 86.4684464 g/mol (0.190630 lb/mol).<sup>1</sup> The substance has low acute toxicity; ASHRAE Standard 34-2007 classifies it as an "A1" refrigerant, signifying "lower toxicity" and "no flame propagation" for prescribed safety criteria.<sup>2</sup>

R-410A, marketed by a number of refrigerant vendors among them Honeywell as *Genetron AZ-20*<sup>®</sup>, is a binary zeotrope formulated as 50.0+0.5,-1.5% R-32 and 50+1.5,-0.5% R-125 by mass – R-32/125 (50.0/50.0) (+0.5,-1.5/+1.5,-0.5). Its molar mass is 72.58481 g/mol (0.160022 lb/mol) and component mole fractions are 69.762 and 30.238 %, respectively. Both components are hydrofluorocarbons (HFCs). The blend has low acute toxicity; ASHRAE Standard 34-2007 classifies it as an "A1" refrigerant, signifying "lower toxicity" and "no flame propagation" for prescribed safety criteria.<sup>1,2</sup>

R-421A, marketed by RMS of Georgia as *Choice Refrigerant R-421A*, is a binary zeotrope formulated as 58.0±1.0% R-125 and 42.0±1.0% R-134a by mass – R-125/134a (58.0/42.0) (±1.0/±1.0). Its molar mass is 111.74591 g/mol (0.246358 lb/mol) and component mole fractions are 54.001 and 45.999 %, respectively. Both components are HFCs. The blend has low acute toxicity; ASHRAE Standard 34-2007 classifies it as an "A1" refrigerant, signifying "lower toxicity" and "no flame propagation" for prescribed safety criteria.<sup>1,2</sup>

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R-422B, marketed by ICOR International as *NU-22B™*, is a ternary zeotrope formulated as 55.0±1.0% R-125, 42.0±1.0% R-134a, and 3.0+0.1,-0.5% R-600a (isobutane) by mass – R-125/134a/600a (55.0/42.0/3.0) (±1.0/±1.0/+0.1,-0.5). Its molar mass is 108.51787 g/mol (0.239241 lb/mol) and component mole fractions are 49.729, 44.670, and 5.601 %, respectively. The first two components are HFCs while the third is a hydrocarbon (HC). The blend has low acute toxicity; ASHRAE Standard 34-2007 classifies it as an “A1” refrigerant, signifying “lower toxicity” and “no flame propagation” for prescribed safety criteria.<sup>1,2</sup>

R-422D, marketed by DuPont Fluorochemicals as *Isceon® MO29*, is a variant of the same components in a different formulation. It is a ternary zeotrope formulated as 65.1+0.9,-1.1% R-125, 31.5±1.0% R-134a, and 3.4+0.1,-0.4% R-600a by mass – R-125/134a/600a (65.1/31.5/3.4) (+0.9,-1.1/±1.0/+0.1,-0.4). Its molar mass is 109.93470 g/mol (0.242365 lb/mol) and component mole fractions are 59.629, 33.940, and 6.431 %, respectively. The first two components are HFCs while the third is an HC. The blend has low acute toxicity; ASHRAE Standard 34-2007 classifies it as an “A1” refrigerant, signifying “lower toxicity” and “no flame propagation” for prescribed safety criteria.<sup>1,2</sup>

Table 1 compares representative properties of the five refrigerants based on data calculations using NIST REFPROP 8.0 combined with additional physical, environmental, and safety data.<sup>1-3</sup>



Table 1: Properties Comparison

properties	R-22	R-410A	R-421A	R-422B	R-422D
composition	chlorodifluoro- methane	R-32/125 (50.0/50.0)	R-125/134a (58.0/42.0)	R-125/134a/600a (55.0/42.0/3.0)	R-125/134a/600a (65.1/31.5/3.4)
molar mass					
g/mol	86.4684464	72.58481	111.74591	108.51787	109.93470
lb/mol	0.190630	0.160022	0.246358	0.239241	0.242365
normal boiling or bubble point					
°C	<b>-40.8</b>	-51.4	<b>-40.7</b>	-41.3	-43.2
°F	<b>-41.5</b>	-60.6	<b>-41.2</b>	-42.4	-45.8
blend dew point					
°C		-51.4	-35.4	-35.9	-38.3
°F		-60.5	-31.7	-32.6	-37.0
density, saturated liquid					
kg/m <sup>3</sup>	1409	1350	1461	1398	1402
lb/cf	87.97	84.26	91.19	87.25	87.51
density, saturated vapor					
kg/m <sup>3</sup>	4.70	4.17	5.98	5.82	5.96
lb/cf	0.294	0.261	0.373	0.363	0.372
NBP latent heat of vaporization					
kJ/kg	233.8	273.0	191.8	195.7	190.0
Btu/lb	100.5	117.4	82.4	84.1	81.7
kJ/m <sup>3</sup> vapor	1098.9	1138.4	<b>1147.0</b>	1139.0	1132.4
Btu/cf vapor	29.6	30.6	<b>30.7</b>	30.5	30.4
saturated vapor pressure					
at 20 °C in kPa	910.0	1443.0	820.7	831.9	903.7
at 68 °F in psia	131.99	556.1	119.03	120.65	131.07
saturated vapor pressure					
at 60 °C in kPa	2427	3834	2333	2346	2512
at 140 °F in psia	352.1	556.1	338.3	340.3	364.3
critical point temperature					
°C	96.1	71.4	82.8	83.2	79.6
°F	205.1	160.4	181.0	181.8	175.2
critical point pressure					
kPa	4990	4902	3919	3958	3905
psia	723.7	711.0	568.4	574.1	566.4
ozone depletion potential (ODP)					
model-derived to R 11	0.034	<b>&lt;0.000015</b>	<0.000024	<0.000023	<0.000024
semi-empirical to R-11	0.050	0.000	0.000	0.000	0.000
regulatory	0.055	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
global warming potential (GWP)					
20 yr to CO <sub>2</sub>	5160	4300	5300		
120 yr to CO <sub>2</sub>	<b>1810</b>	2100	2600	2500	2700
500 yr to CO <sub>2</sub>	549	650	820		
ASHRAE 34 / ISO 817					
safety classification	<b>A1</b>	<b>A1</b>	<b>A1</b>	<b>A1</b>	<b>A1</b>
ASHRAE 34 Refrigerant Concentration Limit (RCL)					
ppm v/v	59,000	130,000	61,000	56,000	58,000
lb/Mcf	13	25	17	16	16

Table 2 compares the pressure-temperature (PT) relationships for coexisting vapor and liquid at saturated conditions (for liquid at the bubble-point for the blends) of the five refrigerants.

**Table 2: Pressure-Temperature Data Comparisons**

temperature (°C)	pressure (kPa)				
	R-22	R-410A	R-421A	R-422B	R-422D
-40	105	176	105	108	118
-35	132	219	131	135	147
-30	164	270	163	167	182
-25	201	331	201	205	223
-20	245	401	245	250	270
-15	296	482	296	301	326
-10	355	575	355	360	389
-5	422	681	422	428	461
0	498	801	499	505	543
5	584	936	585	592	636
10	681	1088	683	689	740
15	789	1258	792	799	856
20	910	1448	914	920	985
25	1044	1657	1049	1056	1128
30	1192	1889	1199	1205	1286
35	1355	2145	1364	1370	1460
40	1534	2426	1545	1550	1651
45	1729	2734	1744	1749	1860
50	1943	3071	1961	1965	2089
55	2175	3439	2198	2201	2338
60	2428	3842	2456	2458	2609
65	2701	4282	2736	2738	2904

temperature (°F)	pressure (psig)				
	R-22	R-410A	R-421A	R-422B	R-422D
-40	0.6	10.8	0.5	0.9	2.4
-30	4.9	17.8	4.8	5.4	7.1
-20	10.2	26.3	10.1	10.7	12.9
-10	16.5	36.5	16.5	17.1	19.8
0	24.0	48.4	24.0	24.7	27.9
10	32.8	62.4	32.8	33.6	37.5
20	43.1	78.7	43.1	43.9	48.5
30	55.0	97.4	55.0	55.9	61.3
40	68.6	118.8	68.7	69.6	75.9
50	84.1	143.2	84.3	85.3	92.6
60	101.6	170.7	102.0	103.0	111.4
70	121.4	201.8	122.0	123.0	132.6
80	143.6	236.5	144.4	145.4	156.3
90	168.4	275.4	169.5	170.4	182.8
100	195.9	318.6	197.4	198.2	212.2
110	226.4	366.4	228.3	229.0	244.7
120	260.0	419.4	262.4	263.1	280.7
130	296.9	477.9	300.1	300.6	320.2
140	337.4	542.5	341.5	341.8	363.7
150	381.7	613.9	386.9	387.1	411.4

Table 3 repeats the PT comparison for R-421A, shown in Table 2 to match R-22 most closely on a PT basis, with an added column quantifying the very small difference.

**Table 3: Pressure-Temperature Data for R-22 and R-421A**

temperature (°C)	pressure (kPa)		difference (%)
	R-22	R-421A	
-40	105	105	-0.60
-35	132	131	-0.47
-30	164	163	-0.35
-25	201	201	-0.25
-20	245	245	-0.16
-15	296	296	-0.08
-10	355	355	0.00
-5	422	422	0.07
0	498	499	0.14
5	584	585	0.21
10	681	683	0.27
15	789	792	0.34
20	910	914	0.41
25	1044	1049	0.49
30	1192	1199	0.55
35	1355	1364	0.64
40	1534	1545	0.73
45	1729	1744	0.83
50	1943	1961	0.93
55	2175	2198	1.03
60	2428	2456	1.16
65	2701	2736	1.29

temperature (°F)	pressure (psig)		difference (%)
	R-22	R-421A	
-30	4.9	4.8	-1.81%
-20	10.2	10.1	-0.81%
-10	16.5	16.5	-0.42%
0	24.0	24.0	-0.20%
10	32.8	32.8	-0.05%
20	43.1	43.1	0.06%
30	55.0	55.0	0.16%
40	68.6	68.7	0.24%
50	84.1	84.3	0.32%
60	101.6	102.0	0.39%
70	121.4	122.0	0.48%
80	143.6	144.4	0.56%
90	168.4	169.5	0.65%
100	195.9	197.4	0.75%
110	226.4	228.3	0.84%
120	260.0	262.4	0.95%
130	296.9	300.1	1.07%
140	337.4	341.5	1.21%
150	381.7	386.9	1.35%

The reason the difference values appear very slightly higher in the inch-pound (IP) portion of the table compared to the metric (SI) portion, for example at 60 °C and 140 °F that are the same, is the SI pressures indicated are absolute and the IP are gauge, consistent with common convention for the respective units. When converted to consistent absolute or gauge pressures, the difference values are the same. The important conclusion is that the saturation pressure-temperature dependence for R-421A is nearly identical to R-22 with less than 1% difference for most of the temperature range of interest.

Figure 1 plots the data from Table 2 for graphical comparison.

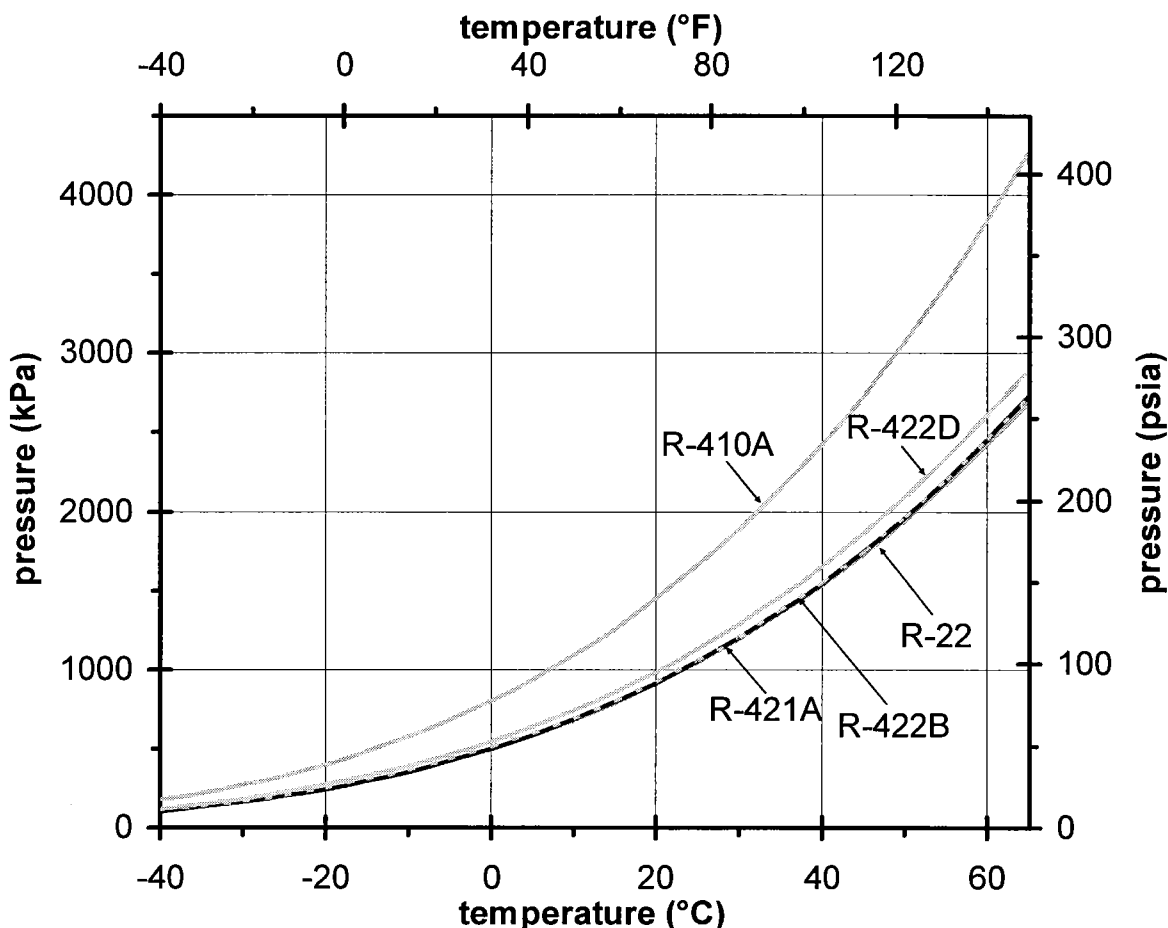


Figure 1: Pressure-Temperature Comparisons

## PERFORMANCE

The following discussion addresses comparative performance relative to R-22 based on ideal cycle analyses using the NIST CYCLE\_D program.<sup>4</sup> Thermodynamic cycle analyses for theoretical conditions indicate the limits or comparative limits to attainable performance for simple cycles without regard to differences in equipment and component deviations from ideal, heat transfer, additional thermophysical properties, and lubricant differences. The results indicate

thermodynamic limits to what is attainable for different refrigerants in comparably optimized systems, but do not imply either that all systems will achieve such performance or that performance rankings of different refrigerants would not change in order of preference for systems not comparably optimized for the individual refrigerants.<sup>5,6</sup> Although excluded from the analyses herein to focus on refrigerant influences, real-world equipment performance properties will be lower than theoretical limits not only for the reasons mentioned, but also because fan, control, and sometimes pump burdens as well as start-up transients also factor into standard equipment ratings.

Table 4 summarizes the cycle conditions, consistent with those used in prior studies by Calm and Domanski, used for the analyses addressed herein. Omission of the fan and control power burdens facilitates focus on the refrigerant influences on performance, and would not change relative rankings of the candidates considered if included.

**Table 4: Conditions for Performance Comparison**

<b>parameter</b>	<b>theoretical cycle limit for air conditioning</b>
<u>average evaporating temperature</u>	
input temperature	10 °C (50 °F)
superheat	0 °C (0 °F)
<u>average condensing temperature</u>	
input temperature	35-65 °C (95-149 °F)
superheat	0 °C (0 °F)
<u>compressor efficiencies</u>	
isentropic	100%
volumetric	100%
motor	100%
<u>pipng losses (drop)</u>	
suction line	none: 0 °C (0 °F)
discharge line	none: 0 °C (0 °F)
suction line / liquid line heat exchanger	none (0%)
<u>fans and control power burdens</u>	
indoor fan / chilled water pump	not included (0 W)
outdoor fan / condensing water pump	not included (0 W)
controls	not included (0 W)

The following figure compares the coefficient of performance (COP) for cooling (air conditioning) for a range of refrigerant condensing temperatures (necessarily higher than a corresponding range of ambient temperatures for air-cooled equipment). The plot spans a range a condensing temperatures of 35-65 °C (95-149 °F), corresponding to outside ambient air temperatures approximately 5-10 °C (9-18 °F) cooler to account for the heat transfer approach temperatures. Although the high-end of the range exceeds standard equipment rating temperatures, it is relevant to reflect performance at temperature extremes when cooling is most needed, that result in the highest cooling loads, and that can occur at lower ambient temperatures for condensing units installed on dark rooftops and/or in direct sunlight especially or with discharge air recirculation.

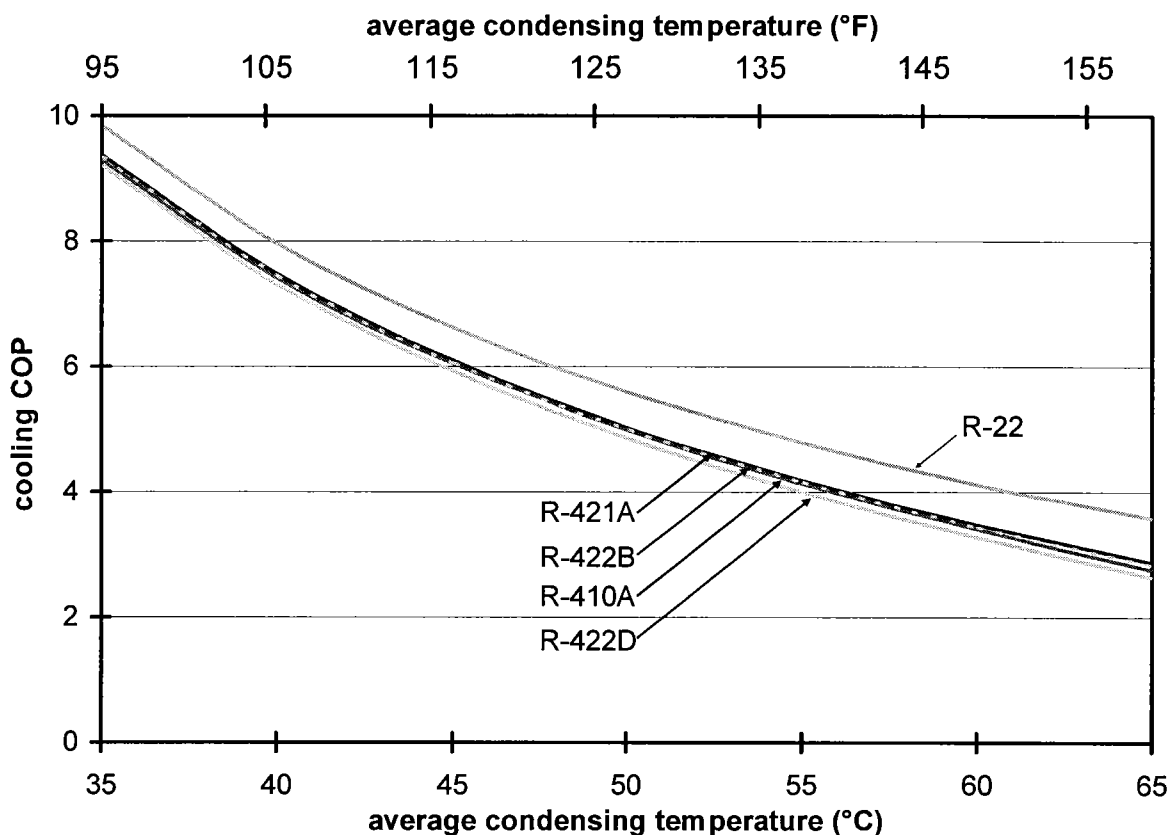
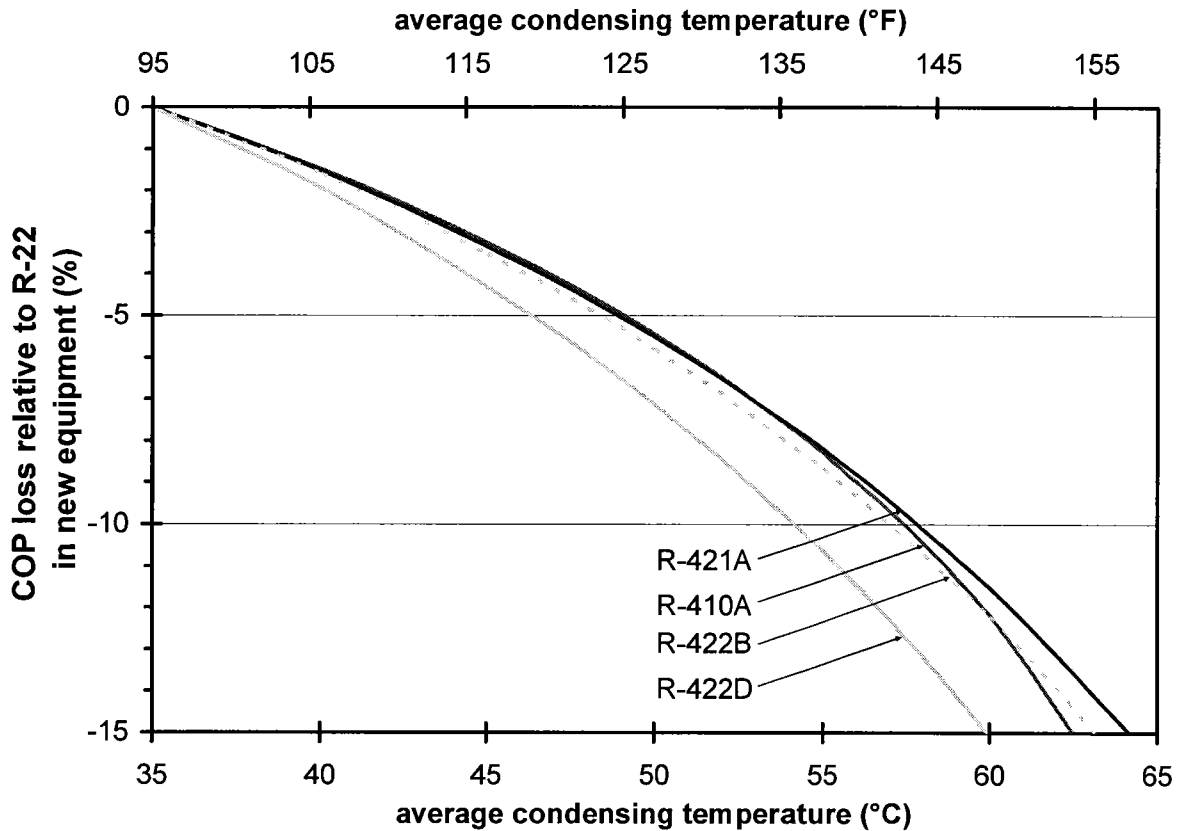


Figure 2: Cooling Coefficient of Performance (COP) Comparison

As shown, all four blends are thermodynamically less efficient than R-22 on an ideal-cycle basis. Of the four blends analyzed, R-421A offers the highest comparative efficiency, ranging from 4.8% to 19.8% lower than R-22 at 35-65 °C (95-149 °F) average condensing temperature. The lowest of the four ranges from 6.4% to 26.0% lower than R-22 for the same temperatures.

Figure 3 depicts the comparative cooling efficiency of the four blends at increasing condensing temperatures relative to that of R-22 for cycles optimized for equivalent performance at 35 °C (95 °F), the primary product rating condition with ideal but unattainable heat transfer (an approach temperature of zero), again excluding control, fan power, and similar power burdens.<sup>7</sup>

This comparison does not imply comparable costs, since the efficiency differences depicted in Figure 2 require increased heat exchanger sizing and other component and cycle optimization to overcome the thermodynamic differences and to overcome refrigerant selection influences towards achieving comparable capacities. It also does not account for lubricant differences.



**Figure 3: Relative COP Degradation with Increasing Condensing Temperature for Equipment Designed for Equivalent Performance at the Nominal Rating Point (35 °C, 95 °F)**

As shown, the efficiencies of R410A, R-421A, and R-422B remain very similar for the low end of the temperature range illustrated, but R-421A's efficiency suffers the least degradation with increasing condensing temperatures (more extreme ambient temperatures).

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/937,736

09/08/2004

Kenneth M. Ponder

821920-1030

1006

24504 7590 05/10/2010  
THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
600 GALLERIA PARKWAY, S.E.  
STE 1500  
ATLANTA, GA 30339-5994

EXAMINER

HARDEE, JOHN R

ART UNIT

PAPER NUMBER

1796

MAIL DATE

DELIVERY MODE

05/10/2010

PAPER

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The time period for reply, if any, is set in the attached communication.

1 RECORD OF ORAL HEARING  
2  
3 UNITED STATES PATENT AND TRADEMARK OFFICE  
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6 BEFORE THE BOARD OF PATENT APPEALS  
7 AND INTERFERENCES  
8  
9

10 *Ex parte* KENNETH M. PONDER and  
11 STEFFAN THOMAS, JR.  
12  
13

14 Appeal No. 2009-012229  
15 Application No. 10/937,736  
16 Technology Center 1700  
17  
18

19 Oral Hearing Held: April 14, 2010  
20  
21

22 Before MICHAEL COLAIANNI, LINDA M. GAUDETTE, and  
23 JEFFREY B. ROBERTSON, *Administrative Patent Judges*.  
24

25 APPEARANCES:

26  
27 ON BEHALF OF THE APPELLANT:

28  
29 TODD DEVEAU, ESQUIRE  
30 Thomas, Kayden, Horstemeyer & Risley, LLP  
31 600 Galleria Parkway, S.E.  
32 Suite 1500  
33 Atlanta, Georgia 30339  
34  
35  
36

1 THE USHER: Good afternoon. Calendar Number 29, Appeal Number  
2 2009-012229. Mr. Deveau.

3 JUDGE COLAIANNI: Good afternoon, Mr. Deveau.

4 MR. DEVEAU: Good afternoon.

5 JUDGE COLAIANNI: Welcome to the Board.

6 MR. DEVEAU: Thank you.

7 JUDGE COLAIANNI: We have a court reporter that will be transcribing  
8 today's proceedings. If you have a business card for her, she would  
9 appreciate it.

10 MR. DEVEAU: Would you like that now or later?

11 JUDGE COLAIANNI: You can do that at the end. That is fine. You have  
12 20 minutes. You may begin when you're ready.

13 MR. DEVEAU: Very good. I have and would like to introduce as well with  
14 me this afternoon Ken Ponder. He is one of the co-inventors on the  
15 application. Mr. Ponder is right there.

16 The appeal in this case involves a refrigerant composition, and I'll briefly go  
17 over the claim language that I think is at issue so that we can have that in  
18 front of us.

19 All the independent claims in effect refer to a refrigerant composition  
20 comprising a combination of refrigerant gases and non-refrigerant gas  
21 components. The refrigerant gases consisting of about 40 to 45 percent by  
22 weight tetrafluoroethane and about 55 to about 60 percent by weight  
23 pentafluoroethane. Then we have a claim where refrigerant gases consist of  
24 only two gases to the exclusion of others and very specific weight ranges of  
25 only 5 percent.

1 The rejection is based only on one reference, Takigawa, and only on 103  
2 obviousness. There is no 102 anticipation rejection. Thus acknowledging  
3 that Takigawa does not teach every feature of any one of the pending claims.  
4 The Examiner, of course, has the burden of establishing a prima facie case of  
5 obviousness to support the rejection. This requires something more than  
6 conclusory statements referring to routine optimization. Under KSR, this  
7 requires articulated reasoning. This is to prevent application of unpermitted  
8 hindsight.

9 Thus here the Examiner has the burden of showing how and where  
10 Takigawa teaches under the recited claims refrigerant gases consisting of  
11 tetrafluoroethane and pentafluoroethane to the exclusion of any other  
12 refrigerant gas. And further, the Examiner has the burden of showing where  
13 and how Takigawa teaches the specific weight ranges recited in the claims.  
14 We submit the Examiner has failed to meet this burden and the rejection is  
15 erroneous and should be reversed as to all the pending claims. We submit  
16 there is no teaching in Takigawa of a refrigerant gas composition consisting  
17 of only pentafluoroethane and tetrafluoroethane.

18 The Examiner in arguing this point relies on the reference and the statement  
19 -- particular statement in the reference that there is no restriction as to the  
20 kind of HFC to be mixed with the disclosed refrigerants at Column 8. This  
21 statement, however, contravenes the ordinary meaning of the phrase "to be  
22 mixed with." "To be mixed with" is an expressed positive statement. It is a  
23 statement that states to somebody of ordinary skill that something else is to  
24 be mixed in. It cannot be fairly interpreted to mean the opposite, namely  
25 nothing is to be mixed in.

1 The reliance on the statement in Takigawa also takes this statement out of  
2 context with the rest of the reference. For example, if you consider the  
3 following two immediately following paragraphs from this citation, we see,  
4 for example, in the first immediately-following paragraph the statement,  
5 Examples of the HFC refrigerant containing tetrafluoroethane and/or  
6 pentafluoroethane that are useful in this invention are HFC-134a, which is  
7 tetrafluoroethane, alone; HFC-125, which is pentafluoroethane, alone; a  
8 mixture of HFC-134a and HFC-32, which is a refrigerant gas that is not  
9 recited in the claims; a mixture of HFC-134a, HFC-32 and HFC-125, and it  
10 continues.

11 Nowhere do we see in Takigawa a teaching or suggestion of selecting only  
12 pentafluoroethane and tetrafluoroethane as a refrigerant gas composition.

13 The fact that Takigawa may teach each of the refrigerants alone or in  
14 combination with some other third refrigerant, such as R-32, does not  
15 amount to teaching to select only pentafluoroethane and tetrafluoroethane  
16 together to the exclusion of any other refrigerant gas.

17 JUDGE COLAIANNI: Let me ask you a question, Mr. Deveau.

18 MR. DEVEAU: Yes?

19 JUDGE COLAIANNI: That portion of the reference, Column 8 that you're  
20 referring to that the Examiner relied on, it has in there starting about Line  
21 20, it talks about the refrigerants used for the refrigerating machine together,  
22 with refrigerating oil of Takigawa's invention, and they include this alkane  
23 fluoride that is mixed in, I guess, with HFC-134a and/or HFC-125.

24 MR. DEVEAU: Yes.

1 JUDGE COLAIANNI: Why can't that alkane fluoride that the refrigerants  
2 have that is one to three carbon atoms, why can't that be HFC-134a or  
3 HFC-125?

4 MR. DEVEAU: The way the sentence reads is refrigerants used include an  
5 alkane fluoride having one to three carbons and preferably one to two  
6 carbons. And it says, "And containing tetrafluoroethane and/or alkane  
7 fluoride having one to three carbons." I think a more appropriate  
8 interpretation of that sentence would be to say that HFC-134, the  
9 tetrafluoroethane, is added to the alkane fluoride having one to three  
10 carbons.

11 JUDGE GAUDETTE: Correct. But why can't that alkane fluoride be  
12 HFC-125?

13 MR. DEVEAU: Well then, that would render meaningless the and/or  
14 statement following that where it continues to say that it could also contain  
15 tetrafluoroethane in combination with that.

16 JUDGE GAUDETTE: Well, no because it says or an alkane fluoride  
17 contains -- well, it says, "and/or an alkane fluoride which would contain  
18 HFC-125." So in that instance, why couldn't the alkane fluoride be  
19 HFC-134?

20 MR. DEVEAU: Well, in that case, you have got a reference to the alkane  
21 fluoride having one to three atoms, a second reference to the  
22 tetrafluoroethane, and a third reference to pentafluoroethane.

23 So if you interpret the first reference to alkane fluoride as being either the  
24 tetrafluoroethane or the pentafluoroethane, that would render meaningless  
25 the subsequent reference to those, would it not? The sentence would be

1 worded differently if it were intended to be interpreted the way that you  
2 described.

3 And if you look at the following paragraph where it says "examples," I think  
4 that puts it into context what they're talking about.

5 JUDGE GAUDETTE: Would you say that HFC-125 is an alkane fluoride  
6 having one to three carbon atoms?

7 MR. DEVEAU: Yes.

8 JUDGE GAUDETTE: And the same would apply to HFC-134a?

9 MR. DEVEAU: Correct. The end result, however, is you're talking about  
10 an alkane fluoride having one to three carbon atoms, which is hundreds of  
11 thousands of possible compounds. And so the question then is, where is the  
12 teaching out of all those hundreds of thousands of compounds to select only  
13 pentafluoroethane and tetrafluoroethane to the exclusion of anything else?  
14 So you have to get over that hurdle to meet the consisting of part of the  
15 limitation. And even if you get over that hurdle, you have the problem of,  
16 where is the teaching for the specific ranges?

17 JUDGE GAUDETTE: Did you make that argument in your Appeal Brief  
18 that you would have to select from numerous --

19 MR. DEVEAU: Yes, yes. The number of combinations in Takigawa of  
20 HFC's is one to three carbons is enormous. So from that -- and we also  
21 make the argument in our Appeal Brief of the genus species argument. We  
22 have a genus that is that large. The genus does not necessarily teach a  
23 specific species that may be encompassed by that genus.  
24 The effect basically is the Examiner has a two-prong hurdle to overcome.  
25 The Examiner has to overcome the consisting-of feature of the claim that we

1 select only pentafluoroethane and tetrafluoroethane to the exclusion of any  
2 other refrigerant gas.

3 And further, the Examiner must show how Takigawa teaches the specific  
4 ranges. They're only in 5-percent range. And that Takigawa may, just like  
5 any reference, the fact that various elements of a reference may be  
6 individually known does not necessarily render their particular combination  
7 obvious.

8 The Examiner to support the argument that the specific ranges are taught by  
9 Takigawa makes a conclusory statement that optimizing the ranges amounts  
10 to routine experimentation with no support or explanation for that statement.  
11 This statement is contradicted in a number of ways.

12 The Examiner himself contradicts a statement by his concession at Page 7 of  
13 the Answer that different blends of pentafluoroethane and tetrafluoroethane  
14 will have very different properties and that one such composition would not  
15 render another such composition obvious.

16 The Examiner's position about routine experimentation is also contradicted  
17 by this Office's issuance of Applicant's own U.S. Patent 7,320,763, which is  
18 directed to a refrigerant blend consisting of pentafluoroethane and  
19 tetrafluoroethane in a ratio of about 85 percent to 15 percent. And that has  
20 that limitation as consisting of.

21 If the Examiner's position about routine experimentation were true, then that  
22 patent would not have issued. And in this case, we have the very same  
23 Examiner, Mr. Hardee, who examined the application that issued as a '763  
24 patent as we have here.

25 The Examiner's position on routine optimization is also contradicted by the



1 ASHRAE evidence in several ways. ASHRAE is the industry standards  
2 organization. It is the organization that determines when a refrigerant is  
3 considered new and when a new and different refrigerant is given a specific  
4 refrigerant designation, such as the 125 or 134a.

5 ASHRAE here has awarded the composition of this application -- for  
6 example, on a 58- to 42-percent blend with a designation R421a. This  
7 shows that ASHRAE considers the composition of this application to be new  
8 and different than other compositions -- refrigerant compositions that had  
9 gone before.

10 ASHRAE has also awarded the composition of Applicant's '763 patent with  
11 a different designation though. That designation is R421b showing, again,  
12 that ASHRAE considers even the 85/15 blend of pentafluoroethane to  
13 tetrafluoroethane to be something new and different from, for example, a 58-  
14 to 42-percent blend of the same two refrigerants to the exclusion of other  
15 refrigerants.

16 The designation number 421 simply means that both compositions have the  
17 same two refrigerant gases. It is the a and b that follow the 421a and b that  
18 represent the different designations and shows that ASHRAE considers them  
19 to be different refrigerants.

20 The Examiner's position on routine optimization is also contradicted by the  
21 evidence in the Ponder Declaration that R421a of the present application and  
22 claims and R421b of the '763 patent are SNAP approved by the EPA for  
23 different uses, which tells us that one cannot necessarily be substituted for  
24 another in refrigerant equipment.

25 The Examiner's position is also contradicted by the ASHRAE evidence in

1 general of Exhibit C in our exhibit appendix and Gabor's declaration  
2 showing there are a large number of refrigerant gases that have been given  
3 ASHRAE designations all showing that ASHRAE considers these all to be  
4 different and cannot necessarily be substituted one for another.

5 For example, refrigeration equipment is typically designated to use a  
6 particular refrigerant gas, such as R32. This specific designation basically  
7 means that only R32 or accepted substitutes for R32 can be used, not any  
8 and all refrigerants.

9 The Examiner further attempts to support the rejection based on a  
10 conclusory statement that the determination of a best application within the  
11 field of refrigeration for any refrigerant gas which can be made according to  
12 Takigawa amounts to routine experimentation. Again, he does not explain  
13 this statement, does not provide support for this statement.

14 If this statement were true, no refrigerant composition involving a  
15 combination of two or more individually known HFC's would be patentable,  
16 which, of course, is contradicted by the number of refrigerant gas  
17 composition patents that have been issued by the Office and also particular  
18 Applicant's '763 patent. Also we would not have so many different  
19 ASHRAE designations as we have.

20 The reason -- part of the reason why Takigawa does not teach either a  
21 refrigerant gas composition consisting of only tetrafluoroethane and  
22 pentafluoroethane together to the exclusion of other refrigerant gases or the  
23 specific ranges is that Takigawa is only interested in selecting a lubricant for  
24 use with an HFC.

25 Takigawa has no interest in what HFC should be used other than it is an

1 alkane fluoride of one to three carbons. Basically, Takigawa could care less  
2 what HFC is to be selected for the refrigerant gas that is the subject of  
3 Takigawa.

4 And naturally, then, Takigawa provides no teaching or suggestion how one  
5 would go about selecting what HFC gas to use for what application or what  
6 combination of gases or even of the gases that you select what percentages  
7 should be applied. And the Examiner provides no other basis and no other  
8 reasoning where one would get this teaching other than routine optimization.  
9 The Examiner's reliance on these conclusory statements suggest an improper  
10 use of hindsight. Otherwise, how do you interpret "to be mixed with" as  
11 meaning nothing is mixed? Otherwise, how do you explain that Takigawa  
12 teaches -- the lack of explanation of how Takigawa teaches specific ranges  
13 while the Examiner concedes that different blends will have very different  
14 properties?

15 And further, while the Examiner concedes that one such composition of  
16 pentafluoroethane and tetrafluoroethane would not render another such  
17 composition obvious.

18 JUDGE COLAIANNI: Just a question, Mr. Deveau. You have mentioned  
19 about the Examiner's construction of that phrase in Takigawa that there is no  
20 restriction as to the kind of HFC that is to be mixed. Looking at the  
21 Examiner's Answer on Page 5, I see there it says the Examiner construes  
22 this, that particular phrase, to mean that no other alkyl fluoride at all need be  
23 mixed with tetrafluoroethane and/or pentafluoroethane.

24 I'm understanding that to mean that the Examiner seems to be interpreting  
25 that phrase to mean that the alkane fluoride that Takigawa is referring to

1 could be, as Judge Gaudette was referring to, could be HFC-134a or  
2 HFC-125 as also being included as to the kind of HFC's that can be mixed  
3 with the HFC-134a blend with HFC-125.

4 MR. DEVEAU: Well, if we look at the sentence the Examiner relies on it  
5 reads, "There is no restriction as to the kind of HFC hydrocarbon to be  
6 mixed with HFC-134 and/or HFC-125." So if it is interpreted that way, then  
7 that would make that sentence meaningless because the statement says -- it  
8 expressly states and infers that something is to be mixed with HFC-134  
9 and/or 125. So if that HFC that is to be mixed is one or the other, then the  
10 sentence would not read correctly.

11 JUDGE COLAIANNI: If you have a blend, let's say you have HFC-134a  
12 and HFC-125, why would that not include mixing additional HFC-134a into  
13 that blend or additional HFC-125 into the HFC-134a/125 blend? Why does  
14 it have to be some additional alkane fluoride, some different alkane fluoride?

15 MR. DEVEAU: That, I think, would misread the phrase "to be mixed." "To  
16 be mixed" basically states that something else is to be included. If you're  
17 including more of the same thing, that is not something else.

18 If you were to interpret that sentence the way you suggest the sentence  
19 should have been written that the HFC can be 134a or 134b -- or 125, I'm  
20 sorry -- or a combination or it can include anything else, it doesn't state that  
21 it is optional to include something in addition to 134a and/or 125. It doesn't  
22 say that nothing can be mixed with. It says -- it infers something is to be  
23 mixed with.

24 JUDGE COLAIANNI: But it places no restriction, though, on what may be  
25 mixed with that blend.

1 MR. DEVEAU: Other than it suggests something is to be mixed, not  
2 nothing.

3 JUDGE COLAIANNI: Right. And the Examiner's construction of that  
4 phrase, as I understand from Page 5 of the Answer, is that no other alkyl  
5 fluoride at all need be mixed meaning it can be the same alkyl fluoride that  
6 is being blended.

7 MR. DEVEAU: If it is the same alkyl fluoride, why would you rewrite the  
8 sentence though? Then you're writing a sentence that says there is no  
9 restriction what can be mixed. We can mix more of the same.

10 JUDGE COLAIANNI: Correct.

11 MR. DEVEAU: But I would suggest that is not the way the sentence reads.

12 JUDGE COLAIANNI: Okay. Fair enough.

13 MR. DEVEAU: And even -- and all that does, though, is addresses only the  
14 issue of the phrase consisting of pentafluoroethane and tetrafluoroethane and  
15 has nothing to do with the selection of the specific ranges.

16 So the Examiner -- for the Examiner's rejection to be upheld, there has to be  
17 a teaching or suggestion in Takigawa for both the phrase consisting of  
18 pentafluoroethane and tetrafluoroethane to the exclusion of anything else.

19 And secondly, to the specific ranges.

20 And I go back, for example, on the specific ranges to the Examiner's  
21 concession that one such blend does not render another such blend obvious.  
22 That, I think, absolutely contradicts his statement about routine optimization.  
23 We also have as to the rebuttal evidence on the issue of obviousness the  
24 Declaration of Andy Gabor. Andy Gabor was on the ASHRAE committee  
25 that selected or determined when a refrigerant composition received an

1 ASHRAE designation. That is spelled out in his Declaration. And if you  
2 look at Exhibit C, he is listed as one of the committee members.  
3 In his Declaration, he presents reasoning as to why the claimed composition  
4 is not obvious in view of Takigawa. The Examiner I would suggest does not  
5 address the details of Mr. Gabor's Declaration. He gives it a cursory review  
6 and in particular ignores Mr. Gabor's reference to the ASHRAE reference.  
7 Once faced with such rebuttal evidence, the Examiner may not rely on a  
8 cursory statement or routine optimization, not only to what is faced with  
9 Gabor's Declaration, but the ASHRAE evidence of Exhibit C, Mr. Ponder's  
10 Declaration, the evidence concerning Applicant's '763 patent, the other  
11 things we mentioned in rebuttal as showing that the Examiner's position of  
12 routine optimization does not stand.  
13 He can no longer simply rely on that cursory statement. As required by  
14 KSR, he must present articulated reasoning in response to the rebuttal  
15 evidence as to show why routine optimization would be applicable here and  
16 he has not done so.  
17 Basically what we have is a refrigerant gas -- the thermodynamic properties  
18 of refrigerant gas change dramatically when you change their percentages.  
19 And so once you start changing percentages over a few percentage points,  
20 which is the reason why we have the narrow ranges claimed and I think  
21 likely the reason why the Examiner concedes that one composition does not  
22 render another composition obvious even when we're looking at only  
23 pentafluoroethane and tetrafluoroethane, is an acknowledgment that the  
24 thermodynamic properties greatly alter the properties -- are greatly changed  
25 by altering the properties of the blend and it is not routine.

1 For these reasons and the reasons -- as I've pointed out, we do make other  
2 arguments in our Brief. So not only for the reasons I've mentioned but also  
3 the reasons in our Brief, we respectfully request that the rejection be  
4 reversed.

5 The Examiner has not shown that Takigawa teaches both limitations of a  
6 refrigerant gas consisting of pentafluoroethane and tetrafluoroethane to the  
7 exclusion of others and also in the specific ranges particularly when you  
8 consider the hundreds of thousands of possible combinations that are  
9 possible under Takigawa and consider that Takigawa really has no interest in  
10 what HFC you select because his only interest is in the lubricant to be  
11 selected and he has identified a particular alkyl benzyl as a lubricant.

12 And that is all I have to present. If you have additional questions, I'm more  
13 than happy to address them.

14 JUDGE COLAIANNI: Thank you Mr. Deveau.

15 MR. DEVEAU: Thank you.

16 Whereupon, the proceedings at 1:30 p.m. were concluded.



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BEFORE THE BOARD OF PATENT APPEALS  
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*Ex parte* KENNETH M. PONDER  
and STEFFAN THOMAS, JR.

---

Appeal 2009-012229<sup>1</sup>  
Application 10/937,736  
Technology Center 1700

---

Decided: April 29, 2010

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Before MICHAEL P. COLAIANNI, LINDA M. GAUDETTE, and  
JEFFREY B. ROBERTSON, *Administrative Patent Judges*.

COLAIANNI, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 the final rejection of claims 1-10, 21-25, 27, 29-31, 33-35, and 37-40. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b).

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<sup>1</sup> Oral arguments were heard in the appeal on April 14, 2010.

We AFFIRM.

Appellants disclose a refrigerant replacement for refrigerant R-22 (chlorodifluoromethane) composed of a blend of refrigerant that is less damaging to the ozone layer and a method and apparatus for refrigeration (Spec. 1: 10-22).

Claim 21 is illustrative:

21. A refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components,

(a) the refrigerant gases consisting of:

about 40% to about 45% by weight tetrafluoroethane; and

about 55% to about 60% by weight pentafluoroethane; and

(b) the non-refrigerant gas components including about 0.5% up to about 20% by weight of the refrigerant gases of a lubricating oil, wherein the lubricating oil is selected from the group consisting of naphthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.

Appellants appeal the following rejection:

Claims 1-10, 21-25, 27, 29-31, 33-35, and 37-40 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Takigawa (U.S. Patent 6,207,071 B1, March 27, 2001).

Appellants argue the claims as a group (App. Br. 5). Appellants' mere statement of the subject matter of dependent claims 4, 9, and 25 (App. Br. 10) do not amount to a separate argument of those claims. 37 C.F.R.

§ 41.37(c)(1)(vii). Therefore, we select claim 21, the broadest independent claim on appeal, as representative of the group. *Id.*

### ISSUE

Did the Examiner err in concluding that Takigawa would have suggested the subject matter of claim 21? We decide this issue in the negative.

### PRINCIPLES OF LAW

Applicants' reason for making the modification does not control the obviousness analysis; rather, “any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 420 (2007).

A compound and all of its properties are inseparable. *In re Papesch*, 315 F.2d 381, 391 (CCPA 1963).

A declarant’s or affiant’s opinion evidence as to an ultimate legal conclusion is afforded no weight, though the underlying reasons for the opinion may be considered. *In re Lindell*, 385 F.2d 453, 456 (CCPA 1967).

### FACTUAL FINDINGS (FF)

We adopt the Examiner’s findings in the Answer and Final Office Action as our own, except as to those findings that we expressly overturn or set aside in the Analysis that follows. We add the following factual findings:

1. Takigawa discloses a refrigerant oil and a fluid composition for a refrigerator containing the oil and an HFC (hydrofluorocarbon)

- refrigerant blend containing 1,1,1,2-tetrafluoroethane (HFC-134a) and/or pentafluoroethane (HFC-125) (col. 1, ll. 13-19).
2. Takigawa discloses that the HFC refrigerant contains HFC-134a and/or HFC-125 (col. 2, ll. 15-17; 23-24; 40-41).
  3. Takigawa discloses that the HFC-134a and/or HFC-125 blend may include additional HFC refrigerants such as alkane fluorides having 1 to 3 carbon atoms (col. 8, ll. 20-28). Takigawa places “no restriction” on the kind of HFC to be mixed with HFC- 134a and/or HFC-125 and exemplifies various suitable HFC combinations (col. 8, ll. 29-55).
  4. Takigawa claims that the HFC refrigerant used in the fluid composition contains “at least one of HFC-134a and/or HFC-125” (claim 1).
  5. Takigawa discloses that HFC-134a is present in the refrigerant composition in an amount of 40 weight percent or greater and that HFC-125 is present in a most preferable amount of 40 weight percent or greater (col. 8, ll. 20-28).

Additional findings of fact may appear in the Analysis that follows.

### ANALYSIS

Appellants argue that Takigawa fails to teach or suggest a refrigerant composition “consisting of” about 40% to about 45% HFC-134a (i.e., tetrafluoroethane) and about 55% to about 60% HFC-125 (i.e., pentafluoroethane) (App. Br. 8). Appellants contend that the claim phrase “consisting of” excludes additional HFC refrigerants from the blend, which

Takigawa teaches to mix with the HFC-134a and HFC-125 blend (App. Br. 9). Appellants argue that the Examiner has not provided a reason to select the claimed narrower range (i.e., 40-45% HFC-134a and 55-60% HFC-125) from Takigawa's broader ranges (i.e., 40-100% HFC-134a and 20-100% HFC-125) (App. Br. 9). Appellants contend that the Examiner's stated case lacks articulated reasoning for modifying Takigawa's teachings to arrive at the claimed invention (App. Br. 6-7).

Appellants' argument that "consisting of" excludes additional HFC refrigerants fails to address the Examiner's position that Takigawa's unrestricted disclosure of HFCs that may be mixed with the refrigerant means that no additional HFC need be added to the HFC-134a and HFC-125 blend (Ans. 3, 5). In other words, Takigawa's alkane fluoride that is to be mixed with the HFC-134a and HFC-125 blend may be an additional amount of HFC-134a or HFC-125, rather than a different HFC. Though Takigawa exemplifies different HFCs being mixed with the HFC-134a and HFC-125 blend, Takigawa's claim 1 recites that the refrigerant includes "at least one of HFC-134a and HFC-125", which underscores that the simplest refrigerant composition mixture claimed by Takigawa includes the binary mixture of HFC-134a and HFC-125.

Similarly, Appellants' argument regarding the claimed percentages of the refrigerant gases is not persuasive because it fails to address the Examiner's finding that Takigawa's simplest binary refrigerant composition is HFC-134a and HFC-125. As the simplest binary mixture, the Examiner correctly determines, based on Takigawa's disclosure (FF 5), that HFC-134a would have been present in an amount of 40 to 60% by weight and HFC-125 correspondingly would be present in a range of 60 to 40% by weight (Ans.

3, 5). Therefore, Takigawa's disclosure would have suggested that at least two of the end points of Appellants' claimed ranges (i.e., 40% HFC-134a and 60% HFC-125) and thus further narrowed Takigawa's range.

Accordingly, we agree with the Examiner that given the guidance provided by Takigawa, determining acceptable refrigerant gas concentration ranges would have been a matter of routine experimentation.

We are unpersuaded by Appellants' argument that there is no rationale provided that Takigawa would have led one of ordinary skill in the art to the claimed refrigerant composition. In light of the reasons noted above, the Examiner correctly determined that Takigawa would have suggested Appellants' claimed refrigerant composition.

Appellants further argue that Takigawa is directed to solving a different problem (i.e., finding a suitable lubricant) than Appellants' claimed invention such that there would be no reasonable expectation of successfully solving Appellants' problems (i.e., high temperature application refrigerant for replacing R-22 refrigerant) (App. Br. 11).

However, this argument is unpersuasive because the Examiner's reason for modifying the prior art to arrive at the claimed invention need not be the same as Appellants' reason for making the claimed invention. *KSR*, 550 U.S. at 420. Instead, any need or problem in the field of endeavor may provide the reason for modifying the prior art. *Id.* Accordingly, Takigawa's disclosure of solving a different problem than Appellants' problem is not determinative.

As noted by the Examiner (Ans. 3, 5-6), Takigawa would have suggested the claimed refrigerant composition, such that there is a reasonable expectation of successfully achieving the claimed refrigerant

composition, which would necessarily have the same properties as Appellants' claimed composition. *Papesch*, 315 F.2d at 391.

Appellants contend that the claimed composition possesses a superior high temperature property not possessed or taught by Takigawa (App. Br. 12-14).<sup>2</sup> Appellants rely on the Ponder and Gbur Declarations as evidence that refrigerant gas compositions with different gas proportions have different properties (App. Br. 12-14). Declarants Gbur and Ponder opine that the claimed invention would not have been obvious from Takigawa (App. Br. 13; Reply Br. 11).

Appellants' evidence of unexpected results is not persuasive because it fails to compare the claimed invention to the closest prior art (i.e., Takigawa) as noted by the Examiner (Ans. 7). Instead, the Ponder and Gbur Declarations compare the claimed invention to the refrigerant R421B (85% pentafluoroethane and 15% tetrafluoroethane), a refrigerant composition not disclosed by Takigawa. Though the declarations may establish that different combinations of refrigerant gases produce refrigerant compositions with different properties, the comparison of R421A to R421B fails to account for Takigawa's disclosure of a binary refrigerant composition having 40% or greater tetrafluoroethane content (i.e., HFC-134a) and preferably 40% or greater pentafluoroethane content (i.e., HFC-125).

While Declarants Ponder's and Gbur's views that the claimed invention would not have been obvious over Takigawa are not afforded any

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<sup>2</sup> Appellants argue long-felt need for the first time on pages 10-11 of the Reply Brief. Because this argument is being raised for the first time in the Reply Brief and there is no reason provided why this argument was not raised in the Appeal Brief, we shall not consider the argument. *Ex parte Nakashima*, 2010 WL 191183 \*3-\*5 (BPAI 2010).

consideration as they are directed to the ultimate legal conclusion, the underlying analyses that led to their conclusions in the declarations have been considered. *Lindell*, 385 F.2d at 456. Specifically, the Ponder Declaration merely states that the declarant found no teaching or suggestion in Takigawa to make a refrigerant composition consisting of tetrafluoroethane and pentafluoroethane as claimed (Ponder Dec. 8). The Gbur Declaration filed October 30, 2007 does not address Takigawa but rather discusses errors and analysis of Appellants' Specification data. The Gbur Declaration filed May 16, 2008, like the Ponder Declaration, rests its conclusion of non-obviousness on Takigawa's failure to exemplify a blend of only HFC-134a and HFC-125 (Gbur Dec. 2).

However, the Ponder and Gbur Declarations analyses are not persuasive in view of Takigawa's disclosures and our analysis of these disclosures *supra* which determine that Takigawa would have suggested the claimed refrigerant composition.

For the above reasons, we affirm the Examiner's § 103 rejection of claims 1-10, 21-25, 27, 29-31, 33-35, and 37-40 over Takigawa.

#### DECISION

The Examiner's decision is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1).

#### AFFIRMED

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Appeal 2009-012229  
Application 10/937,736

THOMAS, KEYDEN, HORSTEMEYER &  
RISLEY, LLP  
600 GALLERIA PARKWAY, SE  
SUITE 1500  
ATLANTA, GA 30339-5994

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ATLANTA, GA  
30339-5994

Appeal No: 2009-012229  
Appellant: Kenneth M. Ponder et al.  
Application No: 10/937,736  
Hearing Room: A  
Hearing Docket: A  
Hearing Date: Wednesday, April 14, 2010  
Hearing Time: 01:00 PM  
Location: Madison Building - East Wing  
600 Dulany Street, 9th Floor  
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Atlanta, GA 30339  
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[Matter No.821920-1030]

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United States Patent and Trademark Office

FROM:  
Todd Deveau

FAX: 571-273-8300

FAX: 770-951-0933

TEL: 770-933-9500

TEL: 571-272-9797

EMAIL: todd.deveau@tkhr.com

RE: Confirmation of Attendance of Hearing  
U.S. Application Serial No. 10/937,736  
"Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant"

Number of Pages (Including This Cover Sheet): - 2 - Page(s)

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/937,736

09/08/2004

Kenneth M. Ponder

821920-1030

1006

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7590

02/23/2010

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
600 GALLERIA PARKWAY, S.E.  
STE 1500  
ATLANTA, GA 30339-5994

EXAMINER

HARDEE, JOHN R

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30339-5994

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Hearing Room: A  
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UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE COMMISSIONER OF PATENTS AND TRADEMARKS

In re Kenneth M. Ponder *et al.*

Application: 10/937,736


Filed: September 8, 2004

Appeal No. 2009-012229

HEARING POSTPONED DUE TO INCLEMENT WEATHER

An oral hearing before a merits panel of the Board of Patent Appeals and Interferences (Board) scheduled for Wednesday, February 10, 2010, was postponed due to inclement weather.

BY ORDER OF THE BOARD OF PATENT  
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STE 1500  
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Appeal No: 2009-012229  
Appellant: Kenneth M. Ponder, Steffan Thomas et al.  
Application No: 10/937,736  
Hearing Room: B  
Hearing Docket: A  
Hearing Date: Wednesday, February 10, 2010  
Hearing Time: 09:00 AM  
Location: Madison Building - East Wing  
600 Dulany Street, 9th Floor  
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Kenneth M. Ponder

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FROM:  
Todd Deveau

FAX: 571-273-8300

FAX: 770-951-0933

TEL: 770-933-9500

TEL:

EMAIL: [todd.deveau@tkhr.com](mailto:todd.deveau@tkhr.com)

RE: U.S. application serial no. 10/937,736

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FAX: 571-273-8300

FAX: 770-951-0933

TEL: 770-933-9500

TEL:

EMAIL: [todd.deveau@tkhr.com](mailto:todd.deveau@tkhr.com)

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10/937,736

09/08/2004

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600 GALLERIA PARKWAY, S.E.  
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06/30/2009

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
600 GALLERIA PARKWAY, S.E.  
STE 1500  
ATLANTA, GA 30339-5994

EXAMINER

HARDEE, JOHN R

ART UNIT

PAPER NUMBER

1796

MAIL DATE

DELIVERY MODE

06/30/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

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THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
600 GALLERIA PARKWAY, S.E.  
STE 1500  
ATLANTA, GA 30339-5994

Appeal No: 2009-012229  
Application: 10/937,736  
Appellant: Kenneth M. Ponder et al.

### Board of Patent Appeals and Interferences Docketing Notice

Application 10/937,736 was received from the Technology Center at the Board on June 22, 2009 and has been assigned Appeal No: 2009-012229.

A review of the file indicates that the following documents have been filed by appellant:

Appeal Brief filed on: February 19, 2009  
Reply Brief filed on: June 01, 2009  
Request for Hearing filed on: June 01, 2009

In all future communications regarding this appeal, please include both the application number and the appeal number.

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The facsimile number of the Board is 571-273-0052. Because of the heightened security in the Washington D.C. area, facsimile communications are recommended. Telephone inquiries can be made by calling 571-272-9797 and should be directed to a Program and Resource Administrator.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/937,736

09/08/2004

Kenneth M. Ponder

821920-1030

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7590

06/22/2009

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
600 GALLERIA PARKWAY, S.E.  
STE 1500  
ATLANTA, GA 30339-5994

EXAMINER

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**UNITED STATES DEPARTMENT OF COMMERCE****U.S. Patent and Trademark Office**

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APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
10937736	9/8/2004	PONDER ET AL.	821920-1030

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
600 GALLERIA PARKWAY, S.E.  
STE 1500  
ATLANTA, GA 30339-5994

**EXAMINER**

JOHN R.. HARDEE

ART UNIT	PAPER
1796	20090618

DATE MAILED:

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner for Patents**

/John R. Hardee/  
Primary Examiner, Art Unit 1796



Art Unit: 1796

1. The reply brief filed June 1, 2009 has been entered and considered. The application has been forwarded to the Board of Patent Appeals and Interferences for decision on the appeal.
2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, Dr. John R. Hardee, whose telephone number is (571) 272-1318. The examiner can normally be reached on Monday through Friday from 8:00 until 4:30. In the event that the examiner is not available, his supervisor, Mr. Harold Pyon, may be reached at (571) 272-1498.

The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/John R. Hardee/  
Primary Examiner  
June 18, 2009

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In Re Application of:

Docket No.: 821920-1030

PONDER, K., et al.,

Art Unit: 1796

Serial No.: 10/937,736

Examiner: John R. Hardee

Filing Date: September 8, 2004

Confirmation No.: 1006

For: **Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant**

**REPLY BRIEF**

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

This Reply Brief under 37 C.F.R. §41.41 is timely submitted in support of the Notice of Appeal filed December 9, 2009, appealing to the Board from the Final Office Action, mailed June 27, 2008 (Paper No. Mail Date 20080623), finally rejecting claims 1-10, 21-25, 27, 29-31, 33-35 and 37-40 of the above referenced application and in response to the Examiner's Answer mailed March 31, 2009. No new or non-admitted amendment or any new or non-admitted affidavit or other evidence is submitted with this Reply Brief.

(9) Grounds of Rejection

In response to Appellants' Appeal Brief, the Examiner's Answer (hereinafter also "the Answer") relies solely upon the teachings of Takigawa to render independent claims 1, 6, 21, and 22 obvious. The Answer maintains the position that Takigawa bears only one difference from the claimed refrigerant composition. Namely, the Answer contends Takigawa differs from the rejected claims in that it fails to teach the precise ratio of HFC-134a and HFC-125 refrigerant gases recited in the pending claims. The Answer goes on to erroneously conclude such a ratio is obvious in light of Takigawa. The only support for such conclusion is the conclusory statement that the precise ratio recited in the claims "amounts to routine optimization". No evidence is presented as to why Appellants' precise ratio amounts to routine optimization. In view of the present record, no such evidence is available.

Appellants agree that Takigawa fails to teach the claimed ratio of HFC-134a and HFC-125. Takigawa, however, also fails to teach or suggest a refrigerant composition where HFC-134a and HFC-125 are the only two refrigerant gases present. Taken in its entirety, Takigawa simply does not guide the skilled artisan to the refrigerant composition recited in claims 1, 6, 21, and 22. In order to reach the conclusion of obviousness, Takigawa must be viewed selectively, using the rejected claims as a blueprint.

To support an interpretation that Takigawa teaches a mixture in which HFC-134a and HFC-125 are the only two refrigerant gases, the Answer cites Takigawa, col. 1, lines 13+:

"This invention relates to a refrigerator oil and a fluid composition for a refrigerator, and in particular to a refrigerator oil and a fluid composition containing said oil for use in a refrigerator, the refrigerator oil comprising an alkyl benzene having a specific feature and being suited for use with an HFC refrigerant containing 1,1,1,2-tetrafluoroethane (HFC-134a) and/or pentafluoroethane (HFC-125)."

and col. 8, lines 29-31:

"There is no restriction as to the kind of HFC (hydrofluorocarbon) to be mixed with HFC-134a and/or HFC-125."

The Answer interprets the combination of these sentences to mean "that no additional HFC need be added, and that the disclosure reads on refrigerant compositions *consisting of* 40-60% [HFC-]134a and 60-40% of [HFC-]125." Answer, page 3, lines 13-15. This, however, is not what is recited in the pending claims. Moreover, isolating these two sentences from

Takigawa, the Answer selectively ignores what the whole of Takigawa teaches the skilled artisan. Takigawa does not teach a mixture of only HFC-134a and HFC-125, and Takigawa does not teach the ratio recited in the rejected claims.

For example, col. 1, lines 13+ disclose an “HFC refrigerant containing 1,1,1,2-tetrafluoroethane (HFC-134a) and/or pentafluoroethane (HFC-125).” (Emphasis added). This statement does not suggest compositions consisting of about 40-45% HFC-134a and about 55-60% of HFC-125 as recited in pending claims 1, 6, 21 and 22, let alone a refrigerant gas composition consisting of about 60% HFC-125 and about 40% HFC-134a (see claims 3, 8 and 23), or about 58% HFC-125 and about 42% HFC-134a (see claims 4, 9 and 24), or about 55% HFC-125 and about 45% HFC-134a.

In addition, when read in context, even the sentence used as the Answer’s cornerstone (underlined below), does not suggest an HFC-134a/HFC-125-only mixture.

At col. 8, lines 29-46 Takigawa states:

“There is no restriction as to the kind of HFC (hydrofluorocarbon) to be mixed with HFC-134a and/or HFC-125. The HFC includes trifluoromethane (HFC-23), difluoromethane (HFC-32), 1,1,2,2-tetrafluoroethane (HFC-134), 1,1,1-trifluoroethane (HFC-143a) or 1,1-difluoroethane (HFC-152a).”

Examples of the HFC-refrigerant containing 1,1,1,2-tetrafluoroethane (HFC-134a) and/or pentafluoroethane (HFC-125) that are useful in this invention are **HFC-134a alone, HFC-125 alone**, a mixture of HFC-134a/HFC-32 in a ratio of 60-80% by weight/40-20% by weight; a mixture of HFC-134a/HFC-32/HFC-125 in a ratio of 40-70% by weight/15-35% by weight/5-40% by weight, a mixture of HFC-125/HFC-32 in a ratio of 30-60% by weight/70-40% by weight, a mixture of HFC-125/HFC-143a in a ratio of 40-60 % by weight/60-40% by weight and a mixture of HFC-125/HFC-134a/HFC-143a in a ratio of 35-55% by weight/1-15% by weight/40-60% by weight.

Specific examples of the HFC refrigerant mixture are R404A (HFC-125/HFC-143a/HFC-134a in a ratio of 44% by weight/52% by weight/4% by weight), R407C (HFC-32/HFC-125/HFC-134a in a ratio of 23% by weight/25% by weight/52% by weight), R410A (HFC-32/HFC-125 in a ratio of 45% by weight/55% by weight) and R507 (HFC125/HFC-143a in a ratio of 50% by weight/50% by weight.”

(Emphasis added)

Interpreting the phrase “to be mixed with” in Takigawa as a teaching that “no additional HFC need be added” can only be interpreted as a deliberate misinterpretation of Takigawa. It certainly is not a reasonable interpretation of Takigawa. In fact, a plain English interpretation of

“to be mixed with” suggests additional HFCs are added. However, even if “to be mixed with” could mean no additional HFC need be added”, Takigawa suggests the exact opposite.

Takigawa generally describes its refrigerating machine oil is for use with alkane fluoride refrigerants. These refrigerants are described as

“alkane fluorides having 1 to 3 carbon atoms, preferably an alkane fluoride having 1 to 2 carbon atoms and containing 40% by weight or more of 1, 1, 1, 2-tetrafluoroethane (HFC-134a) and/or an alkane fluoride having preferably 1 to 2 carbon atoms and containing 20% by weight or more of pentafluoroethane (HFC-125).” (col. 8, lines 20+).

This teaching literally covers thousands of possible combinations of HFC refrigerant gases.

Directly after the cited paragraph, Takigawa identifies suitable HFC's to be mixed with HFC-134a and/or HFC-125 and goes on to identify mixtures suitable for use with its specific lubricant (refrigerant oil). If used in the same composition, HFC-134a and HFC-125 are always joined by a third refrigerant gas, i.e. HFC-143a, HFC-32, and HFC-152a. Two of the refrigerants listed may be used alone, namely “HFC-134a alone” and “HFC-125 alone”. None of these mixtures contemplates an HFC-134a/HFC-125 mixture alone. Therefore, the Answer's position that Takigawa suggests a composition where HFC-134a and HFC-125 are the only two refrigerant gases cannot be justified.

Takigawa offers no guidance on refrigerant mixtures like those claimed because Takigawa is only concerned with the lubricating refrigerator oil to be used. (See, generally, Col. 1, line 29 – Col. 2, line 3). Takigawa is not concerned at all with what the composition of the refrigerant gases should be other than that its lubricating oil be compatible with the refrigerant gases used. In particular, Takigawa is not at all concerned with identifying a refrigerant gas composition to be a substitute for chlorodifluoromethane (R-22), a CFC, not an HFC refrigerant gas. In fact, none of Takigawa's six Evaluation Tests relate or refer to a refrigerant composition consisting of only HFC-134a and HFC-125.

While a reference is not limited to its particular embodiments and is available for all that it teaches, Takigawa as a whole simply does not teach any refrigerant composition in which the refrigerant gas components are a combination of only HFC-125 and HFC-134a, much less a refrigerant composition in which the refrigerant gases consist of about 40% to about 45% by

weight HFC-134a and about 55% to about 60% by weight HFC-125, as recited in the rejected claims.

At p. 4, the Answer, citing case law, states, "In the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art, a *prima facie* case of obviousness exists." This statement may be true where the only differences between an application and cited prior art are differences in ratios. Takigawa, however, does not teach a composition with only HFC-134a and HFC-125. Thus, any ratios mentioned by Takigawa may refer to compositions containing HFC-134a and/or HFC-125 but do not refer to compositions containing only HFC-134a and HFC-125. Even if Takigawa is considered to teach a composition with only HFC-134a and HFC-125, a *prima facie* case of obviousness is rebuttable and has been rebutted by Appellants, as described below.

(10) Response to Argument

2) In responding to Appellants' Appeal Brief arguments, the Answer incorrectly states, "Appellant argues that not every limitation is taught in the reference. This is not persuasive because the rejection was made under 103 rather than 102." The Answer incorrectly implies that a prior art reference need not teach every claimed feature for a rejection under 35 U.S.C. 103(a). Appellants respectfully disagree. It is well settled that "obviousness requires a suggestion of all limitations in a claim." *CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003) (*citing In re Royka*, 490 F.2d 981, 985 (CCPA 1974)) (emphasis added). At §2143.03, the MPEP requires the "consideration" of every claim feature in an obviousness determination. To render any claim unpatentable the Office must do more than merely "consider" each and every feature of a claim. The asserted prior art must also teach or suggest *each and every claim feature*. See *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974) (emphasis added) (to establish *prima facie* obviousness of a claimed invention, all the claim features must be taught or suggested by the prior art).

The pending independent claims recite a refrigerant gas composition consisting of about 40% to about 45% tetrafluoroethane (HFC-134a) and about 55% to about 60% pentafluoroethane (HFC-125). Besides its failure to teach a refrigerant gas composition "consisting of" these two refrigerant gases to the exclusion of other refrigerant gases, Takigawa also fails to teach that tetrafluoroethane should be present in an amount no less than about 40% and in an amount no greater than about 45%, and further fails to teach that pentafluoroethane

should be present in an amount of no less than about 55% and no more than about 60%. Takigawa further fails to teach the 60/40, 58/42 and 55/45 compositions of the dependent claims. Neither the Answer nor the Final Rejection make any effort to present any *prima facie* evidence of a teaching of these upper and lower limits for these two selected refrigerant gases recited in the pending claims because there is no such teaching. Since Takigawa is concerned only with identifying its alkyl benzene refrigerator oil having a specific property, Takigawa presents no teaching of how to select a refrigerant gas composition to be a substitute for the CFC, R-22, among the potentially thousands of combinations of alkane fluoride refrigerant gases it discusses.

3) Appellants' Appeal Brief argues there is no teaching in Takigawa to support a modification to result in the claimed refrigerant composition. In response, the Answer incorrectly states,

"No modification of the reference need be made: The simplest binary composition fairly taught by the reference in the most preferred percentages, consists of 40% or more of each tetrafluoroethane and pentafluoroethane."

An obviousness rejection is an inherent acknowledgement that the primary reference, here Takigawa, relied upon for the rejection fails to teach each and every feature recited in the rejected claims. An obviousness rejection necessarily requires either a combination of one or more references or, in the case of a single-reference obviousness rejection, requires the reference to be modified in order to meet each feature of the claimed refrigerant composition. Here no rejection is presented under Section 102 that Takigawa anticipates the rejected claims. Thus, the single cited reference, Takigawa, must be modified in order to meet the features recited in the rejected claims, especially considering Takigawa never discloses either a binary composition consisting of tetrafluoroethane (HFC-134a) and pentafluoroethane (HFC-125) to the exclusion of other refrigerant gases or the specific percentages of these two refrigerant gases recited in the pending claims.

Appellants maintain the position that nothing in Takigawa would lead the skilled artisan to the refrigerant composition recited in the rejected claims. Neither the Answer nor the Final Rejection present any *prima facie* evidence of how or why one skilled in the art would modify Takigawa to result in the refrigerant gas composition recited in the pending claims.

4) In response to Appellants' Appeal Brief arguments that Takigawa looks to solve a different problem than that addressed by Appellants, the Answer incorrectly attempts to simplify

the respective problems solved by Takigawa and by Appellants to merely generating refrigeration. As noted above, this is not the purpose of Takigawa. Appellants' raised this issue to demonstrate that a skilled artisan would not, by nature of the problem addressed in Takigawa, glean any guidance to choose a binary gas composition consisting only of about 60% to about 55% HFC-125 and of about 40% to about 45% HFC 134a as a substitute for the CFC, R-22. Takigawa is concerned with an alkyl benzene having a specific property for use as a refrigerator oil with HFC refrigerants. To the contrary, the Appellants' recited refrigerant composition results from an attempt to produce a refrigerant composition for high-temperature application suitable to replace the specific CFC refrigerant chlorodifluoromethane, R-22. (Declaration of Kenneth Ponder, paragraphs 3-6, Exhibit A of Appellants' Evidence Appendix). There is no consideration at all in Takigawa of determining a refrigerant gas composition to be a substitute for CFC refrigerant gas, let alone the CFC R-22.

The Answer at pages 6-7 admits that Takigawa "is not drawn specifically to either of high- or medium-temperature refrigeration or to low-temperature refrigeration", but states "Nor are appellants' claims." The Answer misses the point of contrasting the problems to be solved. While not controlling, the problem addressed by Takigawa does not illuminate a route to Appellants' recited refrigerant gas composition. The problems to be solved by Takigawa and Appellants are different, and neither is aimed at simply "successfully generat[ing] refrigeration", as erroneously set forth in the Answer. Simply generating refrigeration is not the goal of either Takigawa or Appellants. Regardless, the fact remains that Takigawa does not attempt to solve the same problem as Appellants and does not intimate any reason to the skilled artisan to use only the refrigerant gases HFC-134a and HFC-125 in the proportions claimed as a replacement for the CFC R-22.

In fact, if "successfully generat[ing] refrigeration" were merely the goal there would be no need for more than one refrigerant gas composition, as one refrigerant gas composition would be suitable to meet such a goal and only one composition would be needed to meet such a goal. Further, simply "successfully generat[ing] refrigeration" as an objective is contradicted by the large number of refrigerant gas compositions that carry ASHRAE designations (see, e.g. Appellants' Evidence Appendix, Exhibit C, ANSI/ASHRAE Addendum u to ANSI/ASHRAE Standard 34-2004, pages 27-30). ASHRAE, the American Society of Heating, Refrigerating, and Air-Conditioning Engineers, is the international industry organization and standards creating body for the heating, ventilating, air conditioning and refrigerating industries.



Such an overstated objective is further contradicted by the Examiner's own concessions at page 7 of the Answer "that behavior profiles of various refrigeration mixtures made according to the reference [Takigawa] will be vastly different." If, as conceded, the behavior profiles will be vastly different, then one cannot expect that all such mixtures will successfully generate refrigeration in any and all applications, let alone as a replacement for the CFC R-22.

The Examiner further contradicts himself in the Answer at page 8 when noting Appellants' argument that there is no teaching in Takigawa that different ratios of pentafluoroethane to tetrafluoroethane can result in compositions for different temperature applications and raising the question "Why else would one make differing compositions of the same gases?" First, where does the recognition of the problem creating different ratios for different temperature applications come from? It is clear the Examiner does not find it in Takigawa. Instead, the Examiner's interpretation of the objective in Takigawa is "successfully generat[ing] refrigeration", which objective would teach away from creating different ratios for different temperature applications as only one ratio would be needed to merely successfully generate refrigeration.

If one were to follow the logic of the rejection of the present claims as presented in the Answer, no patent claim to a refrigerant composition combining two or more known refrigerant gases could ever be allowed since all such combinations are aimed at simply generating refrigeration. Such logic is contradicted by the numbers of patents the US PTO has allowed and issued to combinations of known refrigerant gases, including Appellants' US Patent no. 7,320,763 which patent claims a combination consisting of HFC-125 and HFC-134a. Such logic is further contradicted by the ASHRAE evidence showing that the presence or absence of even a small amount of a refrigerant gas is considered to materially affect the basic properties of a given refrigerant gas composition resulting in one refrigerant gas composition having different properties than another refrigerant gas composition, even consisting of the same gases, and resulting in the issuance by ASHRAE of a new industry designation number. As stated in the Second Declaration of Andy Gbur, a member of the ASHRAE Standard Project Committee 34 from 2002 to 2007 that issues ASHRAE standard designation numbers for refrigerant compositions (Appellants' Evidence Appendix, Exhibit B), paragraph 6:

ASHRAE recognizes that blends of refrigerant gases having the same components in different proportions can produce refrigerant blend compositions having different refrigerant properties as typically reflected by differences in temperature/pressure profiles of the refrigerant blend compositions. ASHRAE

gives each different blend a distinct designation number, or Refrigerant Number. In the case of blends having the same components but differing only in the proportions of the components the differences are identified by designating each different blend with the same Refrigerant Number to show the blends have the same components but with a different uppercase letter to recognize the different blends result in different refrigerants. See Addendum e. Thus, for example, ASHRAE has granted different refrigerant designation numbers to refrigerant compositions consisting of difluoromethane (HFC-32), pentafluoroethane (HFC-125) and tetrafluoroethane (HFC-134a) where these three refrigerant components are present in different proportions as evidenced by designation numbers R407A (a 20-40-40 proportion blend), R407B (a 10-70-20 proportion blend), R407C (a 23-25-52 proportion blend), R407D (a 15-15-70 proportion blend), and R407E (a 25-15-60 proportion blend). See Addendum c to ANSI/ASHRAE Standard 34-2001 (2003). One skilled in the refrigerant art would expect that, for example, refrigerant R407A would have different refrigerant properties than those of refrigerant R407B.

5) In response to Appellants' Appeal Brief arguments that the claimed compositions have a superior property not recognized by Takigawa, the Answer attempts to rephrase the Ponder and Gbur Declarations and completely misses the point of these Declarations. Appellants dispute the claim in the Answer that *prima facie* obviousness is established over the rejected claims. However, even if a factual foundation for *prima facie* obviousness is shown, the burden merely shifts to Appellants to rebut. *Prima facie* obviousness is a rebuttable presumption. To the extent that any valid *prima facie* case of obviousness is presented herein (which Appellants dispute), such *prima facie* case has been sufficiently rebutted by the evidence submitted by Appellants.

Evidence presented by Appellants to negate or rebut *prima facie* obviousness may be summarized as including, for example:

(a) Takigawa solves a different problem than the rejected claims.

Specifically, the refrigerant composition recited in the rejected claims was "developed as a replacement for R-22 refrigerant." Ponder Declaration, p. 3. In contrast, Takigawa is drawn to providing a specific refrigerator oil suitable for use with HFC refrigerants. This difference is substantial. For example, even if Takigawa could be construed as teaching an HFC-134a/HFC-125 composition, Takigawa offers no guidance to arrive at the ratios of HFC-134a/HFC-125 recited in the rejected claims. Put simply, even if the skilled artisan interprets "to be mixed with" like the Examiner as meaning "no additional HFC's need to be mixed with", the skilled artisan is left to derive every feature of the specific refrigerant composition recited in the rejected claims

from a reference which is directed to a specific refrigerator lubricant. There is no clear rationale presented as to how the skilled artisan would arrive at the claimed refrigerant composition using only Takigawa, a reference directed toward refrigerator lubricants.

(b) Appellants' refrigerant mixtures possess unexpectedly advantageous or superior properties.

Appellants submitted a Declaration May 16, 2008 from Andy Gbur (hereinafter, "Gbur Declaration") who served five years on the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) committee responsible for issuing industry standards for refrigerant blends. In essence, the Gbur Declaration demonstrates that the industry recognizes refrigerant blends having the same component gases may possess very different properties. Specifically, the Gbur Declaration explains,

"ASHRAE recognizes that blends of refrigerant gases having the same components in different proportions can produce refrigerant blend compositions having different refrigerant properties as typically reflected by the differences in temperature/pressure profiles of the refrigerant blend compositions." (pp. 1 and 2).

Even if Takigawa is misconstrued as teaching an HFC-134a/HFC-125 composition, by no means does it teach a composition capable of R-22 replacement. Following the logic of the Examiner, regardless of the ratios or proportions used, no refrigerant composition is patentable if all components of the composition are known. This logic ignores the importance of the ratios described in the rejected claims. Appellants demonstrated that even the standard-creating body of the refrigerant industry recognizes the properties of the refrigerant composition recited in the rejected claims as unexpected or unique by labeling the refrigerant composition encompassed by the rejected claims with its own unique standard designation. The Appellants' present claimed composition of a ratio of 58/42 HFC-125/HFC-134a has been given the designation R-421A by ASHRAE demonstrating its uniqueness (see ANSI/ASHRAE Addendum n to ANSI/ASHRAE Standard 34-2004, p. 13, Appellants Evidence Appendix, Exhibit C).

(c) Long felt but unresolved need.

At p. 3, the Declaration submitted September 18, 2008 (hereinafter "Ponder Declaration") states,

"Our R-421A refrigerant was developed as a replacement for R-22 refrigerant that consists of chlorodifluoromethane. R-22 refrigerant could cover a wide array of temperatures. The industry has not yet found a single refrigerant composition that could replace R-22 for use over the entire array of temperatures over which R-22 was used. As a result, the industry has had to come up with multiple refrigerant compositions covering different arrays of temperatures."

Such an admission would seem to negate a conclusion of obviousness. HFC-134a and HFC-125 are known within the refrigerant industry. The mere fact that the refrigerant industry was unable to develop an R-22 substitute negates obviousness. Moreover, Appellants solved the industry's need for an R-22 replacement by blending separately known refrigerants. Considering the need for an R-22 replacement capable of covering a wide array of temperatures, were the solution truly obvious, it would have been solved in the ten years between Takigawa and Appellants' application.

(d) Two skilled artisans reading Takigawa would not arrive at the composition as claimed.

It is noteworthy that Andy Gbur, with over 15 years in the industry and a position on the ASHRAE standard-designating committee, upon reviewing Takigawa and the rejected claims, states,

"While Takigawa makes mention of refrigerants containing HFC-134a (1,1,1,2-tetrafluoroethane) and/or HFC-125 (pentafluoroethane), Takigawa does not disclose a single example of a refrigerant gas composition or blend combining only tetrafluoroethane and pentafluoroethane to the exclusion of another refrigerant gas component." (pp. 2 and 3, Gbur Declaration).

It is precisely Takigawa's lack of guidance which prompts Mr. Gbur to state, .

"In my opinion, it would not be obvious to one skilled in the art of refrigerant gas compositions to produce a refrigerant gas composition containing only about 40% to about 45% by weight tetrafluoroethane and about 55% to about 60<sup>^</sup> by weight pentafluoroethane from the teachings in the Takigawa patent." p. 3, (Gbur Declaration).

Furthermore, Kenneth Ponder, also an expert in the refrigerant industry, states,

"I have read [Takigawa] and do not find any mention or suggestion in Takigawa of combining pentafluoroethane with tetrafluoroethane to create a composition including refrigerant gases consisting of pentafluoroethane and tetrafluoroethane to the exclusion of other refrigerant gases except for impurities ordinarily associated with those two gases having a temperature-pressure profile that provides superior properties for use in high and medium temperature applications as described above."

Neither of the two industry experts was able to logically derive the refrigerant composition recited in the rejected claims from the teachings of Takigawa. While these opinions are not dispositive, they do tend to negate a finding of obviousness.

In spite of the evidence presented by Appellants' Declarations demonstrating unexpected or superior properties of the claimed compositions, the Answer gives the Declarations no weight. Appellants respectfully point out MPEP §2145(VII) which states that

Office personnel should avoid giving evidence no weight, except in rare circumstances. *In re Alton*, 76 F.3d 1168, 1174-75, 37 USPQ2d 1578, 1582-83 (Fed. Cir. 1996). Furthermore, evidence that a composition possesses superior and unexpected properties in one of a spectrum of common properties can be sufficient to rebut a *prima facie* case of obviousness. *In re Chupp*, 816 F.2d 643, 646, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987). Appellants submit that if *prima facie* obviousness has been established, in spite of the fact that Takigawa never teaches a refrigerant gas mixture “consisting of” about 40% to about 45% HFC-134a and about 60% to about 55% HFC-125, obviousness has been rebutted by the evidence presented in the Declarations demonstrating a superior property.

The Answer makes several noteworthy concessions in response to Appellants’ Appeal Brief. The Answer concedes the veracity of the Ponder Declaration and the expertise of Mr. Ponder. (p. 6, Examiner’s Answer). Despite this concession, the Answer ignores the merits of the Ponder Declaration and fails to give it any weight in rebutting the obviousness conclusion. Also, the Answer concedes, “that the behavior profiles of various refrigeration mixtures made according to [Takigawa] will be vastly different.” (p. 7, Examiner’s Answer). This concession, however, was deliberately marginalized by the Answer since “all such compositions [ ] successfully generate refrigeration.” (p. 7, Examiner’s Answer). Furthermore, the Answer even concedes that compositions with “different blends of pentafluoroethane and tetrafluoroethane will have very different properties and that one such composition would not render another such composition obvious.” This concession appears to be an admission that the claimed refrigerant composition is nonobvious over Takigawa or at least lays a logical foundation for such a conclusion. In spite of the aforementioned concessions, however, the Answer maintains its conclusion that the claims are obvious in light of Takigawa. This single-reference obviousness rejection necessarily implies that Takigawa fails to teach every limitation of the rejected claims. Nevertheless, the Office never provides an explanation of where these missing limitations are taught. Nor does the Answer explain why it dismisses the opinions of both Mr. Gbur and Mr. Ponder that the Takigawa reference does not teach or render obvious Appellants’ claimed refrigerant gas composition.

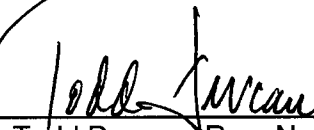
**CONCLUSION**

Based upon the foregoing discussion and that in Appellants' Appeal Brief, Appellants respectfully request that the final rejection of claims 1-10, 21-25, 27, 29-31, 33-35 and 37-40 be overruled and withdrawn by the Board and that the application be allowed to issue as a patent with depending claims.

Respectfully Submitted,

**THOMAS, KAYDEN, HORSTEMEYER  
& RISLEY, L.L.P.**

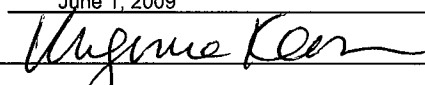
By

A handwritten signature in black ink, appearing to read "Todd Deveau", is written over a horizontal line.

Todd Deveau, Reg. No. 29,526

600 Galleria Parkway, Suite 1500  
Atlanta, Georgia 30339  
(770) 933-9500

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

<b>REQUEST FOR ORAL HEARING BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES</b>		Docket Number (Optional)  <div style="text-align: center;">821920-1030</div>								
I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)] on <u>June 1, 2009</u>  Signature <u></u>  Typed or printed name <u>Virginia Keenan</u>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="padding: 5px;">In re Application of Ponder, K., et al.</td> </tr> <tr> <td style="width: 50%; padding: 5px;">Application Number 10/937,736</td> <td style="width: 50%; padding: 5px;">Filed September 8, 2004</td> </tr> <tr> <td colspan="2" style="padding: 5px;">For Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant</td> </tr> <tr> <td style="padding: 5px;">Art Unit 1796</td> <td style="padding: 5px;">Examiner John R. Hardee</td> </tr> </table>		In re Application of Ponder, K., et al.		Application Number 10/937,736	Filed September 8, 2004	For Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant		Art Unit 1796	Examiner John R. Hardee
In re Application of Ponder, K., et al.										
Application Number 10/937,736	Filed September 8, 2004									
For Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant										
Art Unit 1796	Examiner John R. Hardee									

Applicant hereby requests an oral hearing before the Board of Patent Appeals and Interferences in the appeal of the above-identified application.

The fee for this Request for Oral Hearing is (37 CFR 41.20(b)(3)) \$ 1080.00

☒ Applicant claims small entity status. See 37 CFR 1.27. Therefore, the fee shown above is reduced by half, and the resulting fee is: \$ 540.00

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

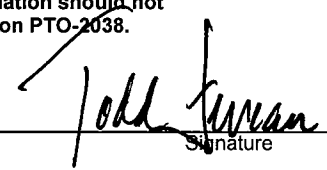
☐ The Director has already been authorized to charge fees in this application to a Deposit Account. I have enclosed a duplicate copy of this sheet.

☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 20-0778.

☐ A petition for an extension of time under 37 CFR 1.136(b) (PTO/SB/23) is enclosed. For extensions of time in reexamination proceedings, see 37 CFR 1.550.

**WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**

I am the

<input type="checkbox"/> applicant/inventor.  <input type="checkbox"/> assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)  <input checked="" type="checkbox"/> attorney or agent of record. Registration number <u>29526</u>  <input type="checkbox"/> attorney or agent acting under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34. _____	 _____ Signature  Todd Deveau Typed or printed name  _____ Date  June 1, 2009 Date  _____ (770) 933-9500 Telephone number
---	--

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below\*.

☐ \*Total of \_\_\_\_\_ forms are submitted.

This collection of information is required by 37 CFR 41.20(b)(3). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

## Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.



## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	10937736			
<b>Filing Date:</b>	08-Sep-2004			
<b>Title of Invention:</b>	Refrigerant with lubricating oil for replacement of R22 refrigerant			
<b>First Named Inventor/Applicant Name:</b>	Kenneth M. Ponder			
<b>Filer:</b>	Todd Deveau./Virginia Keenan			
<b>Attorney Docket Number:</b>	821920-1030			
Filed as Small Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
Request for oral hearing	2403	1	540	540
<b>Post-Allowance-and-Post-Issuance:</b>				
<b>Extension-of-Time:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				540

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	5430948
<b>Application Number:</b>	10937736
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1006
<b>Title of Invention:</b>	Refrigerant with lubricating oil for replacement of R22 refrigerant
<b>First Named Inventor/Applicant Name:</b>	Kenneth M. Ponder
<b>Customer Number:</b>	24504
<b>Filer:</b>	Todd Deveau./Virginia Keenan
<b>Filer Authorized By:</b>	Todd Deveau.
<b>Attorney Docket Number:</b>	821920-1030
<b>Receipt Date:</b>	01-JUN-2009
<b>Filing Date:</b>	08-SEP-2004
<b>Time Stamp:</b>	18:44:16
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 540
RAM confirmation Number	3599
Deposit Account	200778
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Reply Brief Filed	00920975.PDF	683139 dc65384382ab0080b97f6fd4ec2ced486f488bc1	no	13
Warnings:					
Information:					
2	Request for Oral Hearing	00920976.PDF	131182 ea40c4612bc7780500fcf349398c58e272eb28ce	no	2
Warnings:					
Information:					
3	Fee Worksheet (PTO-875)	fee-info.pdf	30128 503fffd7ba2e505c763979dc248b6943254baf89	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			844449		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/937,736	09/08/2004	Kenneth M. Ponder	821920-1030	1006
24504 7590 04/29/2009 THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP 600 GALLERIA PARKWAY, S.E. STE 1500 ATLANTA, GA 30339-5994			EXAMINER HARDEE, JOHN R	
			ART UNIT 1796	PAPER NUMBER
			MAIL DATE 04/29/2009	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**UNITED STATES DEPARTMENT OF COMMERCE****U.S. Patent and Trademark Office**

Address : COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
10937736	9/8/2004	PONDER ET AL.	821920-1030

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
600 GALLERIA PARKWAY, S.E.  
STE 1500  
ATLANTA, GA 30339-5994

**EXAMINER**

JOHN R.. HARDEE

ART UNIT	PAPER
1796	20090421

DATE MAILED:

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner for Patents**

/John R. Hardee/  
Primary Examiner, Art Unit 1796

## DETAILED ACTION

### *Information Disclosure Statement*

1. Appellant's Information Disclosure Statement of October 6, 2005 has been considered, and a signed copy is enclosed.
2. The Examiner's Answer should have been stated as being responsive to appellant's appeal brief of February 19, 2009.
3. The related proceedings section of the examiner's answer was omitted and is attached:

#### **(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, Dr. John R. Hardee, whose telephone number is (571) 272-1318. The examiner can normally be reached on Monday through Friday from 8:00 until 4:30. In the event that the examiner is not available, his supervisor, Mr. Harold Pyon, may be reached at (571) 272-1498.

The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

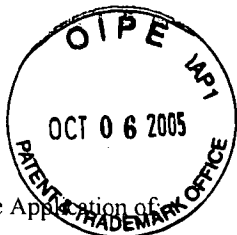
Art Unit: 1796

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/John R. Hardee/  
Primary Examiner  
April 21, 2009





PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of

Ponder, et al.

Confirmation No.: 1006

Group Art Unit: 1751

Serial No.: 10/937,736

Examiner: Unknown

Filed: 09/08/2004

Docket No.: 821920-1030

For: Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant

**INFORMATION DISCLOSURE STATEMENT**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

This information disclosure statement is filed in accordance with 37 C.F.R. §§ 1.56, 1.97, and 1.98, and specifically:

- ☒ under 37 CFR 1.97(b), or  
(within Three months of filing national application; or date of entry of international application; or before mailing date of first office action on the merits; whichever occurs last)
- ☐ under 37 CFR 1.97(c) together with either a:  
☐ Statement Under 37 C.F.R. 1.97(e), or  
☐ a \$180.00 fee under 37 CFR 1.17(p), or  
(After the CFR 1.97(b) time period, but before the final office action or notice of allowance, whichever occurs first)
- ☐ under 37 CFR 1.97(d) together with a:  
☐ Statement under 37 CFR 1.97(e), and  
☐ a \$180.00 petition fee set forth in 37 CFR 1.17(p).  
(Filed after final office action or notice of allowance, whichever occurs first, but before payment of the issue fee)

Enclosed is a check in the amount of \$ .

Enclosed is Credit Card Payment Form (PTO-2038) in the amount of \$ .

Please charge \$ to deposit account . At any time during the pendency of this application, please charge any fees required to Deposit Account pursuant to 37 CFR 1.25. The Commissioner is hereby requested to credit any overpayment to Deposit Account No. .

- ☒ Applicant(s) submit herewith *Form PTO 1449A - Information Disclosure Statement by Applicant* together with copies (where required) of patents, publications or other information of which applicant(s) are aware, which applicant(s) believe(s) may or may not be material to the examination of this application and for which there may be a duty to disclose in accordance with 37 CFR 1.56. As required by 37 C.F.R. §1.98(a), a legible copy of each document is provided.
- ☐ A concise explanation of the relevance of foreign language patents, foreign language publications and other foreign language information listed on PTO Form 1449, as presently understood by the individual(s) designated in 37 CFR 1.56(c) most knowledgeable about the content is given on the attached sheet, or where a foreign language patent is cited in a search report or other action by a foreign patent office in a counterpart foreign application, an English language version of the search report or action which indicates the degree of relevance found by the foreign office is listed on the form PTO 1449 and is enclosed herewith.

The following rights are reserved by the Applicant(s): the right to establish the patentability of the claimed invention over any of the listed documents should they be applied as reference, and/or the right to prove that some of these documents may not be prior art, and/or the right to prove that some of these documents may not be enabling for the teachings they purport to offer.

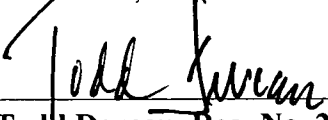
This statement should not be construed as a representation that an exhaustive search has been made, or that information more material to the examination of the present application does not exist. Any statements or identifications regarding the relevance of any portion(s) of cited references should not be construed as a representation that the most relevant portion(s) have been identified, and the absence of such statements or identifications should not be construed as representations that there are no relevant portion(s). The Examiner is specifically requested not to rely solely on the materials submitted herewith. The Examiner is requested to conduct an independent and thorough review of the documents, and to form independent opinions as to their significance.

It is requested that the information disclosed herein be made of record in this application and that the Examiner initial and return a copy of the enclosed PTO-1449 to indicate the documents have been considered.

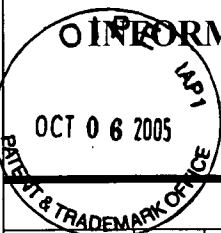
Respectfully Submitted,

THOMAS, KAYDEN, HORSTEMEYER  
& RISLEY, L.L.P.

By:

  
Todd Deveau, Reg. No. 29,526

100 Galleria Parkway, Suite 1750  
Atlanta, Georgia 30339-5948  
770-933-9500

Form PTO-1449				Attorney Docket No. <b>821920-1030</b>		Serial No. <b>10/937,736</b>		
 <b>INFORMATION DISCLOSURE CITATION</b> <i>(Use several sheets if necessary)</i>				Applicant <b>Ponder</b>				
				Filing Date <b>09/08/2004</b>		Group <b>1751</b>		
<b>U.S. PATENT DOCUMENTS</b>								
Examiner Initials	Item	Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate	
	A	3,092,981	06/11/63	Begeman et al.				
	B	3,642,634	02/15/72	Olund				
	C	3,733,850	05/22/73	Olund				
	D	4,046,533	09/06/77	Olund				
	E	4,963,282	10/16/90	Jolley et al.				
	F	4,971,712	11/20/90	Gorski et al.				
	G	4,983,312	01/08/91	Tamura et al.				
	H	5,096,606	03/17/92	Hagihara et al.				
	I	5,145,594	09/08/92	Anton et al.				
	J	5,254,280	10/19/93	Thomas et al.				
	K	5,384,057	01/24/95	Wilczek				
<b>FOREIGN PATENT DOCUMENTS</b>								
		Document Number	Date	Country	Class	Subclass	Translation	
							Yes	No
	L	JP 5 093198A	04/16/93	Japan			X	
	M						X	
	N							
	O							
<b>OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)</b>								
	P							
	Q							
	R							
<p>* EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP § 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to the applicant.</p>								
EXAMINER'S SIGNATURE: /John R. Hardee/					DATE CONSIDERED: 04/21/2009			

Patent and Trademark Office; U. S. DEPARTMENT OF COMMERCE

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /J.R.H.

Form PTO-1449				Attorney Docket No. <b>821920-1030</b>		Serial No. <b>10/937,736</b>		
<b>INFORMATION DISCLOSURE CITATION</b>  <i>(Use several sheets if necessary)</i>				Applicant <b>Ponder</b>				
				Filing Date <b>09/08/2004</b>		Group <b>1751</b>		
<b>U.S. PATENT DOCUMENTS</b>								
Examiner Initials	Item	Document Number	Date	Name	Class	Subclass	Filing Date If Appropriate	
	A	5,417,872	05/23/95	Fukuda et al.				
	B	5,431,835	07/11/95	Katafuchi et al.				
	C	5,454,966	10/03/95	Thomas et al.				
	D	5,492,643	02/20/96	Weber, III				
	E	5,520,833	05/28/96	Kaneko				
	F	5,942,149	08/24/99	Weber, III				
	G	6,565,766	05/20/03	Weber, III				
	H	2004/0200992	10/14/04	Weber, III				
	I							
	J							
	K							
<b>FOREIGN PATENT DOCUMENTS</b>								
		Document Number	Date	Country	Class	Subclass	Translation	
							Yes	No
	L							
	M							
	N							
	O							
<b>OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, etc.)</b>								
	P							
	Q							
	R							
* EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP § 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to the applicant.								
EXAMINER'S SIGNATURE: /John R. Hardee/					DATE CONSIDERED: 04/21/2009			

Patent and Trademark Office; U. S. DEPARTMENT OF COMMERCE

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /J.R.H.



1PW

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on 10/3/05

Laurie Delesandro  
Laurie Delesandro

In Re Application of:

Ponder, et al.

Serial No.: 10/937,736

Filed: 09/08/2004

Confirmation No.: 1006

Group Art Unit: 1751

Examiner: Unknown

Docket No.: 821920-1030

**For: Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant**

The following is a list of documents enclosed:

Return Postcard  
Information Disclosure Statement  
PTO 1449

Further, the Commissioner is authorized to charge Deposit Account No. 20-0778 for any additional fees required. The Commissioner is requested to credit any excess fee paid to Deposit Account No. 20-0778.



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Alexandria, Virginia 22313-1450  
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/937,736

09/08/2004

Kenneth M. Ponder

821920-1030

1006

24504

7590

03/31/2009

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
600 GALLERIA PARKWAY, S.E.  
STE 1500  
ATLANTA, GA 30339-5994

EXAMINER

HARDEE, JOHN R

ART UNIT

PAPER NUMBER

1796

MAIL DATE

DELIVERY MODE

03/31/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



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[www.uspto.gov](http://www.uspto.gov)

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/937,736  
Filing Date: September 08, 2004  
Appellant(s): PONDER ET AL.

---

Mr. Todd Deveau  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed December 9, 2008 appealing from the Office action mailed June 27, 2008.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

6,207,071

TAKIGAWA et al.

3-2001



**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-10, 21-25, 27, 29-31, 33-35 and 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takigawa et al., US 6,207,071. The reference discloses lubricating oil compositions and their use in compositions comprising R134a and R125 (col. 1, lines 13+). The reference further discloses the use of hydrofluorocarbons as replacements for chlorofluorocarbons (col. 1, lines 20+). Suitable lubricants include the alkylbenzene oils described at col. 2, lines 30+. Refrigerants include alkane fluorides containing 40% or more of R134a in admixture with alkyl fluorides containing, most preferably, 40% or more of R125 (col. 8, lines 20+). The reference further discloses that there is "no restriction as to the kind of HFC to be mixed with" the disclosed refrigerants. The examiner takes the position that this can reasonably be construed to mean that no additional HFC need be added, and that the disclosure reads on refrigerant compositions *consisting of* 40-60% R134a and 60-40% of R125. Conventional additives may be added, including those disclosed at the top of col. 8. The examiner takes the position that anticorrosion additives are conventional, and that their use would be obvious over this disclosure. Lubricant compositions comprising naphthenic mineral oil and polyol polyesters are disclosed in Table 1. The examiner takes the position that "naphthenic mineral oil" has a genus-species relationship with the lubricant recited in claim 2, so its use would be obvious over the disclosure in the absence of unexpected results. Note the disclosure in Evaluation Tests 2 and 3 of refrigerant being premixed with lubricant prior to charging a compressor. The

Art Unit: 1796

disclosed lubricating refrigerant compositions are useful in a variety of refrigeration apparatus, as disclosed at the top of col. 9. This reference differs from the claimed subject matter in that it does not disclose a composition which reads on appellant's claims with sufficient specificity to constitute anticipation.

It would have been obvious at the time the invention was made to make such a composition, because this reference teaches that all of the ingredients recited by appellants are suitable for inclusion in a refrigerant composition. The person of ordinary skill in the refrigeration art would expect the recited compositions to have properties similar to those compositions which are exemplified, absent a showing to the contrary.

In the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art, a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed Cir. 1990).

#### **(10) Response to Argument**

At page 5 of the brief, appellants present five arguments traversing the above rejection. These arguments will be addressed in the order presented.

1) Appellant argues that no rationale was presented that the teachings of Takigawa would lead one of skill in the art to the claimed refrigerant compositions. This is not persuasive because the reference discloses compositions "an alkane fluoride having 1 to 3 carbon atoms...containing 40% by weight or more of 1,1,1,2-tetrafluoroethane and/or an alkyl fluoride having 1 to 3 carbon atoms...and containing...more preferably, 40% by weight or more of pentafluoroethane (col. 8, lines

Art Unit: 1796

20+). The reference goes on to say that there is no restriction as to the kind of hydrocarbon to be mixed with the tetrafluoroethane and/or the pentafluoroethane (col. 8, lines 29+). The examiner construes this to mean that *no other alkyl fluoride at all* need be mixed with tetrafluoroethane and/or pentafluoroethane, and that the disclosure can fairly be construed as reading on a mixture consisting of 40% or more of tetrafluoroethane and 40% or more of pentafluoroethane. The reference does not teach that either the first alkyl fluoride or the second alkyl fluoride need be a mixture of more than one alkyl fluoride, and a mixture of 40% or more of tetrafluoroethane and 40% or more of pentafluoroethane represents the simplest case of a binary mixture which can be fairly construed from this passage.

2) Appellant argues that not every limitation is taught in the reference. In the middle of p. 8 of the brief, appellants argue that a composition of such “consisting” scope is not disclosed. This is not persuasive because the rejection was made under 103 rather than 102, and the examiner maintains the position that the simplest binary composition containing both tetrafluoroethane and pentafluoroethane in the most preferable percentages is one which consists of 40% or more of tetrafluoroethane and 40% or more of pentafluoroethane.

3) Appellant argues that there is no reasonable expectation of success that the hypothetical modification of the reference would result in the recited refrigerant composition. This is not persuasive because no modification of the reference need be made: The simplest binary composition fairly taught by the reference, in the most preferred percentages, consists of 40% or more of each of tetrafluoroethane and

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pentafluoroethane. Regarding expectation of success, the reference is drawn to refrigerant compositions. In addition, optimizing within the range of 40% or more of each of the refrigerants amounts to routine experimentation.

4) Appellants argue that the reference solves a different problem from that addressed by the appellants. Appellants' concerns include high-temperature application and replacing R-22 refrigerant (an ozone damaging chlorofluorocarbon). Accepting appellant's argument regarding high-temperature application, there is still motivation in the reference to make the compositions as recited. Regarding replacement of chlorofluorocarbon refrigerants, this is disclosed at col. 1, lines 20+. Replacement or retrofitting of chlorofluorocarbon refrigerating equipment is not disclosed in the reference as being necessary, and no such retrofitting is mentioned in the examples. The compositions are simply charged to standard refrigeration equipment and evaluated.

Kenneth Ponder's declaration states that applicant's refrigerant R-421A, a composition according to the present claims, was developed to address a very different problem from appellants' R-421B, which contains 85% of pentafluoroethane and 15% of tetrafluoroethane. R-421A is used for high- to medium-temperature applications, and R-421B is used for low-temperature applications. R-421A is therefore superior to R-421B for high- and medium-temperature applications. The examiner concedes the veracity of these statements and the expertise of Mr. Ponder. Nonetheless, the reference provides motivation to make compositions as claimed for the reasons given above. In addition, the reference is not drawn specifically to either of high- or medium-temperature

Art Unit: 1796

refrigeration or to low-temperature refrigeration. Nor are appellants' claims. Finally, R-421B is not made according to the teaching of the reference, which calls for at least 40% by weight of tetrafluoroethane. The examiner concedes that the behavior profiles of various refrigeration mixtures made according to the reference will be vastly different, but all such compositions will successfully generate refrigeration. In the absence of evidence to the contrary, there is every expectation of success. Determination of the best application for any such mixture amounts to routine optimization.

5) Finally, appellants argue that the recited compositions have a superior property not recognized in the reference. This is addressed in Mr. Ponder's declaration, which states that compositions according to the invention are superior for high- and low-temperature applications. While this is undoubtedly the case, Mr. Ponder's comparison is with R-421B, which is not made according to the reference. It is not the closest prior art. In addition, appellants' claims do not appear to be commensurate in scope with what is being argued, which is generation of high- and medium-temperature refrigeration.

Andy Gbur's declaration of May, 2008 states that different blends of pentafluoroethane and tetrafluoroethane will have very different properties and that one such composition would not render another such composition obvious. The examiner concedes the argument, but it is not persuasive because it is the reference which makes R-421A obvious, not R-421B. Appellants further argue that the final rejection of June 27, 2008 does not address Mr. Gbur's opinion that one skilled in the art would be motivated to make a composition as claimed, and that the Office therefore concedes Mr.

Art Unit: 1796

Gbur's opinion. Mr. Gbur is entitled to his opinion, but the examiner does not and did not concede its legal correctness. Mr. Gbur's opinion was addressed in paragraph 3 of the final office action. The examiner maintains his finding that the reference makes obvious the formulation of compositions as recited for the reasons given above.

Appellants conclude by arguing that there is no teaching in the reference that different ratios of pentafluoroethane to tetrafluoroethane can result in refrigeration gas compositions for different temperature applications. This is correct, but it is obviously true whether Takigawa restates it or not. Why else would one make differing compositions of the same gases? However, it is not persuasive because determination of the best application within the field of refrigeration for any refrigerant gas which can be made according to the reference amounts to routine experimentation.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/John R. Hardee/

Primary Examiner, Art Unit 1796

Conferees:

/Harold Y Pyon/

Supervisory Patent Examiner, Art Unit 1796

/Christopher A. Fiorilla/

Chris Fiorilla

Supervisory Patent Examiner, Art Unit 1700

Application/Control Number: 10/937,736  
Art Unit: 1796

Page 9

**Thomas | Kayden**

THOMAS, KAYDEN, HORSTEMEYER &amp; RISLEY, LLP

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February 19, 2009

[Matter No.821920-1030]

TO:  
United States Patent and Trademark Office  
Attn: Tracey M. YoungFROM:  
Todd DeveauFAX: 571-273-8300  
571-273-1644

FAX: 770-951-0933

TEL: 770-933-9500

EMAIL: todd.deveau@tkhr.com

RE: U.S. application serial no. 10/937,736  
Response and Amendment to Notice of Non-Compliant Appeal Brief

Number of Pages (Including This Cover Sheet): - 3 - Page(s)

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PAGE 1/3 \* RCVD AT 2/19/2009 10:11:56 AM [Eastern Standard Time] \* SVR:USPTO-EFAX-5/44 \* DNIS:2738300 \* CSID:7709510933 \* DURATION (mm:ss):01-06

EXHIBIT 1005  
Page 148 of 665



## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In Re Application of:

Docket No.: 821920-1030

PONDER, K., et al.,

Art Unit: 1796

Serial No.: 10/937,736

Examiner: John R. Hardee

Filing Date: September 8, 2004

Confirmation No.: 1006

For: Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant

## RESPONSE AND AMENDMENT TO NOTICE OF NON-COMPLIANT APPEAL BRIEF

Mail Stop: Appeal Brief-Patents

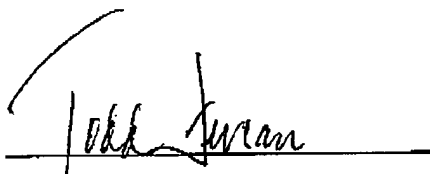
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

Per the telephone conversation with Tracey M. Young on February 18, 2009 and in response to the Notice of Non-Compliant Appeal Brief filed January 21, 2009, please find attached a replacement page 2 for the Appeal Brief filed December 9, 2008, in which section "III" is amended to include the status of all claims.

Respectfully submitted,

By:



Todd Deveau

Registration No. 29,526

**REPLACEMENT PAGE 2**

Serial No.: 10/937,736  
Docket No.: 821920-1030

**I. REAL PARTY IN INTEREST**

The real party in interest is Stefko Properties LLC, a for profit corporation established under the laws of the State of Georgia and having a principal place of business at 610 McFarland-400 Drive, Alpharetta, Georgia 30004

**II. RELATED APPEALS AND INTERFERENCES**

There are no known related appeals or interferences that will affect or be affected by a decision in this Appeal.

**III. STATUS OF CLAIMS**

Claims 1-10, 21-25, 27, 29-31, 33-35, and 37-40 are pending and finally rejected. Claims 11-20, 26, 28, 32, and 36 are canceled. The final rejection of claims 1-10, 21-25, 27, 29-31, 33-35, and 37-40 is appealed.

**IV. STATUS OF AMENDMENTS**

No amendments have been made or requested since the mailing of the FINAL Office Action. All amendments submitted prior to the FINAL action have been entered. A copy of the current claims is attached in the Claims Appendix (See below).

**V. SUMMARY OF CLAIMED SUBJECT MATTER**

The claimed inventions are summarized below with reference numerals and references to the written description ("Specification") and drawings. The subject matter described in the following appears in the original disclosure at least where indicated, and may further appear in other places within the original disclosure.

2009 JAN 23 PM 4: 07

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

☒ In re application of\*: Ponder et al.<sup>2</sup>

Serial No.: 10/937,736

Group No.: 1796

Filed: September 8, 2004

Examiner: Hardec, John R.

For\*: Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant

☐ Patent No.:

Issued:

*NOTE: Insert name(s) of inventor(s) and title also for patent. Where the refund request is with respect to a maintenance fee payment also insert application serial number and filing date.*

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ATTENTION: Refund Section, Accounting Division, Office of Finance  
**REQUEST FOR REFUND**  
**(37 C.F.R. 1.28(a))**

*NOTE: 37 C.F.R. § 1028(a) "(a) Refunds based on later establishment of small entity status. A refund pursuant to § 1.26, based on establishment on small entity status, of a portion of fees timely paid in full prior to establishing status as a small entity may only be obtained if an assertion under § 1.27(c) and a request for refund of the excess amount are filed within three months of the date of the timely payment of the full fee. The three-month time period is not extendable under § 1.136. Status as small entity is waived for any fee by the failure to establish the status prior to paying, at the time of paying, or within three months of the date of payment of, the full fee."*

*NOTE: Submission of a Change of Status (small/not small entity status) after issuance of the Notice of Allowance in an application does not result in a reduction in patent term adjustment under 37 C.F.R. § 1.704(c)(1). See Notice of May 29, 2001, 1247 OG 111-112, June 26, 2001.*

---

**CERTIFICATE OF MAILING 37 CFR 1.8(a)**

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1/23/09  
Date

Ungeme Keenan  
Signature

EXHIBIT 1005

Page 151 of 665

**I. SUBMISSION OF SMALL ENTITY ASSERTION**

- ☐ Attached is an assertion of small entity status in this application.  
☒ An assertion of small entity status was filed in this application on September 8, 2004.

**II. REFUND REQUEST**

This request for refund is made within three months of the date a fee was paid in this application on (date) December 9, 2008 in the amount of \$ 2190.

**NOTE:** The two-month period (§ 1.28(a)) is not included in the provisions for extension under 37 C.F.R. 1.136 since it is not a period for response. Notice of November 30, 1983, 49 FR 548, January 4, 1984.

**III. FEES PAID FOR WHICH REFUND REQUESTED**

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<input checked="" type="checkbox"/> extension of term	\$ <u>555.00</u>
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**NOTE:** The refund provisions of § 1.28(a) for later submitted small entity statements apply to maintenance fees. Notice of July 30, 1984, 1046 O.G. 28-37

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**TOTAL REFUND REQUESTED**                      \$ 1095.00

PATENT

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- ☒ Deposit Account No. 20-0778.
- ☐ Credit card (Master Card No. 5588 3295 0062 2743)
- ☐ Refunding overpayment

  
\_\_\_\_\_  
Todd Deveau; Reg. No.: 29,526

**THOMAS, KAYDEN, HORSTEMEYER  
& RISLEY, L.L.P.**  
600 Galleria Parkway, Suite 1500  
Atlanta, Georgia 30339-5948  
770-933-9500

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	10937736			
<b>Filing Date:</b>	08-Sep-2004			
<b>Title of Invention:</b>	Refrigerant with lubricating oil for replacement of R22 refrigerant			
<b>First Named Inventor/Applicant Name:</b>	Kenneth M. Ponder			
<b>Filer:</b>	Todd Deveau./Angela Brathwaite			
<b>Attorney Docket Number:</b>	821920-1030			
Filed as Large Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>	Adjustment date: 02/06/2009 MGE8REM1 12/10/2008 INTEFSW 00004982 200778 10937736 01 FC:1253 1110.00 CR 02 FC:1401 540.00 CR 03 FC:1402 540.00 CR			
<b>Patent-Appeals-and-Interference:</b>	02/06/2009 MGE8REM1 00000000 200778 10937736			
Notice of appeal	1401	01 FC:2401 02 FC:2402	2340.00 DA 270.00 DA	540
Filing a brief in support of an appeal	1402	03 FC:2253 1	555.00 DA 540	540
<b>Post-Allowance-and-Post-Issuance:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Extension-of-Time:</b>				
Extension - 3 months with \$0 paid	1253	1	1110	1110
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>2190</b>

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

☒ In re application of\*: Ponder et al.

Serial No.: 10/937,736

Group No.: 1796

Filed: September 8, 2004

Examiner: Hardee, John R.

For\*: Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant

☐ Patent No.:

Issued:

NOTE: Insert name(s) of inventor(s) and title also for patent. Where the refund request is with respect to a maintenance fee payment also insert application serial number and filing date.

**Mail Stop 16****Director of the US Patent and  
Trademarks Office****P.O. Box 1450****Alexandria, VA 22313-1450****ATTENTION: Refund Section, Accounting Division, Office of Finance****REQUEST FOR REFUND****(37 C.F.R. 1.28(a))**

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Date

Uyume Keenan  
Signature



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<input type="checkbox"/> first maintenance fee	\$ _____
<input type="checkbox"/> second maintenance fee	\$ _____
<input type="checkbox"/> third maintenance fee	\$ _____
<input type="checkbox"/> patent maintenance fee surcharge.	

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**TOTAL REFUND REQUESTED**                      **\$ 1095.00**

**IV. MANNER OF REFUND**

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- ☐ Credit card (Master Card No. 5588 3295 0062 2743)
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\_\_\_\_\_  
**Todd Deveau; Reg. No.: 29,526**

**THOMAS, KAYDEN, HORSTEMEYER  
& RISLEY, L.L.P.**

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Atlanta, Georgia 30339-5948  
770-933-9500

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	4664639
<b>Application Number:</b>	10937736
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1006
<b>Title of Invention:</b>	Refrigerant with lubricating oil for replacement of R22 refrigerant
<b>First Named Inventor/Applicant Name:</b>	Kenneth M. Ponder
<b>Customer Number:</b>	24504
<b>Filer:</b>	Todd Deveau./Virginia Keenan
<b>Filer Authorized By:</b>	Todd Deveau.
<b>Attorney Docket Number:</b>	821920-1030
<b>Receipt Date:</b>	23-JAN-2009
<b>Filing Date:</b>	08-SEP-2004
<b>Time Stamp:</b>	13:35:01
<b>Application Type:</b>	Utility under 35 USC 111(a)

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### File Listing:

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1	Refund Request	00852053.PDF	81771 3e322794f860edd04c5ab916ec7139d0d41b0dc	no	3

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**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/937,736	09/08/2004	Kenneth M. Ponder	821920-1030	1006

24504 7590 01/21/2009

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
600 GALLERIA PARKWAY, S.E.  
STE 1500  
ATLANTA, GA 30339-5994

EXAMINER

ART UNIT PAPER NUMBER

DATE MAILED: 01/21/2009

Please find below and/or attached an Office communication concerning this application or proceeding.

**Notification of Non-Compliant Appeal Brief  
(37 CFR 41.37)**

Application No.

10/937,736

Applicant(s)

PONDER ET AL.

Examiner

JOHN HARDEE

Art Unit

1796

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

The Appeal Brief filed on 09 December 2008 is defective for failure to comply with one or more provisions of 37 CFR 41.37.

To avoid dismissal of the appeal, applicant must file an amended brief or other appropriate correction (see MPEP 1205.03) within **ONE MONTH or THIRTY DAYS** from the mailing date of this Notification, whichever is longer. **EXTENSIONS OF THIS TIME PERIOD MAY BE GRANTED UNDER 37 CFR 1.136.**

1. ☐ The brief does not contain the items required under 37 CFR 41.37(c), or the items are not under the proper heading or in the proper order.
2. ☒ The brief does not contain a statement of the status of all claims, (e.g., rejected, allowed, withdrawn, objected to, canceled), or does not identify the appealed claims (37 CFR 41.37(c)(1)(iii)).
3. ☐ At least one amendment has been filed subsequent to the final rejection, and the brief does not contain a statement of the status of each such amendment (37 CFR 41.37(c)(1)(iv)).
4. ☐ (a) The brief does not contain a concise explanation of the subject matter defined in each of the independent claims involved in the appeal, referring to the specification by page and line number and to the drawings, if any, by reference characters; and/or (b) the brief fails to: (1) identify, for each independent claim involved in the appeal and for each dependent claim argued separately, every means plus function and step plus function under 35 U.S.C. 112, sixth paragraph, and/or (2) set forth the structure, material, or acts described in the specification as corresponding to each claimed function with reference to the specification by page and line number, and to the drawings, if any, by reference characters (37 CFR 41.37(c)(1)(v)).
5. ☐ The brief does not contain a concise statement of each ground of rejection presented for review (37 CFR 41.37(c)(1)(vi)).
6. ☐ The brief does not present an argument under a separate heading for each ground of rejection on appeal (37 CFR 41.37(c)(1)(vii)).
7. ☐ The brief does not contain a correct copy of the appealed claims as an appendix thereto (37 CFR 41.37(c)(1)(viii)).
8. ☐ The brief does not contain copies of the evidence submitted under 37 CFR 1.130, 1.131, or 1.132 or of any other evidence entered by the examiner **and relied upon by appellant in the appeal**, along with a statement setting forth where in the record that evidence was entered by the examiner, as an appendix thereto (37 CFR 41.37(c)(1)(ix)).
9. ☐ The brief does not contain copies of the decisions rendered by a court or the Board in the proceeding identified in the Related Appeals and Interferences section of the brief as an appendix thereto (37 CFR 41.37(c)(1)(x)).
10. ☐ Other (including any explanation in support of the above items):

2. Status of claims must identify the status of all claims filed in the application (11-20, 26, 28, and 32, 36).

Entire brief is not required only the section found defective.

Tracey M Young/Tracey M Young/  
Patent Appeal Specialist



# UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/937,736

09/08/2004

Kenneth M. Ponder

821920-1030

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7590

12/15/2008

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
600 GALLERIA PARKWAY, S.E.  
STE 1500  
ATLANTA, GA 30339-5994

EXAMINER

HARDEE, JOHN R

ART UNIT

PAPER NUMBER

1796

MAIL DATE

DELIVERY MODE

12/15/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Interview Summary</b>	<b>Application No.</b> 10/937,736	<b>Applicant(s)</b> PONDER ET AL.	
	<b>Examiner</b> JOHN R. HARDEE	<b>Art Unit</b> 1796	

All participants (applicant, applicant's representative, PTO personnel):

(1) JOHN R. HARDEE. (3) \_\_\_\_.

(2) Atty. Michael Barker. (4) \_\_\_\_.

Date of Interview: 08 December 2008.

Type: a) ☒ Telephonic    b) ☐ Video Conference  
c) ☐ Personal [copy given to: 1) ☐ applicant    2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes    e) ☒ No.  
If Yes, brief description: \_\_\_\_.

Claim(s) discussed: \_\_\_\_.

Identification of prior art discussed: \_\_\_\_.

Agreement with respect to the claims f) ☐ was reached.    g) ☐ was not reached.    h) ☒ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: The examiner left a message in response to a message left by Mr. Barker on December 5, 2008. In response to Mr. Barker's request, the examiner agreed to consider the affidavit of September 18, 2008, but stated that it was not persuasive.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.



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APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.
10937736	9/8/2004	PONDER ET AL.	821920-1030

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
600 GALLERIA PARKWAY, S.E.  
STE 1500  
ATLANTA, GA 30339-5994

**EXAMINER**

JOHN R.. HARDEE

ART UNIT	PAPER
1796	20081208

DATE MAILED:

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner for Patents**

/John R. Hardee/  
Primary Examiner, Art Unit 1796

**DETAILED ACTION**

1. Upon further consideration, applicant's declaration of September 18, 2008 is entered. However, it is not persuasive because it only presents arguments and opinions, rather than data. The declarant argues that R-421A is superior to R-421B because it has a different temperature-pressure profile than R-421B and because that temperature pressure profile is superior to that of R-421B for high and medium temperature applications. This is not persuasive because R-421B is not the closest prior art. As it differs substantially from R-421A, the person of ordinary skill in the art would expect it to have a different temperature-pressure profile. The superiority of R-421A is stated as a conclusion, and no data have been presented. Furthermore, applicant has not claimed a method of generating refrigeration at high and medium temperatures. Applicant has claimed a composition, and the composition remains obvious over the cited art for the reasons of record.

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, Dr. John R. Hardee, whose telephone number is (571) 272-1318. The examiner can normally be reached on Monday through Friday from 8:00 until 4:30. In the event that the examiner is not available, his supervisor, Mr. Harold Pyon, may be reached at (571) 272-1498.

The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8100.

Art Unit: 1796

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/John R. Hardee/  
Primary Examiner  
December 8, 2008

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In Re Application of:

Docket No.: 821920-1030

PONDER, K., et al.,

Art Unit: 1796

Serial No.: 10/937,736

Examiner: John R. Hardee

Filing Date: September 8, 2004

Confirmation No.: 1006

For: **Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant**

**APPEAL BRIEF UNDER 37 C.F.R. § 41.37**

Mail Stop: Appeal Brief-Patents

Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

This Appeal Brief under 37 C.F.R. § 41.37 is submitted in support of the Notice of Appeal filed concurrently herewith. This appeal is taken from the *Final Office Action* mailed June 27, 2008, rejecting claims 1-10, 21-25, 27, 29-31, 33-35, and 37-40, as clarified by the *Advisory Action* mailed September 25, 2008.

It is not believed that extensions of time or fees are required to consider this Appeal Brief, in addition to the Petition for Extension simultaneously filed. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. §1.136(a), and any fees required therefore are hereby authorized to be charged to Deposit Account No. 20-0778.

#### **I. REAL PARTY IN INTEREST**

The real party in interest is Stefko Properties LLC, a for profit corporation established under the laws of the State of Georgia and having a principal place of business at 610 McFarland-400 Drive, Alpharetta, Georgia 30004

#### **II. RELATED APPEALS AND INTERFERENCES**

There are no known related appeals or interferences that will affect or be affected by a decision in this Appeal.

#### **III. STATUS OF CLAIMS**

Claims 1-10, 21-25, 27, 29-31, 33-35, and 37-40 are pending. The final rejection of claims 1-10, 21-25, 27, 29-31, 33-35, and 37-40 is appealed.

#### **IV. STATUS OF AMENDMENTS**

No amendments have been made or requested since the mailing of the FINAL Office Action. All amendments submitted prior to the FINAL action have been entered. A copy of the current claims is attached in the Claims Appendix (See below).

#### **V. SUMMARY OF CLAIMED SUBJECT MATTER**

The claimed inventions are summarized below with reference numerals and references to the written description ("Specification") and drawings. The subject matter described in the following appears in the original disclosure at least where indicated, and may further appear in other places within the original disclosure.

Independent claim 1 recites an improvement to an apparatus designed for use with chlorodifluoromethane refrigerant (also referred to as R-22), which comprises substituting the

chlorodifluoromethane with a refrigerant composition containing a lubricant, the refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components. See, Applicant's Specification of September 9, 2004, page 1, lines 10-16, and page 11, lines, lines 5-16. The refrigerant gases consist of about 40% to about 45% by weight tetrafluoroethane and about 55% to about 60% by weight pentafluoroethane. See, Applicant's Amended Specification of August 13, 2008, page 2, lines 3-7, and Applicant's Specification of September 9, 2004, p. 16, Table 2. The non-refrigerant gas components include about 0.5% to about 20% by weight of the refrigerant gases a lubricating oil that is soluble in chlorodifluoromethane, pentafluoroethane and tetrafluoroethane, wherein the lubricating oil is selected from napthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester. See, Applicant's Specification of September 9, 2004, page 7, lines 5-12 and 20-26, page 8, lines 1-4, and page 9, lines 9-12 and 21-22.

Independent claim 6 recites a method for refilling an apparatus designed for use with a chlorodifluoromethane refrigerant (R-22). See, Applicant's Specification of September 9, 2004, page 1, lines 10-18, page 8, lines 5-14. The method comprises supplying a substitute refrigerant composition under pressure, in a cylinder can fitted with an outlet compatible with a chlorodifluoromethane recharging manifold of the apparatus and adding a substitute refrigerant composition for chlorodifluoromethane via the manifold, the substitute refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components. See, Applicant's Specification of September 9, 2004, page 8, lines 21-27. The refrigerant gases consist of about 40% to about 45% by weight tetrafluoroethane and about 55% to about 60% by weight pentafluoroethane. See, Applicant's amended Specification of August 13, 2008, page 2, lines 3-7, and Applicant's Specification of September 9, 2004, p. 16, Table 2.. The non-refrigerant gas components include about 0.5% to about 20% by weight of the refrigerant gases

a lubricating oil that is soluble in chlorodifluoromethane, pentafluoroethane and tetrafluoroethane, wherein the lubricating oil is selected from napthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester. See, Applicant's Specification of September 9, 2004, page 7, lines 5-12 and 20-26, page 8, lines 1-4, and page 9, lines 9-12 and 21-22.

Independent claim 21 recites a refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components. See, Applicant's Specification of September 9, 2004, page 1, lines 10-16, and page 11, lines , lines 5-16. The refrigerant gases consist of about 40% to about 45% by weight tetrafluoroethane and about 55% to about 60% by weight pentafluoroethane. See, Applicant's amended Specification of August 13, 2008, page 2, lines 3-7, and Applicant's Specification of September 9, 2004, p. 16, Table 2.. The non-refrigerant gas components include about 0.5% to about 20% by weight of the refrigerant gases a lubricating oil that is soluble in chlorodifluoromethane, pentafluoroethane and tetrafluoroethane, wherein the lubricating oil is selected from napthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester. See, Applicant's Specification of September 9, 2004, page 7, lines 5-12 and 20-26, page 8, lines 1-4, and page 9, lines 9-12 and 21-22.

Independent claim 22 recites a refrigerant composition comprising a combination of refrigerant and non-refrigerant gas components. See, Applicant's Specification of September 9, 2004, page 1, lines 10-16, and page 11, lines , lines 5-16. The refrigerant gases consist of about 40% to about 45% by weight tetrafluoroethane and about 55% to about 60% by weight pentafluoroethane. See, Applicant's amended Specification of August 13, 2008, page 2, lines 3-7, and Applicant's Specification of September 9, 2004, p. 16, Table 2.. The non-refrigerant gas components include about 0.5% to about 20% by weight of the refrigerant gases a lubricating oil

having 65% to 85% hydrotreated light naphthenic distillate, and 10% to 20% solvent refined light naphthenic distillate petroleum. See, Applicant's Specification of September 9, 2004, page 7, lines 5-12 and 14-19.

## **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

The following grounds of rejections are to be reviewed on appeal:

Claims 1-10, 21-25, 27, 29-31, 33-35, and 37-40 stand rejected under 35 U.S.C. §103(a) as unpatentable over *Takigawa* (U.S. Patent No. 6,207,071).

## **VII. ARGUMENTS**

### **Rejection under 35 U.S.C. 103(a) over *Takigawa***

Applicants respectfully submit the rejection of independent claims 1, 6, 21, and 22 under 35 U.S.C. §103 should be overturned, since no *prima facie* case of obviousness is established. For the same reasons, Applicants respectfully submit pending dependent claims 2-5, 7-10, 23-25, 27, 29-31, 33-35, and 37-40 are also allowable. *In re Fine*, 5 USPQ.2d 1596, 1600 (Fed. Cir. 1988).

Applicant submits that no *prima facie* obviousness has been established to adequately support the rejection for at least the following reasons:

- 1) No adequate rationale was provided which proves by a preponderance of the evidence that *Takigawa* would lead one of skill in the art to the refrigerant composition recited in the rejected claims;
- 2) *Takigawa* does not teach every limitation of the refrigerant composition recited in the rejected claims;
- 3) There is no reasonable expectation of success that the hypothetical modification of *Takigawa* would result in the refrigerant composition recited in the rejected claims;
- 4) *Takigawa* is drawn to solving a different problem; and
- 5) The refrigerant composition recited in claims 1, 6, 21, and 22 possesses a superior property not possessed or taught by *Takigawa*.



As established by the Court of Appeals for the Federal Circuit, the U.S. Patent and Trademark Office ("USPTO") bears the burden under 35 U.S.C. 103(a) to establish a *prima facie* case of obviousness by providing a rationale demonstrating that an objective teaching in the prior art or knowledge generally available would lead one of ordinary skill in that art to the claimed invention. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). This requirement is not negated by *KSR*, which points out that a rationale should accompany the legal conclusion of obviousness and should be made explicit. *KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 82 USPQ2d 1385, 1395-97, 127 S.Ct. 1727, 1742 (2007). The legal standard to be met for *prima facie* obviousness is "a preponderance of evidence", which requires the evidence to be more convincing than the evidence which is offered in opposition to it. With regard to rejections under 35 U.S.C. 103, the Examiner must provide evidence which as a whole shows that the legal determination sought to be proved (i.e., the reference teachings establish a *prima facie* case of obviousness) is more probable than not. *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006). See also *KSR*, 550 U.S. at 398, 82 USPQ2d at 1396 (quoting Federal Circuit statement with approval). In the present case, however, the Examiner presented no rationale demonstrating by a preponderance of the evidence that *Takigawa* would lead one of ordinary skill in the art to the refrigerant composition recited in the rejected claims. Instead, at p. 3 of the *Non-Final Office Action* of December 18, 2007, the Examiner reasons,

"It would have been obvious at the time the invention was made to make such a composition [as disclosed in independent claims 1, 6, 21, and 22], because [*Takigawa*] teaches that all of the ingredients recited by applicants are suitable for inclusion in a refrigerant composition." lines 7-9.

(Please note: Reference to the *Non-Final Office Action* is made where necessary, as the grounds for rejection were not reiterated in the *Final Office Action*.)

This sentence does not provide articulated reasoning proving obviousness by a preponderance of the evidence. It is instead a conclusory statement, with no supporting analysis.

"[R]ejections on obviousness grounds *cannot be sustained by mere conclusory statements*; instead, there must be some *articulated reasoning* with some rational underpinning to support the legal conclusion of obviousness." *KSR*, 550 U.S. at 398, 82 USPQ2d at 1396, S. Ct. at 1741 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (C.A.Fed. 2006)) (Emphasis added). The Court further stated it is "important to *identify a reason* that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does." *Id.* (Emphasis added). An invention composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.

There must be adequate prior art support involved for structural changes to complete the PTO's *prima facie* case and shift the burden of going forward to Applicant. The mere fact that it is possible to find two isolated teachings that might be combined in such a way to produce a new compound does not necessarily render such production obvious. *In re Grabiak*, 769 F.2d 729, 226 USPQ 870 (Fed. Cir. 1985). See also *In re Levitt*, 11 USPQ2d 1315, 1316 (Fed. Cir. 1989 – unpublished) ("The mere fact that both references originate from the herbicide art does not provide any teaching or suggestion to combine them. Nor does the fact that both references concern compounds containing a phenyl ring suggest that substituents suitable in one case would be expected to be suitable in the other."). Because there is no objective rationale provided to modify *Takigawa* to yield the refrigerant composition encompassed by the rejected claims, *prima facie* obviousness is negated, and Applicant respectfully requests the rejections be withdrawn.

Furthermore, *Takigawa* does not disclose or teach each limitation of the rejected claims. According to MPEP 2143.03, all claim limitations must be considered when determining patentability of a claim against the prior art. At p. 2, lines 6-10, the *Non-Final Office Action* of December 18, 2007 references col. 8, lines 20+ of *Takigawa* to provide motivation to make the

composition encompassed by independent claims 1, 6, 21, and 22. To the contrary, at col. 8, lines 20+, *Takigawa* discloses:

“The refrigerants used for a refrigerating machine together with the refrigerating machine oil of this invention, include an alkane fluoride having 1 to 3 carbon atoms, preferably 1 to 2 carbon atoms and containing 40% by weight or more of 1,1,1,2-tetrafluoroethane (HFC-134a) and/or an alkane fluoride having 1 to 3 carbon atoms, preferably 1 to 2 carbon atoms and containing 20% by weight or more, preferably 30% by weight or more, more preferably 40% by weight or more of pentafluoroethane (HFC-125).”

Put alternatively, at most *Takigawa* discloses a refrigerant composition including 40% to 100% by weight of tetrafluoroethane and 20% to 100% by weight pentafluoroethane. In contrast, independent claims 1, 6, 21, and 22 make reference to a combination of refrigerant gases and non-refrigerant gas components, the refrigerant gases consisting of about 40% to about 45% by weight tetrafluoroethane and about 55% to about 60% by weight pentafluoroethane. *Takigawa* does not meet each limitation of the rejected claims, since it does not disclose or teach a refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components, the refrigerant gases consisting of, “about 40% to about 45% by weight tetrafluoroethane; and about 55% to about 60% by weight pentafluoroethane”, as recited in independent claims 1, 6, 21, and 22. Because *Takigawa* does not disclose every limitation of the rejected claims, *prima facie* obviousness is negated, and Applicants respectfully request the rejections be withdrawn. In addition to the aforementioned arguments in support of allowance, Applicants respectfully request consideration of the following arguments.

Notably, *Takigawa* states there is “no restriction as to the kind of HFC to be mixed with” tetrafluoroethane and/or pentafluoroethane. See, col. 8, lines 29-31. The *Non-Final Office Action* of December 18, 2007 interpreted this statement to mean that “no additional HFC need be added”. See, p. 2, line 13. Applicants respectfully take issue with this conclusion. It is not supported by the citation. This citation is a far cry from teaching that no HFC should be mixed with tetrafluoroethane and/or pentafluoroethane. *Takigawa* specifically stipulates certain HFC's

“to be mixed” with tetrafluoroethane and/or pentafluoroethane. See, col. 8, line 30. The phrase “to be mixed” indicates an additional HFC is mixed with tetrafluoroethane and/or pentafluoroethane. This indication is borne out by the examples, each of which comprises tetrafluoroethane and/or pentafluoroethane plus an additional HFC. See, *Takigawa*, col. 8, lines 35-55.

Accordingly, *Takigawa* does not teach any composition “consisting of” tetrafluoroethane and pentafluoroethane as the refrigerant gases in the composition. The transitional phrase “consisting of” excludes any element, step, or ingredient not specified in the claim. *In re Gray*, 53 F.2d 520, 11 USPQ 255 (CCPA 1931); *Ex parte Davis*, 80 USPQ 448, 450 (Bd. App. 1948) (“consisting of” defined as “closing the claim to the inclusion of materials other than those recited except for impurities ordinarily associated therewith.”). When the phrase “consists of” appears in a clause of the body of a claim, rather than immediately following the preamble, it limits only the element set forth in that clause; other elements are not excluded from the claim as a whole. *Mannesmann Demag Corp. v. Engineered Metal Products Co.*, 793 F.2d 1279, 230 USPQ 45 (Fed. Cir. 1986).

Even if *Takigawa* were interpreted to teach a composition “consisting of” tetrafluoroethane (at 40% to 100%) and tetrafluoroethane (at 20% to 100%), the Examiner has not met the burden of providing motivation to select the narrower ranges specified by the instant invention. Instead, the *Non-Final Office Action* of December 18, 2007 notes, “In the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art, a *prima facie* case of obviousness exists.” See, p. 3, lines 12 and 13. This statement is not universally true. It may apply to cases in which the ranges are similar or disclose a small number of distinct compositions. “A prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a *prima facie* case of obviousness.” *In re Peterson*, 315 F.3d 1325 (Fed. Cir. 2003). The rationale used by the Peterson court is similar to that of the

species-genus argument: A species can anticipate a genus, but a genus does not always anticipate a species.

As applied to the currently appealed claims, a reference disclosing a narrower range (species or sub-genus) might render obvious a broader claimed range (genus). However, *Takigawa* does not disclose a narrower range than recited in the present claims; it is exactly opposite. The MPEP warns: "If the reference's disclosed range is so broad as to encompass a very large number of possible distinct compositions, this might present a situation analogous to the obviousness of a species when the prior art broadly discloses a genus." 2144.05(I). See also, *In re Baird*, 16 F.3d 380 (Fed. Cir. 1994). *Baird* dealt with a prior art reference disclosing a broad genus of compounds. Applicant claimed a particular species, one of many encompassed by the broad range taught under the prior art reference. The court held that applicant's compound was nonobvious since the prior art reference made no suggestion that this particular compound, amongst the broad range it disclosed, would work well, or even at all. Similarly, in this case, the prior art makes no suggestion that the specific, claimed composition would work well or even at all.

Within *Takigawa*, there is no suggestion or teaching to narrow the range of tetrafluoroethane from 40% to 100% down to the claimed ranges of 40% to 45% and pentafluoroethane from 20% to 100% down to the claimed ranges 55% to 60. As recited in independent claims 1, 6, 21, and 22, let alone to narrow the amount of pentafluoroethane and tetrafluoroethane down to 58% and 42% respectively, as recited in dependent claims 4, 9, and 25. In other words, there is no suggestion in *Takigawa* to select the specific ranges of the instant invention from the broad ranges listed at col. 8, lines 20-28. Moreover, there is no suggestion, as noted above, of a composition including refrigerant gases "consisting of" the specific ranges of the two gases recited in Applicants' claims – to the exclusion of other refrigerant gases.

The Examiner may not pick and choose amongst the ranges until finding similar ranges in order to ground an obviousness rejection. Within *Takigawa*, there must be a suggestion or teaching toward selecting narrower ranges. The teaching can come from 'blaze marks' pointing toward the instant invention or elsewhere, but there must be some rationale presented leading a skilled artisan to the invention as claimed. There is no such teaching in *Takigawa*. See *In re Baird*, 16 F.3d 380 (Fed. Cir. 1994). Thus, the overlap in ranges of *Takigawa* and Applicants' recited composition does not suffice to establish a *prima facie* case of obviousness.

Additionally, there is no showing in the Office Action of a reasonable expectation of success to support the hypothetical modification of *Takigawa* or rejection. *Takigawa* is directed to a different problem than that solved by the composition recited in independent claims 1, 6, 21, and 22. *Takigawa* is directed to the question of providing a refrigerator oil and a fluid composition containing said oil. See, col. 1, lines 14-15. *Takigawa* does not address the problems solved by Applicants' recited composition. Specifically, the refrigerant composition recited in Applicants' claims addresses problems, including:

- 1) High temperature application in the industry; and
- 2) Replacing R-22 refrigerant without retrofitting existing refrigerant systems.

*Takigawa* does not address these problems. In contrast, the claims provide a specific refrigerant composition capable of replacing R-22 refrigerant in high temperature applications. *Takigawa* seeks to solve a different problem than that solved by the present claims. See, Exhibit A, Declaration of Kenneth M. Ponder of September 18, 2008, page 3, paragraph 8. Since *Takigawa* is directed to a different problem, its teaching provides no reasonable expectation, in the absence of Applicants' disclosure, that Applicants' problems would be successfully addressed by the Office Action's hypothetical modification of *Takigawa*. Notwithstanding the reasons for allowance presented above, independent claims 1, 6, 21, and 22 are allowable for the additional reasons presented below.

The composition recited in independent claims 1, 6, 21, and 22 possesses a superior property not possessed or taught by *Takigawa*. Evidence of unobvious or unexpected advantageous properties, such as superiority in a property the claimed compound shares with the prior art, can rebut *prima facie* obviousness. See, MPEP 716.02(a)(II).

According to the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE) the presence or absence of even a small amount of a refrigerant gas is considered to materially affect the basic properties of a given refrigerant composition resulting in one refrigerant composition having different properties than another refrigerant composition consisting of the same refrigerant gases. For example, refrigerants known under the ASHRAE designations R421A and R421B contain only pentafluoroethane and tetrafluoroethane, as the refrigerant gases. See, Exhibit A, Declaration of Kenneth M. Ponder of September 18, 2008, page 1, paragraph 3. The ASHRAE designation R421A indicates a refrigerant with a gaseous ratio of 58/42 of pentafluoroethane to tetrafluoroethane. See, Exhibit A, Declaration of Kenneth M. Ponder of September 18, 2008, page 1, paragraph 3, and Exhibit C, ANSI/ASHRAE Addenda, page 13. The ASHRAE designation R421B, covered by applicant's own U.S. Patent No. 7,320,763, indicates a refrigerant with a gaseous ratio of 85/15 of pentafluoroethane to tetrafluoroethane. See, Exhibit A, Declaration of Kenneth M. Ponder of September 18, 2008, page 1, paragraph 3, and Exhibit C, ANSI/ASHRAE Addenda, page 22.

R421A and R421B, differing only in the ratio of pentafluoroethane and tetrafluoroethane, were developed to address different uses in the marketplace. R421A was developed to address high temperature applications, while R421B was developed to address low temperature applications. See, Exhibit A, Declaration of Kenneth M. Ponder of September 18, 2008, page 2, paragraph 6. R421A and R421B are SNAP approved by the EPA for different uses. See, Exhibit A, Declaration of Kenneth M. Ponder of September 18, 2008, page 1, paragraph 3. Accordingly, R421A and R421B are marketed toward different applications and meet different customer needs. In particular, R421A is superior to R421B in high temperature applications

resulting from its temperature-pressure profile. R421B is superior to R421A in low temperature applications also resulting from its temperature-pressure profile. See, Exhibit A, Declaration of Kenneth M. Ponder of September 18, 2008, page 2, paragraph 7. These different ASHRAE designations demonstrate that the industry recognizes that the presence or absence of even a small amount of refrigerant gas materially affects the basic properties of a given refrigerant composition. See, Exhibit B, Declaration of Andy Gbur of May 16, 2008, pages 1 and 2, paragraph 6.

As confirmed by Andy Gbur's Declaration, the different designations by ASHRAE among refrigerant blends having the same components in different proportions reflected by different uppercase letters is due to a recognition in the industry that even the same components in different proportions can produce refrigerant blend compositions having different refrigerant properties as typically reflected by differences in temperature/pressure profiles. See, Exhibit B, Declaration of Andy Gbur of May 16, 2008, pages 1 and 2, paragraph 6. Put differently, a refrigerant blend consisting of pentafluoroethane and tetrafluoroethane in a 58/42 ratio, as recited in dependent claims 4, 9, and 25 and reflected by ASHRAE designation R421A, would not render obvious a refrigerant blend consisting of pentafluoroethane and tetrafluoroethane in an 85/15 ratio. As demonstrated by different ASHRAE designations, one skilled in the art would not expect the properties of one refrigerant composition with one set of proportions would be similar to the properties of another refrigerant composition, even when having the same gas components but in different proportions. See, Exhibit B, Declaration of Andy Gbur of May 16, 2008, pages 1 and 2, paragraph 6.

More specifically, Mr. Gbur, a skilled artisan, reviewed *Takigawa* and concluded it is not obvious to one skilled in the art from a reading of *Takigawa* to produce a refrigerant gas composition as instantly claimed. See, Exhibit B, Declaration of Andy Gbur of May 16, 2008, pages 2 and 3, paragraph 7. Because it fails to address the opinion, the *Final Office Action* of June 27, 2008 does not contest Mr. Gbur's opinion and therefore concedes the opinion. There



is no recognition in *Takigawa* that different ratios of pentafluoroethane to tetrafluoroethane can result in refrigerant gas compositions for different temperature applications, where one composition has superior properties to another composition, such as Applicants' R421A and R421B. Thus, there is no teaching or suggestion in *Takigawa* to combine pentafluoroethane with tetrafluoroethane, as recited in the pending claims, to create a refrigerant gas composition having a temperature-pressure profile that provides superior properties for use in high temperature applications. Accordingly, *prima facie* obviousness is negated, and Applicants respectfully request the rejections be withdrawn.

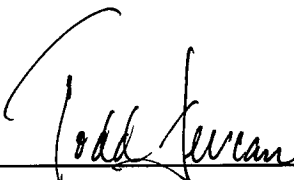
Furthermore, pending dependent claims 2-5, 7-10, 23-25, 27, 29-31, 33-35, and 37-40 include every feature of independent claims 1, 6, 21, and 22. Thus, pending dependent claims 2-5, 7-10, 23-25, 27, 29-31, 33-35, and 37-40 are also allowable over the prior art of record. *In re Fine*, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988). Therefore, Applicants respectfully request the rejection of claims 2-5, 7-10, 23-25, 27, 29-31, 33-35, and 37-40 be overturned.

### **VIII. CONCLUSION**

In summary, it is Applicant's position that claims 1-10, 21-25, 27, 29-31, 33-35, and 37-40 are patentable over the applied cited art reference and that the rejection of these claims should be withdrawn. Appellant therefore respectfully requests that the Board of Appeals overturn the Examiner's rejection and allow Applicant's pending claims.

Respectfully submitted,

By:



Todd Deveau

Registration No. 29,526

**CLAIMS APPENDIX UNDER 37 C.F.R. § 41.37(c)(1)(viii)**

The following are the claims that are involved in this Appeal.

1. In an apparatus designed for use with chlorodifluoromethane refrigerant, the improvement comprising substituting the chlorodifluoromethane with a refrigerant composition containing a lubricant, the refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components,
  - (a) said refrigerant gases consisting of:
    - about 40% to about 45% by weight tetrafluoroethane; and
    - about 55% to about 60% by weight pentafluoroethane; and
  - (b) said non-refrigerant gas components including about 0.5% up to about 20% by weight of the refrigerant gases a lubricating oil that is soluble in chlorodifluoromethane, pentafluoroethane and tetrafluoroethane, wherein the lubricating oil is selected from the group consisting of naphthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.
2. The invention according to Claim 1, the lubricating oil having the following components:
  - 65-88% hydrotreated light naphthenic distillate, and
  - 10-20% solvent refined light naphthenic distillate petroleum.

3. The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 60% by weight to said tetrafluoroethane present in an amount of about 40% by weight.
4. The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight.
5. The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 55% by weight to said tetrafluoroethane present in an amount of about 45% by weight.
6. A method for refilling an apparatus designed for use with a chlorodifluoromethane refrigerant, the method comprising:
  - (1) supplying a substitute refrigerant composition under pressure, in a cylinder can fitted with an outlet compatible with a chlorodifluoromethane recharging manifold of the apparatus; and
  - (2) adding to said apparatus via the manifold the substitute refrigerant composition for chlorodifluoromethane, said substitute refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components,
    - (a) the refrigerant gases consisting of:
      - about 40% to about 45% by weight tetrafluoroethane; and
      - about 55% to about 60% by weight pentafluoroethane; and
    - (b) the non-refrigerant components including about 0.5% up to about 20% by weight of the refrigerant gases of a lubricating oil that is

soluble in chlorodifluoromethane, pentafluoroethane and  
tetrafluoroethane,

wherein the lubricating oil is selected from the group consisting of napthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.

7. The method according to claim 6, the lubricating oil having the following components:  
65-85% hydrotreated light napthenic distillate, and  
10-20% solvent refined light napthenic distillate petroleum.
8. The method according to claim 6 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 60% by weight to said tetrafluoroethane present in an amount of about 40% by weight.
9. The method according to claim 6 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight.
10. The method according to claim 6 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 55% by weight to said tetrafluoroethane present in an amount of about 45% by weight.
11. – 20. Cancelled

21. A refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components,
- (a) the refrigerant gases consisting of:
    - about 40% to about 45% by weight tetrafluoroethane; and
    - about 55% to about 60% by weight pentafluoroethane; and
  - (b) the non-refrigerant gas components including about 0.5% up to about 20% by weight of the refrigerant gases of a lubricating oil, wherein the lubricating oil is selected from the group consisting of naphthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.
22. A refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components,
- (a) the refrigerant gases consisting of: about 40% to about 45% by weight tetrafluoroethane; and about 55% to about 60% by weight pentafluoroethane; and
  - (b) the non-refrigerant gas components including about 0.5% up to about 20% by weight of the refrigerant gases of a lubricating oil, the lubricating oil having the following components:
    - 65-85% hydrotreated light naphthenic distillate, and
    - 10-20% solvent refined light naphthenic distillate petroleum.

23. A refrigerant composition according to claim 21 wherein said pentafluoroethane is present in the ratio of about 60% by weight to said tetrafluoroethane present in an amount of about 40% by weight.
24. A refrigerant composition according to claim 21 wherein said pentafluoroethane is present in the ratio of about 55% by weight to said tetrafluoroethane present in an amount of about 45% by weight with a napthenic lubricant.
25. A refrigerant composition according to claim 21 wherein said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight with a napthenic lubricant.
26. Cancelled
27. The refrigerant composition according to claim 21, wherein the lubricating oil further includes an acrylic polymer or a corrosion inhibitor or both.
28. Cancelled
29. The refrigerant composition according to claim 21, wherein the lubricating oil is an alkylbenzene-based lubricating oil.
30. The invention according to claim 1, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.

31. The invention according to claim 1, wherein the lubricating oil includes an additive selected from the group consisting of acrylic polymer, a corrosion inhibitor and mixtures thereof.
32. Cancelled
33. The invention according to claim 1, wherein the lubricating oil is an alkylbenzene-based lubricating oil.
34. The method according to claim 6, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.
35. The method according to claim 6, wherein the lubricating oil includes an additive selected from the group consisting of acrylic polymer, a corrosion inhibitor and mixtures thereof.
36. Cancelled
37. The method according to claim 6, wherein the lubricating oil is an alkylbenzene-based lubricating oil.

38. The invention according to claim 1, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.
39. The method of claim 6, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.
40. The refrigerant composition of claim 21, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.



**EVIDENCE APPENDIX UNDER 37 C.F.R. § 41.37(c)(1)(ix)**

Extrinsic evidence to be considered in this Appeal is as follows:

- Exhibit A:** Declaration of Kenneth M. Ponder of September 18, 2008. On December 8, 2008, Examiner Hardee agreed to enter the Declaration of Kenneth M. Ponder via a voicemail message. See, Statement of Substance of Interview, filed December 9, 2008.
- Exhibit B:** Declaration of Andy Gbur of May 16, 2008, entered June 27, 2008.
- Exhibit C:** ANSI/ASHRAE Addenda a, b, c, e, f, k, n, o, p, q, r, s, and u to ANSI/ASHRAE Standard 34-2004, 2006 Supplement.
- Exhibit D:** Declaration of Andy Gbur of October 30, 2007, entered December 17, 2007.

## Exhibit A

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In Re Application of:

Docket No.: 821920-1030

PONDER, K., et al.,

Confirmation No.: 1006

Serial No.: 10/937,736

Group Art Unit: 1751

Filing Date: September 8, 2004

Examiner: John R. Hardee

For: **Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant****DECLARATION OF KENNETH M. PONDER**

I, Kenneth M. Ponder, hereby declare as follows:

1. I am the President of RMS of Georgia, LLC and am a co-inventor named on the above application.
2. RMS of Georgia, LLC sells and distributes refrigerants and reclaims most refrigerants.
3. Among the refrigerants that RMS of Georgia, LLC sells and distributes are refrigerants known under ASHRAE designations R-421A and R-421B and SNAP approved by the EPA for different uses. The refrigerant having the ASHRAE designation R-421A is a refrigerant composition that is a mixture of R-125(pentafluoroethane) and R-134a (1,1,1,2-tetrafluoroethane) blended with a lubricant in which R-125 is present in an amount of about 58% by weight and R-134a is present in an amount of about 42% by weight of the refrigerant gases. R-421B, on the other hand, is also a mixture of R-125(pentafluoroethane) and R-134a (1,1,1,2-tetrafluoroethane) blended with a lubricant. R-421B, however, includes pentafluoroethane in the amount of about 85% by weight and 1,1,1,2-tetrafluoroethane in the amount of about 15% by weight of the refrigerant gases.

4. Our R-421B refrigerant comprised of about 85% by weight pentafluoroethane and about 15% tetrafluoroethane by weight of the refrigerant gases is covered by U.S. Patent No. 7,320,763 on which I am named as a co-inventor.

5. Our R-421A refrigerant was developed as a replacement for R-22 refrigerant that consists of chlorodifluoromethane. R-22 refrigerant could cover a wide array of temperatures. The industry has not yet found a single refrigerant composition that could replace R-22 for use over the entire array of temperatures over which R-22 was used. As a result, the industry has had to come up with multiple refrigerant compositions covering different arrays of temperatures.

6. Our R-421A and our R-421B refrigerants were developed to address different uses in the marketplace. In particular, R-421A was developed to address a higher temperature or (medium temp) application in the industry. By high or medium temperature applications I mean approximately -5°F to +45 °F. In contrast, R-421B was developed as a long term option for low temperature applications in the Industry. By low temperature applications, I mean applications below about 0°F and generally in the range of below about -5°F to about -40°F. Accordingly, R-421A and R-421B are marketed by us and used by our customers for different applications to meet different needs, depending upon whether a high and medium temperature application or a low temperature application is the specified use by our customer.

7. Our refrigerant R-421A that includes 58% pentafluoroethane and 42% tetrafluoroethane, which would be covered by the presently pending claims in this application, is superior to R-421B that consists of 85% pentafluoroethane and 15% tetrafluoroethane in high and medium temperature applications because it has a different temperature-pressure profile than R-421B and because the temperature-pressure profile of R-421A is superior to that of R-421B for high and medium temperature applications.

8. I have read U.S. Patent No. 6,207,071 (Takigawa et al.) and do not find any mention or suggestion in Takigawa of combining pentafluoroethane with tetrafluoroethane to create a composition including refrigerant gases consisting of pentafluoroethane and tetrafluoroethane to the exclusion of other refrigerant gases except for impurities ordinarily associated with those two gases having a temperature-pressure profile that provides superior properties for use in high and medium temperature applications as described above.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of this patent.

Respectfully submitted,

Date: 9/18/08

  
Kenneth M. Ponder

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In Re Application of:

Docket No.: 821920-1030

PONDER, K., et al.,

Confirmation No.: 1006

Serial No.: 10/937,736

Group Art Unit: 1751

Filing Date: September 8, 2004

Examiner: John R. Hardee

For: **Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant**

**SECOND DECLARATION OF ANDY GBUR**

I, Andy Gbur, hereby declare as follows:

1. I am the Director of Operations for Intertek, ETL SEMKO Division.
2. My duties at Intertek include financial and technical oversight of the Refrigeration Chemistry laboratory.
3. My educational background includes B.S. in Chemistry from the Ohio State University.
4. My work experience prior to joining Intertek includes I have been employed with Intertek (Integral Sciences) for the last 15 yrs since graduation.
5. I have served on the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE) Standard Project Committee 34 from 2002 to 2007. The work of this Committee includes review and issuance of ASHRAE standards and adoption and publication of amendments to standards in the form of addenda, such as Addendum c and Addendum e to ANSI/ASHRAE Standard 34-2001, copies of which are attached hereto. I served on this Committee when both Addendum c and Addendum e were approved and issued by the Committee.
6. Our Committee in ASHRAE recognizes that blends of refrigerant gases having the same components in different proportions can produce refrigerant blend compositions having different refrigerant properties as typically reflected by differences

in temperature/pressure profiles of the refrigerant blend compositions. ASHRAE gives each different blend a distinct designation number, or Refrigerant Number. In the case of blends having the same components but differing only in the proportions of the components the differences are identified by designating each different blend with the same Refrigerant Number to show the blends have the same components but with a different uppercase letter to recognize the different blends result in different refrigerants. See Addendum e. Thus, for example, ASHRAE has granted different refrigerant designation numbers to refrigerant compositions consisting of difluoromethane (HFC-32), pentafluoroethane (HFC-125) and tetrafluoroethane (HFC-134a) where these three refrigerant components are present in different proportions as evidenced by designation numbers R407A (a 20-40-40 proportion blend), R407B (a 10-70-20 proportion blend), R407C (a 23-25-52 proportion blend), R407D (a 15-15-70 proportion blend), and R407E (a 25-15-60 proportion blend). See Addendum c to ANSI/ASHRAE Standard 34-2001 (2003). One skilled in the refrigerant art would expect that, for example, refrigerant R407A would have different refrigerant properties than those of refrigerant R407B.


7. I have reviewed U.S. Patent 6,207,071 in the name of Takigawa. While Takigawa makes mention of refrigerants containing HFC-134a (1,1,1,2-tetrafluoroethane) and/or HFC-125 (pentafluoroethane), Takigawa does not disclose a single example of a refrigerant gas composition or blend combining only tetrafluoroethane and pentafluoroethane to the exclusion of another refrigerant gas component. Every example provided that includes a combination of tetrafluoroethane and pentafluoroethane also involves the addition of at least one additional refrigerant gas component, such as HFC-32 (difluoromethane). See, for example, Column 8, lines 35-55, and the Examples beginning at Column 10, line 5. Thus, Takigawa fails to teach a refrigerant composition consisting of tetrafluoroethane and pentafluoroethane as the only refrigerant gas components in the composition in any particular proportion. Further,

in view of the different designations by ASHRAE of even the same refrigerant gas components provided in different proportions (such as R407A, R407B, etc.) in my opinion it would not be obvious to one skilled in the art of refrigerant gas compositions to produce a refrigerant gas composition containing only about 40% to about 45% by weight tetrafluoroethane and about 55% to about 60% by weight pentafluoroethane from the teachings in the Takigawa patent. It should be noted that ASHRAE does not consider components such as lubricants or corrosion inhibitors to be refrigerant gas components, but instead additives. Additives are not considered to affect the refrigerant properties of a refrigerant gas composition and thus may or may not be included or added to any such refrigerant composition.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of this patent.

Respectfully submitted,

Date: 5-16-8

  
\_\_\_\_\_  
Andy Gbur

**2006 SUPPLEMENT**

# **Designation and Safety Classification of Refrigerants**

See appendix for approval dates by the ASHRAE Standards Committee, the ASHRAE Board of Directors, and the American National Standards Institute.

This standard is under continuous maintenance by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE Web site, <http://www.ashrae.org>, or in paper form from the Manager of Standards. The latest edition of an ASHRAE Standard may be purchased from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: [orders@ashrae.org](mailto:orders@ashrae.org). Fax: 404-321-5478. Telephone: 404-636-8400 (worldwide), or toll free 1-800-527-4723 (for orders in US and Canada).

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ISSN 1041-2336





**Addenda a, b, c, e, f, and n**

**ASHRAE Standing Standard Project Committee 34**  
**Cognizant TC: TC 3.1, Refrigerants and Secondary Coolants**  
**SPLS Liaison: Roger L. Hedrick**  
**Staff Liaison: Douglas K. Tucker**

Robert G. Doerr, *Chair\**  
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Ronald E. Jarnagin, *CO*

Claire B. Ramspeck, *Assistant Director of Standards and Special Projects*

**Addenda k, o, q, r, and s**

**ASHRAE Standing Standard Project Committee 34**  
**Cognizant TC: TC 3.1, Refrigerants and Secondary Coolants**  
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Michael D. Blanford  
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James R. Sand\*  
Mark W. Spatz\*  
Ganesan "Sonny" Sundaresan  
Eugene F. Troy  
Mahesh Valiya-Naduvath

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Frank E. Jakob  
Stephen D. Kennedy

James D. Lutz  
David E. Knebel  
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Gideon Shavit  
David R. Tree  
James E. Woods  
Michael F. Beda, *BOD ExO*  
William A. Harrison, *CO*

Claire B. Ramspeck, *Manager of Standards*

## Addendum p

**ASHRAE Standing Standard Project Committee 34**  
**Cognizant TC: TC 3.1, Refrigerants and Secondary Coolants**  
**SPLS Liaison: Roger L. Hedrick**  
**Staff Liaison: Douglas K. Tucker**

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## Addendum u

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#### NOTE

When addenda, interpretations, or errata to this standard have been approved, they can be downloaded free of charge from the ASHRAE Web site at <http://www.ashrae.org>.

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1791 Tullie Circle NE  
Atlanta, GA 30329  
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FOREWORD

*This addendum adds a designation of R-422B to the blend R-125/134a/600a (55.0/42.0/3.0) with tolerances of (±1.0/ ±1.0/ +0.1,-0.5) and a safety classification of A1.*

Addendum a to 34-2004

Add to Table 2 the following entries for R-422B:

TABLE 2 Data and Safety Classifications for Refrigerant Blends

Refrigerant Number	Composition (Mass %)	Composition Tolerances	Azeotropic Temperature		Molecular Mass <sup>a</sup>	Normal Boiling Point <sup>a</sup>		Safety Group
			(°C)	(°F)		(°C)	(°F)	
422B	R-125/134a/600a (55.0/42.0/3.0)	(±1.0/±1.0/+0.1,-0.5)						A1

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## FOREWORD

*This addendum adds a designation of R-422C to the blend R-125/134a/600a (82.0/15.0/3.0) with tolerances of ( $\pm 1.0/\pm 1.0/+0.1,-0.5$ ) and a safety classification of A1.*

### Addendum b to 34-2004

*Add to Table 2 the following entries for R-422C:*

**TABLE 2 Data and Safety Classifications for Refrigerant Blends**

Refrigerant Number	Composition (Mass %)	Composition Tolerances	Azeotropic Temperature		Molecular Mass <sup>a</sup>	Normal Boiling Point <sup>a</sup>		Safety Group
			(°C)	(°F)		(°C)	(°F)	
422C	R-125/134a/600a (82.0/15.0/3.0)	( $\pm 1.0/\pm 1.0/+0.1,-0.5$ )						A1



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## FOREWORD

*This addendum adds a designation of R-423A to the blend R-134a/227ea (52.5/47.5) with tolerances of ( $\pm 1.0/\pm 1.0$ ) and a safety classification of A1.*

### Addendum c to 34-2004

*Add to Table 2 the following entries for R-423A:*

**TABLE 2 Data and Safety Classifications for Refrigerant Blends**

Refrigerant Number	Composition (Mass %)	Composition Tolerances	Azeotropic Temperature		Molecular Mass <sup>a</sup>	Normal Boiling Point <sup>a</sup>		Safety Group
			(°C)	(°F)		(°C)	(°F)	
423A	R-134a/227ea (52.5/47.5)	( $\pm 1.0/\pm 1.0$ )						A1

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FOREWORD

*This addendum adds a designation of R-424A to the blend R-125/134a/600a/600/601a (50.5/47.0/0.9/1.0/0.6) with tolerances of (±1.0/ ±1.0/+0.1,-0.2/+0.1,-0.2/+0.1,-0.2) and a safety classification of A1.*

Addendum e to 34-2004

Add to Table 2 the following entries for R-424A:

TABLE 2    Data and Safety Classifications for Refrigerant Blends

Refrigerant Number	Composition (Mass %)	Composition Tolerances	Safety Group
424A	R-125/134a/600a/600/601a (50.5/47.0/0.9/1.0/0.6)	(±1.0/±1.0/+1.0,-0.2/+0.1,-0.2/+0.1,-0.2)	A1

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## FOREWORD

*This addendum adds a designation of R-425A to the blend R-32/134a/227ea (18.5/69.5/12.0) with tolerances of ( $\pm 0.5/\pm 0.5/\pm 0.5$ ) and a safety classification of A1.*

### Addendum f to 34-2004

*Add to Table 2 the following entries for R-425A:*

**TABLE 2 Data and Safety Classifications for Refrigerant Blends**

Refrigerant Number	Composition (Mass %)	Composition Tolerances	Safety Group
425A	R-32/134a/227ea (18.5/69.5/12.0)	( $\pm 0.5/\pm 0.5/\pm 0.5$ )	A1

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## FOREWORD

*This addendum adds a designation of R-601 for pentane (no safety classification) and a designation of R-601a for 2-methylbutane (isopentane) with a safety classification of A3.*

*Additions are shown in this addendum by underlining; deletions are shown by strikethrough.*

### Addendum k to 34-2004

*Add to Table 1 the following entries for R- 601 and R-601a:*

**TABLE 1 Refrigerant Data and Safety Classifications**

Refrigerant Number	Chemical Name <sup>a,b</sup>	Chemical Formula <sup>a</sup>	Molecular Mass <sup>a</sup>	Normal Boiling Point <sup>a</sup>		Safety Group
				(°C)	(F°)	
<i>Miscellaneous Organic Compounds</i>						
<i><u>hydrocarbons</u></i>						
601	pentane	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub>	72.15	36.1	96.9	—
601a	2-methylbutane (isopentane)	(CH <sub>3</sub> ) <sub>2</sub> CHCH <sub>2</sub> CH <sub>3</sub>	72.15	27.8	82.1	A3

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## FOREWORD

*This addendum provides general guidance for the numbering of C4-C8 alkanes.*

### Addendum n to 34-2004

*Add the following underlined text to Section 4.5:*

4.5 Miscellaneous organic compounds shall be assigned numbers in the 600 series in decadal groups, as outlined in Table 1, in serial order of designation within the groups. For the saturated hydrocarbons with 4 to 8 carbon atoms, the number assigned shall be 600 plus the number of carbon atoms minus 4. For example, butane is R-600, pentane is R-601, hexane is R-602, heptane is R-603, and octane is R-604. The straight-chain or "normal" hydrocarbon has no suffix. For isomers of the hydrocarbons with 4 to 8 carbon atoms, the lower

case letters "a", "b", "c," etc., are appended to isomers according to the group(s) attached to the longest carbon chain as indicated in the table below. For example, R-601a is assigned for 2-methylbutane (isopentane) and R-601b would be assigned for 2,2-dimethylpropane (neopentane).

ATTACHED GROUP(S)	SUFFIX:
<u>none (straight chain)</u>	<u>No suffix</u>
<u>2-methyl-</u>	<u>a</u>
<u>2,2-dimethyl-</u>	<u>b</u>
<u>3-methyl-</u>	<u>c</u>
<u>2,3-dimethyl-</u>	<u>d</u>
<u>3,3-dimethyl-</u>	<u>e</u>
<u>2,4-dimethyl-</u>	<u>f</u>
<u>2,2,3-trimethyl-</u>	<u>g</u>
<u>3-ethyl-</u>	<u>h</u>
<u>4-methyl-</u>	<u>i</u>
<u>2,5-dimethyl-</u>	<u>j</u>
<u>3,4-dimethyl-</u>	<u>k</u>
<u>2,2,4-trimethyl-</u>	<u>l</u>
<u>2,3,3-trimethyl-</u>	<u>m</u>
<u>2,3,4-trimethyl-</u>	<u>n</u>
<u>2,2,3,3-tetramethyl-</u>	<u>o</u>
<u>3-ethyl-2-methyl-</u>	<u>p</u>
<u>3-ethyl-3-methyl-</u>	<u>q</u>

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FOREWORD

*This addendum adds a designation of R-421A to the blend R-125/134a (58.0/42.0) with tolerances of (±1.0/ ±1.0) and a safety classification of A1.*

Addendum o to 34-2004

Add to Table 2 the following entries for R-421A:

TABLE 2								
Data and Safety Classifications for Refrigerant Blends								
Refrigerant Number	Composition (Mass %)	Composition Tolerances	Azeotropic Temperature		Molecular Mass <sup>a</sup>	Normal Boiling Point <sup>a</sup>		Safety Group
			(°C)	(°F)		(°C)	(°F)	
421A	R-125/134a (58.0/42.0)	(±1.0/±1.0)						A1

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## FOREWORD

The purposes of this addendum are to revise the refrigerant flammability classification in ANSI/ASHRAE Standard 34-2004 and to provide details on the required flammability and fractionation testing procedures. The history and rationale for these changes are explained in a paper by Wilson and Richard [ASHRAE Transactions, vol. 108, part 2, pp. 739-756 (2002)]. The major change is that flammability (as determined by flame propagation in air) is to be tested at 100°C for single-compound refrigerants. For refrigerant blends, two separate tests at 100°C and 60°C are to be conducted at compositions corresponding to the WCF and WCFF (see below for definitions), respectively. These are in contrast to the tests at 21-23°C currently specified in Standard 34-2004.

Details for the required flammability testing are provided in Section B.1 of new Appendix B. The procedures are based on ASTM Standard E681 but with specified conditions at which to run the test. The modifications include the specification of a 12-L test flask, ignition by an electric spark, and video recording of the results. Test conditions of temperature, pressure, and humidity are also specified as well as data reporting requirements.

Details for the required fractionation analysis for blends are provided in Section B.2 of new Appendix B. The analysis starts with the worst case of formulation for flammability (WCF—which is the nominal composition with the composition tolerances that results in the most flammable composition). The worst case of fractionation for flammability (WCFF) is the worst case resulting from a series of tests simulating (a) leakage of refrigerant from a storage container under storage and shipping conditions, (b) leakage from equipment, and (c) composition shift from successive recharging of equipment. Conditions of temperature, filling ratio, and leak rate for the analysis and data reporting requirements are specified. The analysis for WCFF must be done experimentally and may use mathematical modeling to reduce the number of experiments. The theory behind the fractionation analysis is given by Kim and Didion [Int. J. HVAC&R Research, vol 1, pp. 3-20 (1995)].

Several definitions have been added or modified. These include the definition for heat of combustion as well as several relating to flammability and fractionation.

Additions are shown in this addendum by underlining; deletions are shown by strikethrough.

## Addendum p to 34-2004

### 3. DEFINITIONS OF TERMS

elevated temperature flame limit (ETFL): the minimum concentration of refrigerant that is capable of propagating a

flame through a homogeneous mixture of the refrigerant and air using test equipment and procedures specified in B.1.1 at 101.3 kPa (14.7 psia) and either 60.0°C (140°F) or 100°C (212°F). It is normally expressed as a refrigerant percentage by volume. When tested at 60.0°C, it is called the ETFL<sub>60</sub>. When tested at 100°C, it is called the ETFL<sub>100</sub>.

flame propagation: any combustion that moves upward and outward from the point of ignition as defined in B.1.8 in Appendix B.

heat of combustion (HOC): the heat released when substances are combusted, determined as the difference in the enthalpy between the reactants, fuel (refrigerant), and air, and the reaction products after combustion. The heat of combustion exceeds zero for exothermic reactions (those that give off heat) and is negative for endothermic reactions (those that require heat). the heat released when a substance is combusted, determined as the difference in the enthalpy between the reactants (refrigerant(s) and air) and their products after combustion as defined in 6.1.3.5. The heat or enthalpy of combustion is often expressed as energy per mass (e.g., kJ/kg or Btu/lb).

lower flammability limit (LFL): the minimum concentration of the refrigerant substance, a refrigerant in this standard, that is capable of propagating a flame through a homogeneous mixture of the refrigerant substance and air under specified test conditions specified in ASTM E681<sup>1</sup>. The LFL normally is expressed as refrigerant percentage by volume.

nominal formulation: the bulk manufactured composition of the refrigerant, which includes the gas and liquid phases. For the purpose of this standard, when a container is 80% or more liquid filled, the liquid composition may be considered as the nominal composition.

worst case of formulation for flammability (WCF): the nominal formulation, including the composition tolerances, that results in the most flammable concentration of components.

worst case of fractionation for flammability (WCFF): the composition produced during fractionation of the worst case of formulation for flammability that results in the highest concentration of flammable component(s) as identified in this standard in the vapor or liquid phase.

### 4. NUMBERING OF REFRIGERANTS

4.4 Blends shall be designated by their respective refrigerant numbers and mass proportions identified by the designations assigned in this standard. Refrigerants shall be named Blends without assigned designations shall be identified by their compositions, listing the components in order of increasing normal boiling points of the components separated by slashes, for example, R-32/134a for a blend of R-32 and R-134a. Specific formulations shall be further identified by appending the corresponding mass fractions expressed as per-

centages to one decimal place and enclosed in parentheses, for example, R-32/134a (30.0/70.0). When formulation tolerances are relevant to the discussion, the corresponding tolerances shall be appended in a second set of parentheses, for example R-32/125/134a (30.0/10.0/60.0) (+1.0,-2.0/±2.0/±2.0) for a blend of R-32, R-125, and R-134a with nominal mass fractions of 30.0%, 10.0%, and 60.0%, respectively, and mass fractions of 28.0-31.0%, 8.0-12.0%, and 58.0-62.0% with tolerances, again respectively. Compositions shall be specified to the nearest 0.1% m/m. No component shall be permitted at less than 0.6% m/m nominal. For example, a 10/90 blend by mass of Refrigerants 12 and 22 shall be indicated as R-22/12 (90.0/10.0) or Refrigerant 22/12 (90.0/10.0). A blend of 92% m/m R-502 (the azeotrope of R-22 and R-115) with 8% m/m R-290 (propane) shall be indicated as R-290/22/115 (8.0/44.9/47.1).

## 6. SAFETY GROUP CLASSIFICATIONS

**6.1.3 Flammability Classification** Refrigerants shall be assigned to one of three classes—1, 2, or 3—based on flammability. Tests shall be conducted in accordance with ASTM E681<sup>1</sup> using a spark ignition source. Testing of all halocarbon refrigerants shall be done in accordance with the Annex of ASTM E681. Single-compound refrigerants shall be assigned a single flammability classification. Refrigerant blends shall be assigned flammability classifications as specified in 6.1.5. Blends shall be assigned a flammability classification based on their WCF and WCFE, as determined from a fractionation analysis (see Section B2 in Appendix B). A fractionation analysis for flammability is not required if the components of the blend are all in one class; the blend shall be that same class.

Class 1 indicates refrigerants that do not show flame propagation when tested in air at 101 kPa (14.7 psia) and 21°C (70°F).

Class 2 signifies refrigerants having a lower flammability limit (LFL) of more than 0.10 kg/m<sup>3</sup> (0.00625 lb/ft<sup>3</sup>) at 21°C and 101 kPa (70°F and 14.7 psia) and a heat of combustion of less than 19,000 kJ/kg (8,174 Btu/lb). The heat of combustion shall be calculated assuming that combustion products are in the gas phase and in their most stable state (e.g., C, N, S give CO<sub>2</sub>, N<sub>2</sub>, SO<sub>3</sub>; F and Cl give HF and HCl if there is enough H in the molecule, otherwise they give F<sub>2</sub> and Cl<sub>2</sub>; excess H is converted to H<sub>2</sub>O).

Class 3 indicates refrigerants that are highly flammable, as defined by an LFL of less than or equal to 0.10 kg/m<sup>3</sup> (0.00625 lb/ft<sup>3</sup>) at 21°C and 101 kPa (70°F and 14.7 psia) or a heat of combustion greater than or equal to 19,000 kJ/kg (8,174 Btu/lb). The heat of combustion is calculated as explained above in the definition for Class 2 category.

Definitions of flammability differ depending on the purpose. For example, ammonia is classified for transportation purposes as a nonflammable gas by the U.S. Department of Transportation, but is a Class 2 refrigerant.

### 6.1.3.1 Class 1

- (a) A single-compound refrigerant shall be classified as Class 1 if the refrigerant does not show flame propagation when tested in air at 100°C (212°F) and 101.3 kPa (14.7 psia).
- (b) The WCF of a refrigerant blend shall be classified as Class 1 if the WCF of the blend does not show flame propagation when tested in air at 100°C (212°F) and 101.3 kPa (14.7 psia).
- (c) The WCFE of a refrigerant blend shall be classified as Class 1 if the WCFE of the blend, as determined from a fractionation analysis specified by B.2 in Appendix B, does not show flame propagation when tested at 60.0°C (140°F) and 101.3 kPa (14.7 psia).

### 6.1.3.2 Class 2

- (a) A single-compound refrigerant shall be classified as Class 2 if the refrigerant meets all three of the following conditions:
  - (1) exhibits flame propagation when tested at 100°C (212°F) and 101.3 kPa (14.7 psia),
  - (2) has an LFL > 0.10 kg/m<sup>3</sup> (0.0062 lb/ft<sup>3</sup>) [see 6.1.3.4 if the refrigerant has no LFL at 23.0°C and 101.3 kPa], and
  - (3) has a heat of combustion <19,000 kJ/kg (8,169 Btu/lb) [see 6.1.3.5].
- (b) The WCF of a refrigerant blend shall be classified as Class 2 if it meets all three of the following conditions:
  - (1) exhibits flame propagation when tested at 100°C (212°F) and 101.3 kPa (14.7 psia),
  - (2) has an LFL > 0.10 kg/m<sup>3</sup> (0.0062 lb/ft<sup>3</sup>) [see 6.1.3.4 if the WCF of the blend has no LFL at 23.0°C and 101.3 kPa], and
  - (3) has a heat of combustion <19,000 kJ/kg (8,169 Btu/lb) [see 6.1.3.5].
- (c) The WCFE of a refrigerant blend shall be classified as Class 2 if it meets all three of the following conditions:
  - (1) exhibits flame propagation when tested at 60.0°C (140°F) and 101.3 kPa (14.7 psia),
  - (2) has an LFL > 0.10 kg/m<sup>3</sup> (0.0062 lb/ft<sup>3</sup>) [see 6.1.3.4 if the WCFE of the blend has no LFL at 23.0°C and 101.3 kPa], and
  - (3) has a heat of combustion <19,000 kJ/kg (8,169 Btu/lb) [see 6.1.3.5].

### 6.1.3.3 Class 3

- (a) A single-compound refrigerant shall be classified as Class 3 if the refrigerant meets both of the following conditions:
  - (1) exhibits flame propagation when tested at 100°C (212°F) and 101.3 kPa (14.7 psia) and
  - (2) has an LFL ≤ 0.10 kg/m<sup>3</sup> (0.0062 lb/ft<sup>3</sup>) [see 6.1.3.4 if the refrigerant has no LFL at 23.0°C and 101.3 kPa]; or it has a heat of combustion that is ≥19,000 kJ/kg (8,169 Btu/lb).
- (b) The WCF of a refrigerant blend shall be classified as Class 3 if it meets both of the following conditions:
  - (1) the WCF exhibits flame propagation when tested at 100°C (212°F) and 101.3 kPa (14.7 psia), and
  - (2) the WCF has an LFL ≤ 0.10 kg/m<sup>3</sup> (0.0062 lb/ft<sup>3</sup>) [see 6.1.3.4 if the WCF of the blend has no LFL



at 23.0°C and 101.3 kPa], or the WCF of the blend has a heat of combustion that is  $\geq 19,000$  kJ/kg (8,169 Btu/lb).

- (c) The WCFF of a refrigerant blend shall be classified as Class 3 if it meets both of the following conditions:

(1) the WCFF exhibits flame propagation when tested at 60.0°C (140°F) and 101.3 kPa (14.7 psia),

(2) the WCFF has an LFL  $\leq 0.10$  kg/m<sup>3</sup> (0.0062 lb/ft<sup>3</sup>) [see 6.1.3.4 if the WCFF of the blend has no LFL at 23.0°C and 101.3 kPa], or the WCFF of the blend has a heat of combustion that is  $\geq 19,000$  kJ/kg (8,169 Btu/lb).

**6.1.3.4** For Class 2 or Class 3 refrigerants or refrigerant blends the LFL shall be determined. For those Class 2 or Class 3 refrigerants or refrigerant blends that show no flame propagation when tested at 23.0°C (73.4°F) and 101.3 kPa (14.7 psia) [i.e., no LFL], an elevated temperature flame limit (ETFL) shall be used in lieu of the LFL for determining their flammability classifications, as follows.

- (a) For a single-compound refrigerant, the ETFL<sub>100</sub> shall be used in lieu of the LFL.
- (b) For the WCF of a refrigerant blend, the ETFL<sub>100</sub> shall be used in lieu of the LFL [see Table 3].
- (c) For the WCFF of a refrigerant blend, the ETFL<sub>60</sub> shall be used in lieu of the LFL [see Table 3].

**6.1.3.5** The heat of combustion shall be calculated for conditions of 25°C (77°F) and 101.3 kPa (14.7 psia).

- (a) For single-component refrigerants, the heat of combustion can be calculated, if the heat of formation (enthalpy of formation) of the refrigerant and its products of reaction are known. Values for heats of formation are tabulated in several chemical and physical properties handbooks and databases. The heat of combustion is the enthalpy of formation of the reactants (refrigerant and oxygen) minus the enthalpy of formation of the products of reaction. In this standard, the heat of combustion is positive for exothermic reactions. Calculated values shall be based on the complete combustion of one mole of refrigerant with enough oxygen for a stoichiometric reaction. The reactants and the combustion products shall be assumed to be in the gas phase. The combustion products shall be CO<sub>2</sub> (N<sub>2</sub>, SO<sub>2</sub> if nitrogen or sulfur are part of the refrigerant's molecular structure), HF and HCl, if there is enough hydrogen in the molecule. If there is insufficient hydrogen available for the formation of both HF and HCl, then the formation of HF takes preference over the formation of HCl. The remaining F and Cl produce F<sub>2</sub> and Cl<sub>2</sub>. Excess H shall be assumed to be converted to H<sub>2</sub>O.
- (b) For refrigerant blends, the heat of combustion shall be measured or calculated from a balanced stoichiometric equation of all component refrigerants.
- (c) Heats of formation and heats of combustion are normally expressed as energy per mole (kJ/mol or Btu/mol). For

purposes of flammability classification under this standard, convert the heat of combustion for a refrigerant from an energy per mole value to an energy per mass value (kJ/kg or Btu/lb).

## 8. APPLICATION INSTRUCTIONS

**8.5.2.2 Azeotropic Blends** The following additional information shall be provided for azeotropes:

- (p) Proposed composition tolerances for classification.
- (q) Worst case of formulation for flammability (WCF) of the blend.
- (r) Worst case of fractionation for flammability (WCFF) of the blend.

**8.5.2.3 Zeotropic Blends** The following additional information shall be provided for zeotropes (including near azeotropes):

- (n) Proposed composition tolerances for classification.
- (o) Worst case of formulation for flammability (WCF) of the blend.
- (p) Worst case of fractionation for flammability (WCFF) of the blend.

**8.7 Flammability Information Applications** for single-compound refrigerants and refrigerant blends shall include the tabulated flammability test data and information identified in 8.7.1B.1.9 in Appendix B. Applications for refrigerant blends shall also include the tabulated fractionation data and information identified in 8.2.6 and 8.7.2B.2.6 in Appendix B. See 8.1.6 regarding blend components.

**8.7.1 Flame Propagation** Applicants for single-compound refrigerants and for refrigerant blends shall include test results determined in accordance with 6.1.3. Applications shall include a description of the apparatus and methods used, including (but not limited to)

- (a) schematic of the apparatus,
- (b) vessel size and shape,
- (c) ignition method,
- (d) preparation procedures including cleaning between tests,
- (e) method(s) used to control and verify test concentration(s),
- (f) how horizontal flame propagation was determined.

**8.7.2.1 Fractionation Analysis** Applications shall include an analysis of fractionation and shall include test results determined in accordance with B.2 in Appendix B.

## 9. REFERENCES

- <sup>2</sup> *Standard for Safety – Refrigerants*, UL Standard 2182, Underwriters Laboratories, Inc., Northbrook, IL, 1994.
- <sup>10</sup> *Title 49 CFR (Code of Federal Regulations)*, Section 173.306
- <sup>11</sup> Richard, R., *Refrigerant Flammability Testing in Large Volume Vessels*, (ARTI MCLR Final Report DOE/CE/23810-87), Air-Conditioning and Refrigeration Technology Institute, Arlington, VA, 1998.

Add Table 3

TABLE 3 Flammability Classifications

Class	Single-Component Refrigerant	WCF of a Refrigerant Blend	WCFF of a Refrigerant Blend
1	No flame propagation when tested at 100°C (212°F) and 101.3 kPa (14.7 psia)	No flame propagation when tested at 100°C (212°F) and 101.3 kPa (14.7 psia)	No flame propagation when tested at 60.0°C (140°F) and 101.3 kPa (14.7 psia)
2	<p>Flame propagation when tested at 100°C (212°F) and 101.3 kPa (14.7 psia)</p> <p>and</p> <p><math>LFL^a &gt; 0.10 \text{ kg/m}^3</math> (<math>&gt; 0.0062 \text{ lb/ft}^3</math>)</p> <p>and</p> <p>heat of combustion &lt;19,000 kJ/kg (&lt;8,169 Btu/lb)</p>	<p>Flame propagation when tested at 100°C (212°F) and 101.3 kPa (14.7 psia)</p> <p>and</p> <p><math>LFL^a &gt; 0.10 \text{ kg/m}^3</math> (<math>&gt; 0.0062 \text{ lb/ft}^3</math>)</p> <p>and</p> <p>heat of combustion &lt;19,000 kJ/kg (&lt;8,169 Btu/lb)</p>	<p>Flame propagation when tested at 60.0°C (140°F) and 101.3 kPa (14.7 psia)</p> <p>and</p> <p><math>LFL^a &gt; 0.10 \text{ kg/m}^3</math> (<math>&gt; 0.0062 \text{ lb/ft}^3</math>)</p> <p>and</p> <p>heat of combustion &lt;19,000 kJ/kg (&lt;8,169 Btu/lb)</p>
3	<p>Flame propagation when tested at 100°C (212°F) and 101.3 kPa (14.7 psia)</p> <p>and</p> <p><math>LFL^a \leq 0.10 \text{ kg/m}^3</math> (<math>\leq 0.0062 \text{ lb/ft}^3</math>)</p> <p>or</p> <p>heat of combustion <math>\geq 19,000 \text{ kJ/kg}</math> (<math>\geq 8,169 \text{ Btu/lb}</math>)</p>	<p>Flame propagation when tested at 100°C (212°F) and 101.3 kPa (14.7 psia)</p> <p>and</p> <p><math>LFL^a \leq 0.10 \text{ kg/m}^3</math> (<math>\leq 0.0062 \text{ lb/ft}^3</math>)</p> <p>or</p> <p>heat of combustion <math>\geq 19,000 \text{ kJ/kg}</math> (<math>\geq 8,169 \text{ Btu/lb}</math>)</p>	<p>Flame propagation when tested at 60.0°C (212°F) and 101.3 kPa (14.7 psia)</p> <p>and</p> <p><math>LFL^a \leq 0.10 \text{ kg/m}^3</math> (<math>\leq 0.0062 \text{ lb/ft}^3</math>)</p> <p>or</p> <p>heat of combustion <math>\geq 19,000 \text{ kJ/kg}</math> (<math>\geq 8,169 \text{ Btu/lb}</math>)</p>

<sup>a</sup> Lower Flammability Limit (LFL) is determined at ambient temperature and pressure. If an LFL does not exist at 23.0°C (73.4°F) and 101.3 kPa (14.7 psia), refer to 6.1.3.4.

(This appendix is a normative appendix and is part of this standard.)

## **APPENDIX B**

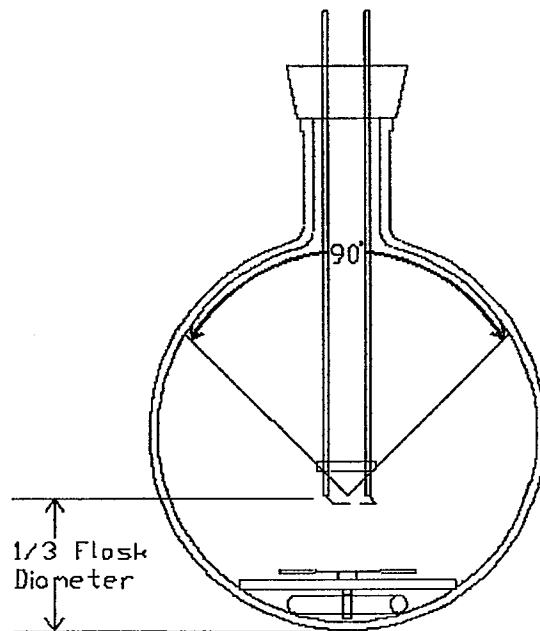
### **DETAILS OF TESTING—FLAMMABILITY**

**B.1 Flammability Testing** Flammability tests shall be conducted in accordance with ASTM E681 (reference 1). The test vessel size shall be a nominal 12 liter (0.424 ft<sup>3</sup>) spherical glass flask (see Figure B.1). The ignition source shall be a spark from a transformer secondary rated at 15 kV and 30 mA alternating current (A/C) as described in ASTM E681, with a 0.4 second spark duration. The electrodes shall be 1 mm, L-shaped tungsten wire electrodes that are spaced 6.4 millimeters (1/4 inch) apart and that extend out of the plane of the electrode holder (see spark assembly diagram in Figure B.2 for more details). The ignition source shall be placed at a height from the bottom of the test vessel that is one-third the diameter of the vessel. Tests shall be conducted at the temperatures specified below and at 1% by volume (refrigerant/air) increments. The absolute humidity of the air used for mixing shall be 0.0088 grams of water vapor per gram of dry air [which equates to 50% relative humidity at 23.0°C (73.4°F) and 101.3 kPa (14.7 psia)].

**CAUTION:** Flammability test procedures specified in this standard are modified procedures of an ASTM test that uses a glass flask as a test vessel. Extreme caution should be employed by test facilities to safeguard against personal injury and equipment damage. Vessels are subject to explode during test. Combustion of refrigerants may produce highly toxic or corrosive by-products. Testing facilities should consult safety precautions cited in the ASTM test standard, along with state and federal regulations.

#### **B.1.1**

- For single-compound refrigerants, flammability tests shall be conducted at 100°C (212°F) and 101.3 kPa (14.7 psia). Testing shall be conducted up to and including the point at which flame propagation is demonstrated. If no flame propagation is apparent, testing shall be done until at least three consecutive concentration increments have been made beyond the stoichiometric composition and beyond the point that combustion around the spark has diminished.
- For refrigerant blends, flammability tests shall be conducted on the WCF at 100°C (212°F) and 101.3 kPa (14.7 psia) and also shall be conducted on the WCFF at 60.0°C (140°F) and 101.3 kPa (14.7 psia). The WCFF shall be determined by the method specified in B.2. When application of the composition tolerances to the nominal formulation produces several possible worst case of fractionation for flammability formulations, the applicant shall conduct flammability testing on all possible worst case of fractionation for flammability formulations or provide sufficient justification for eliminating one or more of the possible worst case of fractionation for flammability formulations.
- For those refrigerants that show flame propagation in accordance with step (a) or (b) above, flammability testing shall also be conducted at 23.0°C (73.4°F) and 101.3



**Figure B.1 Test Apparatus**

Notes for Figure B.1:

- Test vessel is a 12 liter spherical glass flask.
- Ignition source electrodes are positioned at a height from the bottom the bottom of the vessel that is equal to 1/3 of the diameter of the vessel.
- The subtended arc represents  $\pi/2$  (90 degree) fan for determining flame propagation.
- A stirrer shall be installed in the flask to ensure mixing of vapors prior to ignition.

kPa (14.7 psia) to determine the LFL. Under test conditions specified in B.1 at 23.0°C (73.4°F) and 101.3 kPa (14.7 psia), the LFL normally is expressed as refrigerant percentage by volume percent by  $0.00041 \times \text{molecular mass (gram-mole)}$  to obtain kg/m<sup>3</sup> or by  $0.000026 \times \text{molecular mass (gram-mole)}$  to obtain lb/ft<sup>3</sup>. For refrigerant blends, these tests shall be conducted on the WCF and the WCFF.

**B.1.2** When a refrigerant blend containing one or more flammable component(s) is being examined, testing shall be conducted up to and including the point at which flame propagation is demonstrated. If no flame propagation is apparent, testing shall be done until at least three consecutive concentration increments have been made beyond the stoichiometric composition and beyond the point that combustion around the spark has diminished.

**B.1.3** When the ETFL<sub>100</sub> of the flammable component(s) is known, testing for the ETFL<sub>100</sub>, the ETFL<sub>60</sub>, or the LFL shall begin at 1%, by volume, lower than the lowest ETFL<sub>100</sub>. When the ETFL<sub>100</sub> is not known, testing shall begin at 1% refrigerant by volume. If the test of the initial concentration results in a flame propagation, then subsequent testing concentrations shall be reduced in 1% volume increments until the appropriate flame limit is determined.

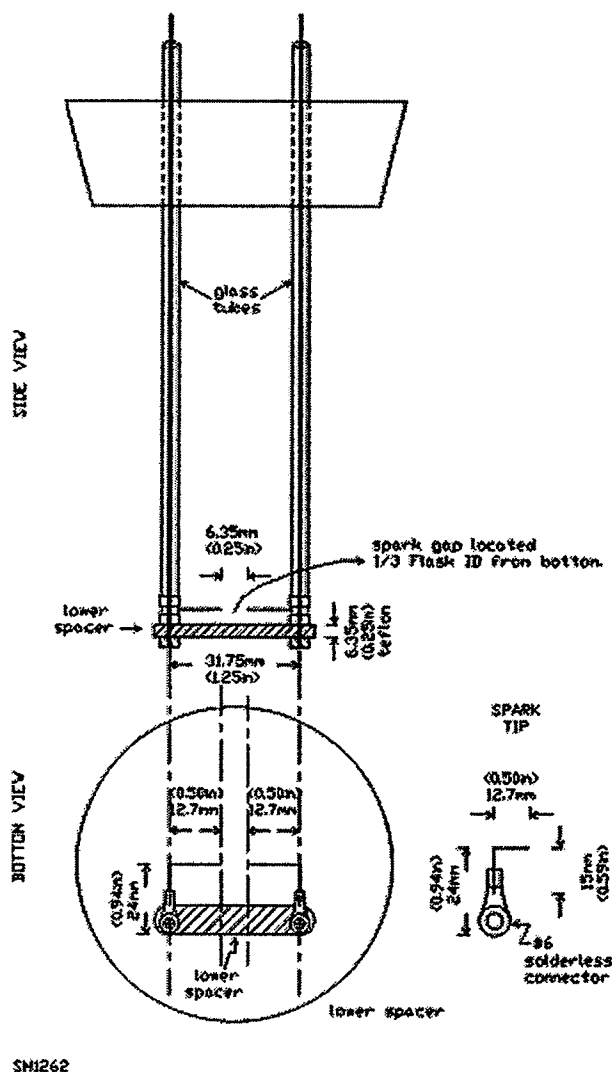


Figure B.2 Spark Electrodes

**B.1.4** The mass percent formulation of the tested blend shall be verified through gas chromatography to a tolerance of  $\pm 0.5$  mass% or one-fourth of the composition tolerance range, whichever is smaller.

**B.1.5** Samples shall be introduced into the flammability test apparatus in the vapor phase in accordance with ASTM E681. Liquid samples of the refrigerant or blend composition to be tested shall be expanded into a suitable evacuated container such that only vapor under pressure is present. The vapors shall be introduced into the flammability test apparatus. Air shall then be added to the test apparatus. Measurement of the refrigerant-to-air concentration shall be by partial pressures. The refrigerant and air shall be mixed in the chamber for at least 2 minutes. Activation of the ignition source shall commence within 30 to 60 seconds of stirrer deactivation.

**B.1.6** If flame propagation is observed while the spark is still active (i.e., the spark is overdriving the test vessel), then

the test shall be repeated using a spark duration of less than 0.4 second but at least 0.2 second.

**B.1.7** All flammability tests shall be recorded using a video recorder. A playback device capable of freeze frame and single frame advance shall be available during testing. A copy of the video recordings, on NTSC format VHS tape, shall be submitted upon request of the committee.

**B.1.8 Criterion for Determining Flame Propagation** A refrigerant-air concentration shall be considered flammable for flammability classification under this standard only if a flame propagation occurs in at least two of three flammability tests on that refrigerant-air concentration. A flame propagation is any combustion that, having moved upward and outward from the point of ignition to the walls of the flask, is continuous along an arc that is greater than that subtended by an angle equal to  $\pi/2$  (90 degrees), as measured from the point of ignition to the walls of the flask (see Figure B.1).

**B.1.9 Flammability Test Data Required Applications** shall include test results determined in accordance with B.1. Test conditions shall be controlled to the tolerances cited below. Applications shall include tabulated flammability test data for each refrigerant or refrigerant blend composition tested. These data shall include but are not limited to:

- (a) refrigerant blend composition tested:  $\pm 0.1$  mass%
- (b) flammability test temperature:  $\pm 3^\circ\text{C}$  ( $\pm 5^\circ\text{F}$ )
- (c) fractionation or leak test temperature:  $\pm 0.1^\circ\text{C}$  ( $\pm 0.2^\circ\text{F}$ )
- (d) test pressure:  $\pm 0.7$  kPa ( $\pm 0.1$  psi)
- (e) humidity:  $\pm 0.0005$  grams of water vapor per gram of dry air
- (f) refrigerant/air concentration:  $\pm 0.2\%$  by volume
- (g) spark duration:  $\pm 0.05$  seconds
- (h) flame propagation determination as measured from the point of ignition to the walls of the flask:  $\pm 0.087$  radians ( $\pm 5.0$  degrees)

**B.2 Fractionation Analysis** Applications shall include an analysis of fractionation.

**B.2.1** The applicant shall report results of a fractionation analysis conducted to determine vapor and liquid phase compositions of refrigerant blends under conditions of leakage (see B.2.4) and successive charge/recharge conditions (see B.2.5). The analysis shall be validated through experimentation. A computer or mathematical model may be used to identify the WCFF. If a computer or mathematical model is used, then the applicant shall identify the model used and shall submit experimental data that verifies the accuracy of the model at the conditions that predict the WCFF.

**B.2.2** All fractionation analysis shall begin using the WCF. When application of the composition tolerances to the nominal formulation produces several possible worst case of formulation for flammability formulations, the applicant shall investigate all possible worst case of formulation for flammability formulations or provide sufficient justification for eliminating one or more of the possible worst case of formulation for flammability formulations.

**B.2.3** The mass percent formulation of the tested blend shall be verified through gas chromatography to a tolerance of  $\pm 0.5$  mass % or one-fourth of the composition tolerance, whichever is smaller.

**B.2.4 Leakage Testing** Refrigerant blends containing a flammable component(s) shall be evaluated to determine their worst case of fractionation for flammability formulation(s) during storage/shipping or use. Experimental tests or computer/mathematical modeling shall be conducted to simulate leaks from

(a) a container under storage/shipping conditions and

(b) a container representing air-conditioning and refrigeration equipment during normal operation, standby, and shipping conditions.

Note: The container used for these tests shall be rated to handle the vapor pressure of the formulation at the highest temperature encountered.

**B.2.4.1 Leaks Under Storage/Shipping Conditions** To simulate leaks under storage/shipping conditions, the container shall be filled with the WCF at 23.0°C (73.4°F) to 90% of the maximum permissible, that which precludes a 100% liquid fill at 54.4°C (130°F), and then shall be vapor leaked, 2% by mass of the starting initial charge per hour, at the following temperatures:

(a) 54.4°C (130°F)

(b) -40.0°C (-40.0°F) or the bubble point plus 10.0°C (18.0°F), whichever is warmer,

(c) The temperature that results in the WCFF between (a) and (b) if the WCFF does not exist at either (a) or (b). If no temperature between (a) and (b) results in the WCFF then the fractionation test shall instead be conducted at 23.0°C (73.4°F). The applicant shall justify and document what constitutes the temperature at which the worst case of fractionation for flammability formulation occurs.

In the fractionation experiment, the composition of the head space gas and remaining liquid shall be determined by analysis. Analyses shall be made initially after 2% of the total charge has leaked (vapor leak), next at 10% loss of the initial mass, then at 10% mass loss intervals of the initial mass until atmospheric pressure is reached in the cylinder or no liquid remains. If liquid remains after 90% of the initial mass is lost and atmospheric pressure has not been reached, then the next and last analysis of head space gas and remaining liquid shall be done at 95% mass loss.

**B.2.4.2 Leaks from Equipment** To simulate leaks from equipment, the container shall be filled with the WCF at ambient temperature to 15% of the maximum permissible fill and then shall be vapor leaked at the following temperatures:

(a) 60.0°C (140°F)

(b) -40.0°C (-40.0°F) or the bubble point plus 10.0°C (18.0°F), whichever is warmer,

(c) The temperature that results in the WCFF between (a) and (b) if the WCFF does not exist at either (a) or (b). If no temperature between (a) and (b) results in the WCFF then the frac-

tionation test shall instead be conducted at 23.0°C (73.4°F). The applicant shall justify and document what constitutes the temperature at which the worst case of fractionation for flammability formulation occurs.

In the fractionation experiment, the composition of the head space gas and remaining liquid shall be determined by analysis. Analyses shall be made initially after 2% of the total charge has leaked, next at 10% loss of the initial mass, then at 10% mass loss intervals of the initial mass until atmospheric pressure is reached in the cylinder or no liquid remains. If liquid remains after 90% of the initial mass is lost and atmospheric pressure has not been reached, then the next and last analysis of head space gas and remaining liquid shall be done at 95% mass loss.

**B.2.5 Charge/Recharge Testing** Refrigerant blends containing a flammable component(s) shall be evaluated to determine the fractionation effects of successive leakage and recharging on the composition of the blend. A container shall be charged to 15% full of its maximum permitted fill with the worst case of formulation for flammability formulation of the refrigerant blend. A vapor leak at a rate of 2% by mass of the starting charge per hour shall be created and maintained at ambient temperature until 20% of the starting charge has been leaked. When 20% leak is reached, the composition of the head space gas shall be determined by analysis. The container shall again be charged with the WCF to 15% full, leaked, and measured in the above defined manner. The charge/leak cycle shall be performed a total of five times. At the conclusion of the fifth leakage, the composition of the head space gas and liquid shall again be determined by gas chromatography.

**B.2.6 Fractionation Analysis Data Required** The applicant shall submit for each fractionation scenario:

(a) fractionation or leak test temperature ( $\pm 0.1^\circ\text{C}$ ;  $\pm 0.2^\circ\text{F}$ )

(b) tabulated liquid and vapor compositions at each leaked increment ( $\pm 0.1$  mass %)

(c) for modeled analysis, model accuracy at conditions that predict the worst case of fractionation for flammability (WCFF) formulation.

The applicant shall also provide a description of test apparatus and procedures used. If the applicant uses a computer or mathematical model for determining the WCFF, the applicant shall identify the model used and submit supporting data verifying the accuracy of the model against experimental measurements at conditions that predict the WCFF.

**Note:**

Appendix B, "Bibliography," is now Appendix C.

Appendix C, "Addenda Description Information," is now Appendix D. Table C-1 is now Table D-1.

(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

## FOREWORD

*This addendum adds a designation of R-422A to the blend R-125/134a/600a (85.1/11.5/3.4) with tolerances of ( $\pm 1.0/\pm 1.0/+0.1, -0.4$ ) and a safety classification of A1.*

*Additions are shown in this addendum by underlining; deletions are shown by strikethrough.*

### Addendum q to 34-2004

*Add to Table 2 the following entry for R-422A:*

**TABLE 2 Data and Safety Classifications for Refrigerant Blends**

Refrigerant Number	Composition (Mass %)	Composition Tolerances	Azeotropic Temperature (°C) (°F)	Molecular Mass <sup>a</sup>	Normal Boiling Point <sup>a</sup> (°C) (°F)	Safety Group
<u>422A</u>	<u>R-125/134a/600a (85.1/11.5/3.4)</u>	<u>(<math>\pm 1.0/\pm 1.0/+0.1, -0.4</math>)</u>				A1

(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

## FOREWORD

*This addendum adds a designation of R-421B to the blend R-125/134a (85.0/15.0) with tolerances of ( $\pm 1.0/\pm 1.0$ ) and a safety classification of A1.*

*Additions are shown in this addendum by underlining; deletions are shown by strikethrough.*

### Addendum r to 34-2004

*Add to Table 2 the following entry for R-421B:*

**TABLE 2 Data and Safety Classifications for Refrigerant Blends**

Refrigerant Number	Composition (Mass %)	Composition Tolerances	Azeotropic Temperature (°C) (°F)	Molecular Mass <sup>a</sup>	Normal Boiling Point <sup>a</sup> (°C) (°F)	Safety Group
421B	R-125/134a (85.0/15.0)	( $\pm 1.0/\pm 1.0$ )				A1

(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

## FOREWORD

*This addendum adds a designation for R-227ea for 1,1,1,2,3,3,3-heptafluoropropane and a safety classification of A1. Additions are shown in this addendum by underlining; deletions are shown by strikethrough.*

### Addendum s to 34-2004

*Add to Table 1 the following entry for R-227ea:*

**TABLE 1 Refrigerant Data and Safety Classifications**

Refrigerant Number	Chemical Name <sup>a,b</sup>	Chemical Formula <sup>a</sup>	Molecular Mass <sup>a</sup>	Normal Boiling Point <sup>a</sup>		Safety Group
				(°C)	(F°)	
R-227ea	<u>1,1,1,2,3,3,3-heptafluoropropane</u>	<u>CF<sub>3</sub>CHFCE<sub>3</sub></u>	<u>170.03</u>	<u>-15.6</u>	<u>3.9</u>	A1



(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objections on informative material are not offered the right to appeal at ASHRAE or ANSI.)

## FOREWORD

The purpose of this addendum is to add a new section to the standard to specify the criteria to determine recommended "Refrigerant Concentration Limits" (RCL) in occupied spaces and to add RCL values to Tables 1 and 2. It is anticipated that the RCL calculation method and values will eventually be referenced in Standard 15 as part of an ongoing, coordinated effort by SSPC 15 and SSPC 34 to consolidate toxicity and flammability data for refrigerants contained in Standard 34 and requirements to use refrigerants, based on these and other data, contained in Standard 15. Informative items from Tables 1 and 2 that are not part of the standard have been deleted, i.e., molecular mass, normal boiling point, and azeotropic molecular mass and azeotropic temperature. This addendum also includes new definitions, calculational and data criteria, and supporting references. The definitions relate an intermediate term, the "acute toxicity exposure limit" (ATEL), to the "immediately dangerous to life and health" (IDLH) concentration for which IDLH values have not been adopted.

The RCL values for six refrigerants have a footnote stating: "the RCL values for these refrigerants are provisional based on data found in searches for other refrigerants, but not fully examined." The provisional RCL values can be finalized and the provisional footnote removed through continuous maintenance after completion of a literature search or after examination of new toxicity information.

## Addendum u to 34-2004

[Add new definitions in Section 3 as follows.]

**acute-toxicity exposure limit (ATEL):** the refrigerant concentration limit determined in accordance with this standard and intended to reduce the risks of acute toxicity hazards in normally occupied, enclosed spaces. ATEL values are similar to the Immediately Dangerous to Life or Health (IDLH) concentrations, set by the National Institute of Occupational Safety and Health (NIOSH). ATEs include explicit, additional components for cardiac sensitization and anesthetic effects, but they do not address flammability. The lowest of the ATEL, 50,000 ppm by volume, or 10% of the LFL, therefore, provides a conservative approximation to IDLH concentrations when needed for refrigerants without adopted IDLH values.

**approximate lethal concentration (ALC):** the concentration of a substance, a refrigerant in this standard, that was lethal to even a single test animal when tested by the same conditions as for an LC<sub>50</sub> test.

**anesthetic effect:** loss of the ability to perceive pain and other sensory stimulation.

**central nervous system (CNS) effect:** treatment-related depression, distraction, stimulation, or other behavioral modification suggesting temporary or permanent changes to control by the brain.

**EC<sub>50</sub> (effective concentration 50%):** the concentration of a material, a refrigerant in this standard, that has caused a biological effect to 50% of test animals.

**flammable concentration limit (FCL):** the refrigerant concentration limit, in air, determined in accordance with this standard and intended to reduce the risk of fire or explosion in normally occupied, enclosed spaces.

**lowest observed effect level (LOEL):** the concentration of a material, a refrigerant in this standard, that has caused any observed effect to even one test animal.

**no-observed-effect level (NOEL):** the highest concentration of a material, a refrigerant in this standard, at which no effect has been observed in even one test animal.

**oxygen deprivation limit (ODL):** the concentration of a refrigerant or other gas that results in insufficient oxygen for normal breathing. For this standard, the ODL is the concentration that reduces the oxygen content in normal air to below 19.5%, assuming uniform mixing.

**refrigerant concentration limit (RCL):** the refrigerant concentration limit, in air, determined in accordance with this standard and intended to reduce the risks of acute toxicity, asphyxiation, and flammability hazards in normally occupied, enclosed spaces.

[Add a new Section 7 as follows. Also, renumber existing Sections 7 (Refrigerant Classifications), 8 (Application Instructions), and 9 (References) as Sections 8, 9, and 10, respectively. Revise all references to these sections accordingly.]

## 7. REFRIGERANT CONCENTRATION LIMIT (RCL)

**7.1 Single-Compound Refrigerants.** The RCL for each refrigerant shall be the lowest of the quantities calculated in accordance with 7.1.1, 7.1.2, and 7.1.3, using data as indicated in 7.3 and adjusted in accordance with 7.4. Determination shall assume full vaporization; no removal by ventilation, dissolution, reaction, or decomposition; and complete mixing of the refrigerant in the space to which it is released.

**7.1.1 Acute-Toxicity Exposure Limit (ATEL).** The ATEL shall be the lowest of items (a)-(d) as follows:

- (a) **Mortality:** 28.3% of the 4-hour LC<sub>50</sub> for rats. If not determined, 28.3% of the 4-hour ALC for rats. If neither has been determined, 0 ppm. The following equations shall be used to adjust LC<sub>50</sub> or ALC values that were determined with 15-minute to 8-hour tests, for refrigerants for which 4-hour test data are not available:

$$LC_{50 \text{ for } T} = LC_{50 \text{ for } t} \cdot (t/T)^{1/2}$$

or

$$ALC_T = ALC_t \cdot (t/T)^{1/2}$$

where

$T$  = 4 hours, and

$t$  = test duration expressed in hours, 0.25-8.

- (b) **Cardiac Sensitization:** 100% of the NOEL for cardiac sensitization in unanesthetized dogs. If not determined, 80% of the LOEL for cardiac sensitization in dogs. If neither has been determined, 0 ppm. The cardiac sensitization term is omitted from ATEL determination if the LC<sub>50</sub> or ALC in (a) is less than 10,000 ppm by volume or if the refrigerant is found, by toxicological review, to not cause cardiac sensitization.
- (c) **Anesthetic or Central Nervous System Effects:** 50% of the 10-minute EC<sub>50</sub> in mice or rats for loss of righting ability in a rotating apparatus. If not determined, 50% of the LOEL for signs of any anesthetic or CNS effect in rats during acute toxicity studies. If neither has been determined, 80% of the NOEL for signs of any anesthetic or CNS effect in rats during an acute, subchronic, or chronic toxicity study in which clinical signs are documented.
- (d) **Other Escape-Impairing Effects and Permanent Injury:** 80% of the lowest concentration, for human exposures of 30 minutes, that is likely to impair ability to escape or to cause irreversible health effects.

**7.1.2 Oxygen Deprivation Limit (ODL).** The ODL shall be 69,100 ppm by volume.

**7.1.3 Flammable Concentration Limit (FCL).** The FCL shall be calculated as 25% of the LFL determined in accordance with 6.1.3.

**7.2 Blends.** The RCL for refrigerants comprising multiple compounds shall be determined by the method in 7.1 except that individual parameter values in 7.1.1 (a) through (d) shall be calculated as the mole-weighted average, by composition of the nominal formulation, of the values for the components.

**7.3 Data for Calculations.** The data used to calculate the RCL shall be taken from scientific and engineering studies or published safety assessments by governmental agencies or expert panels. The applications submitted under section 8, or therein referenced source studies for toxicity data, must indicate the extent of compliance with good laboratory practices (GLP) in accordance with references 7, 8, 9, or 10 or earlier editions of these references in effect when the studies were performed. Data from peer-reviewed publications, including journal articles and reports, also are allowed.

**7.3.1 Alternative Data.** Data from studies that have not been published, from studies that have not been peer reviewed, or from studies involving species other than those indicated in 7.1.1. (a)-(d), shall be submitted to the authority having jurisdiction (AHJ) for approval. For RCL values to be published in addenda or revisions to this standard, the AHJ shall be the committee. Submissions shall include an evaluation of the experimental and analytical methods used, data from alternative sources, and the extent of the data search. The submissions shall summarize the qualifications of the person or persons providing the evaluation.

**7.3.2 Conservative Data.** Where multiple data values have been published, the values used shall be those resulting in the lowest RCL.

#### Exceptions:

1. Where subsequent, peer-reviewed studies explicitly document flaws in or refinements to previously published data, the newer values shall be used.
2. For the cardiac sensitization and anesthetic effect NOEL in 7.1.1 (b) and (c), respectively, the highest-published NOEL not exceeding a published LOEL, for any fraction of tested animals, shall be used. Both the NOEL and LOEL must conform to 7.3 or 7.3.1 for this exception.

**7.3.3 No-Effect Data.** Where no treatment-related effect was observed in animal tests for items 7.1.1 (a)-(d), the ATEL calculation required by 7.1.1 shall use the highest concentration tested in lieu of the specified effect or no-effect level.

**7.3.4 ALC and LOEL Qualification.** No ALC or LOEL shall be used for items 7.1.1(a)-(c) if it resulted in the effect measured (mortality, cardiac sensitization, or anesthetic effect) in more than half the animals exposed at that concentration or if there is a lower ALC or LOEL for any fraction of tested animals.

**7.3.5 Consistent Measures.** Use of data that are determined in consistent manner, or by methods that consistently yield a lower RCL for the same effects, is allowed for the parameters identified in 7.1.

#### 7.4 Units Conversion

**7.4.1 Mass per Unit Volume.** The following equation shall be used to convert the RCL from a volumetric ratio, ppm by volume, to mass per unit volume, g/m<sup>3</sup> (lb/Mcf):

$$RCL_M = RCL \cdot a \cdot M$$

where

$RCL_M$  = the RCL expressed as g/m<sup>3</sup> (lb/Mcf)

RCL = the RCL expressed as ppm v/v

$a$  =  $4.096 \cdot 10^{-5}$  for g/m<sup>3</sup> ( $1.160 \times 10^{-3}$  for lb/Mcf)

$M$  = the molecular mass of the refrigerant in g/mol (lb/mol)

**7.4.2 Adjustment for Altitude.** The RCL shall be adjusted for altitude, when expressed as mass per unit volume, g/m<sup>3</sup> (lb/Mcf), for locations above sea level. The RCL shall not be adjusted when expressed as a volumetric ratio, ppm.

$$rcl_a = RCL_M \cdot (1 - [b \cdot h])$$

where

$rcl_a$  = the adjusted  $RCL_M$

$b$  =  $7.94 \cdot 10^{-5}$  for m ( $2.42 \cdot 10^{-5}$  for ft)

$h$  = altitude above sea level in m (ft)

**7.5 RCL Values.** Refrigerants are assigned the RCLs indicated in Tables 1 and 2.

**7.5.1 Influence of Contaminants.** The RCLs indicated in Tables 1 and 2 are based on data for pure chemicals; RCLs

shall be determined in accordance with 7.5.2 for refrigerants containing contaminants or other impurities that alter the flammability or toxicity.

**7.5.2 RCLs for Other Refrigerants.** RCLs for other refrigerants shall be determined in accordance with this standard and submitted to the authority having jurisdiction (AHJ) for approval. Submissions shall include an evaluation of the experimental and analytical methods used, data from alternative sources, and an indication of the extent of the data search. The submission shall summarize the qualifications of the person or persons that prepared the recommended RCLs.

*[Add a new Section 8.8 to the current Section 8 (to be renumbered as Section 9) as follows.]*

**8.8 Contaminants and Impurities.** Identify contaminants and impurities, including isomeric and decomposition impurities, from manufacturing, transport, and storage known to increase the flammability or toxicity within the precision of the RCL. Also identify limits for those impurities.

*[Add a new Section 8.8.8 to the current Section 8 (to be renumbered as Section 9) as follows.]*

**8.8.8 Substantiation.** Copies of data sources referenced in applications shall be submitted for committee use upon request by the Manager of Standards. These copies shall include the complete documents or pertinent chapters, to enable verification of methods and limitations. The quantity shall be as indicated in 8.8.5.

**Exception:** The quantity shall be reduced to four copies for copyrighted journal articles, conference papers, reports, or other publications for which royalties are charged for reproduction.

*[Update the following references in the current Section 9 (to be renumbered as Section 10) as shown. Added parts are shown with underlining and deleted parts shown with strikethrough.]*

<sup>7</sup>*OECD Principles of Good Laboratory Practice, Annex 2 of Decision C(81)30(Final), Organization for Economic Co-operation and Development (OECD), Paris, France, 13 May 1981 as revised through 1999.*

<sup>8</sup>*Good Laboratory Practice for Nonclinical Laboratory Studies, Food and Drug Administration (FDA), 21 CFR Chapter 1 Part 58, Subparts A-K, Government Printing Office, Washington, DC, 1996 1 April 2000*

<sup>9</sup>*Good Laboratory Practice Standards, Environmental Protection Agency, 40 CFR Part 792, Subparts A-J, Government Printing Office, Washington, DC, 1996 1 July 2000*

*[The following reference has not changed from the currently published standard. It is included here for context only.]*

<sup>10</sup>*GLP for Industrial Chemicals, Kikyoku [Basic Industries Bureau] Dispatch 85, Ministry of International Trade and Industry (MITI), and Kanpogyo [Planning and Coordination Bureau] Dispatch 39, Environmental Agency, Tokyo, Japan, 31 March 1984*

*[Delete Tables 1 and 2 in Standard 34-2004 and replace them with Tables 1 and 2 on the following pages. In the replacement tables, the following columns have been deleted (Modular Mass, Normal Boiling Point, and Azeotropic Temperature) and new columns with RCL values have been added. The footnotes in Standard 34-2004 have been deleted and replaced by the new footnotes of the replacement tables. The only other change is that two specific compositions are shown for Zeotrope 400 (50.0/50.0 and 60.0/40.0). Note that values shown in the Composition Tolerance column of Table 2 in Standard 34-2000 have been moved to footnotes to the table in this addendum.]*

**TABLE 1**  
**Refrigerant Data and Safety Classifications**

Refrigerant Number	Chemical Name <sup>a,b</sup>	Chemical Formula <sup>a</sup>	Safety Group	RCL <sup>c</sup>		
				(ppm v/v)	(g/m <sup>3</sup> )	(lb/Mcf)
<b>Methane Series</b>						
11	trichlorofluoromethane	CCl <sub>3</sub> F	A1	1100	6.2	0.39
12	dichlorodifluoromethane	CCl <sub>2</sub> F <sub>2</sub>	A1	18000	90	5.6
12B1	bromochlorodifluoromethane	CBrClF <sub>2</sub>				
13	chlorotrifluoromethane	CClF <sub>3</sub>	A1			
13B1	bromotrifluoromethane	CBrF <sub>3</sub>	A1			
14 <sup>d</sup>	tetrafluoromethane (carbon tetrafluoride)	CF <sub>4</sub>	A1	69000	250	16
21	dichlorofluoromethane	CHCl <sub>2</sub> F	B1			
22	chlorodifluoromethane	CHClF <sub>2</sub>	A1	25000	89	5.5
23	trifluoromethane	CHF <sub>3</sub>	A1	41000	120	7.3
30	dichloromethane (methylene chloride)	CH <sub>2</sub> Cl <sub>2</sub>	B2			
31	chlorofluoromethane	CH <sub>2</sub> ClF				
32	difluoromethane (methylene fluoride)	CH <sub>2</sub> F <sub>2</sub>	A2	32000	68	4.2
40	chloromethane (methyl chloride)	CH <sub>3</sub> Cl	B2			
41	fluoromethane (methyl fluoride)	CH <sub>3</sub> F				
50	methane	CH <sub>4</sub>	A3			
<b>Ethane Series</b>						
113	1,1,2-trichloro-1,2,2-trifluoroethane	CCl <sub>2</sub> FCClF <sub>2</sub>	A1	2600	20	1.2
114	1,2-dichloro-1,1,2,2-tetrafluoroethane	CClF <sub>2</sub> CClF <sub>2</sub>	A1	20000	140	8.7
115 <sup>d</sup>	chloropentafluoroethane	CClF <sub>2</sub> CF <sub>3</sub>	A1	69000	440	27
116	hexafluoroethane	CF <sub>3</sub> CF <sub>3</sub>	A1	69000	390	24
123	2,2-dichloro-1,1,1-trifluoroethane	CHCl <sub>2</sub> CF <sub>3</sub>	B1	9100	57	3.5
124	2-chloro-1,1,1,2-tetrafluoroethane	CHClFCF <sub>3</sub>	A1	10000	56	3.5
125	pentafluoroethane	CHF <sub>2</sub> CF <sub>3</sub>	A1	69000	340	21
134a	1,1,1,2-tetrafluoroethane	CH <sub>2</sub> FCF <sub>3</sub>	A1	50000	210	13
141b	1,1-dichloro-1-fluoroethane	CH <sub>3</sub> CCl <sub>2</sub> F		2600	12	0.78
142b	1-chloro-1,1-difluoroethane	CH <sub>3</sub> CClF <sub>2</sub>	A2	15000	62	3.9
143a	1,1,1-trifluoroethane	CH <sub>3</sub> CF <sub>3</sub>	A2	18000	60	3.8
152a	1,1-difluoroethane	CH <sub>3</sub> CHF <sub>2</sub>	A2	9300	25	1.6
170 <sup>d</sup>	ethane	CH <sub>3</sub> CH <sub>3</sub>	A3	7000	8.7	0.54
<b>Ethers</b>						
E170	dimethyl ether	CH <sub>3</sub> OCH <sub>3</sub>	A3			
<b>Propane Series</b>						
218	octafluoropropane	CF <sub>3</sub> CF <sub>2</sub> CF <sub>3</sub>	A1	69000	530	33
236fa	1,1,1,3,3,3-hexafluoropropane	CF <sub>3</sub> CH <sub>2</sub> CF <sub>3</sub>	A1	55000	340	21
245fa	1,1,1,3,3-pentafluoropropane	CHF <sub>2</sub> CH <sub>2</sub> CF <sub>3</sub>	B1	34000	190	12
290	propane	CH <sub>3</sub> CH <sub>2</sub> CH <sub>3</sub>	A3	5000	9.0	0.56

**TABLE 1 (continued)**  
**Refrigerant Data and Safety Classifications**

Refrigerant Number	Chemical Name <sup>a,b</sup>	Chemical Formula <sup>a</sup>	Safety Group	RCL <sup>c</sup>		
				(ppm v/v)	(g/m <sup>3</sup> )	(lb/Mcf)
<b>Cyclic Organic Compounds</b>						
C318 <sup>d</sup>	octafluorocyclobutane	-(CF <sub>2</sub> ) <sub>4</sub> -	A1	69000	570	35
See Table 2 for Blends						
<b>Miscellaneous Organic Compounds</b>						
	<b>hydrocarbons</b>					
600	butane	CH <sub>3</sub> CH <sub>2</sub> CH <sub>2</sub> CH <sub>3</sub>	A3			
600a	isobutane	CH(CH <sub>3</sub> ) <sub>2</sub> CH <sub>3</sub>	A3	2500	6.0	0.37
	<b>oxygen compounds</b>					
610	ethyl ether	CH <sub>3</sub> CH <sub>2</sub> OCH <sub>2</sub> CH <sub>3</sub>				
611	methyl formate	HCOOCH <sub>3</sub>	B2			
	<b>sulfur compounds</b>					
620 <sup>d</sup>	(Reserved for future assignment)					
<b>Nitrogen Compounds</b>						
630	methyl amine	CH <sub>3</sub> NH <sub>2</sub>				
631	ethyl amine	CH <sub>3</sub> CH <sub>2</sub> (NH <sub>2</sub> )				
<b>Inorganic Compounds</b>						
702	hydrogen	H <sub>2</sub>	A3			
704	helium	He	A1			
717	ammonia	NH <sub>3</sub>	B2	320	0.22	0.014
718	water	H <sub>2</sub> O	A1			
720	neon	Ne	A1			
728	nitrogen	N <sub>2</sub>	A1			
732	oxygen	O <sub>2</sub>				
740	argon	Ar	A1			
744	carbon dioxide	CO <sub>2</sub>	A1	40000	72	4.5
744A	nitrous oxide	N <sub>2</sub> O				
764	sulfur dioxide	SO <sub>2</sub>	B1			
<b>Unsaturated Organic Compounds</b>						
1150	ethene (ethylene)	CH <sub>2</sub> =CH <sub>2</sub>	A3			
1270 <sup>d</sup>	propene (propylene)	CH <sub>3</sub> CH=CH <sub>2</sub>	A3			

<sup>a</sup> The chemical name and chemical formula are not part of this standard.

<sup>b</sup> The preferred chemical name is followed by the popular name in parentheses.

<sup>c</sup> J.M. Calm, "Toxicity Data to Determine Refrigerant Concentration Limits," report DOE/CE/23810-110, Air-Conditioning and Refrigeration Technology Institute (ARTI) Arlington, VA, USA, September 2000 (and references therein).

<sup>d</sup> The RCL values for these refrigerants are provisional based on data found in searches for other refrigerants, but not fully examined.

**TABLE 2**  
**Data and Safety Classifications for Refrigerant Blends**

		RCL <sup>a</sup>			
Refrigerant	Composition (Mass %)	Safety			
Number		Group	(ppm v/v)	(g/m <sup>3</sup> )	(lb/Mcf)
<b><i>Zeotropes</i></b>					
400	R-12/114 (must be specified)	A1			
	(50.0/50.0)	A1	28000	160	10
	(60.0/40.0)	A1	26000	150	9.3
401A	R-22/152a/124 (53.0/13.0/34.0) <sup>e</sup>	A1	20000	77	4.8
401B	R-22/152a/124 (61.0/11.0/28.0) <sup>e</sup>	A1	21000	79	4.9
401C	R-22/152a/124 (33.0/15.0/52.0) <sup>e</sup>	A1	17000	71	4.4
402A	R-125/290/22 (60.0/2.0/38.0) <sup>f</sup>	A1	39000	160	10
402B	R-125/290/22 (38.0/2.0/60.0) <sup>f</sup>	A1	32000	120	7.8
403A	R-290/22/218 (5.0/75.0/20.0) <sup>g</sup>	A1	29000	110	6.9
403B	R-290/22/218 (5.0/56.0/39.0) <sup>g</sup>	A1	34000	140	8.9
404A	R-125/143a/134a (44.0/52.0/4.0) <sup>f</sup>	A1	69000	280	17
405A <sup>t</sup>	R-22/152a/142b/C318 (45.0/7.0/5.5/42.5) <sup>h</sup>		32000	150	9.2
406A	R-22/600a/142b (55.0/4.0/41.0) <sup>i</sup>	A2	25000	92	5.7
407A	R-32/125/134a (20.0/40.0/40.0) <sup>o</sup>	A1	69000	260	16
407B	R-32/125/134a (10.0/70.0/20.0) <sup>o</sup>	A1	69000	290	18
407C	R-32/125/134a (23.0/25.0/52.0) <sup>o</sup>	A1	69000	240	15
407D	R-32/125/134a (15.0/15.0/70.0) <sup>o</sup>	A1	65000	240	15
407E	R-32/125/134a (25.0/15.0/60.0) <sup>r</sup>	A1	69000	240	15
408A	R-125/143a/22 (7.0/46.0/47.0) <sup>f</sup>	A1	47000	170	10
409A	R-22/124/142b (60.0/25.0/15.0) <sup>k</sup>	A1	20000	79	4.9
409B	R-22/124/142b (65.0/25.0/10.0) <sup>k</sup>	A1	20000	78	4.9
410A	R-32/125 (50.0/50.0) <sup>j</sup>	A1	55000	160	10
410B	R-32/125 (45.0/55.0) <sup>n</sup>	A1	58000	180	11
411A <sup>u</sup>	R-1270/22/152a (1.5/87.5/11.0) <sup>m</sup>	A2	26000	86	5.4
411B <sup>u</sup>	R-1270/22/152a (3.0/94.0/3.0) <sup>m</sup>	A2	23000	80	5.0
412A	R-22/218/142b (70.0/5.0/25.0) <sup>k</sup>	A2	26000	97	6.0
413A	R-218/134a/600a (9.0/88.0/3.0) <sup>q</sup>	A2	49000	210	13
414A	R-22/124/600a/142b (51.0/28.5/4.0/16.5) <sup>s</sup>	A1	19000	76	4.8
414B	R-22/124/600a/142b (50.0/39.0/1.5/9.5) <sup>s</sup>	A1	18000	73	4.5
415A	R-22/152a (82.0/18.0) <sup>n</sup>	A2			
415B	R-22/152a (25.0/75.0) <sup>n</sup>	A2			
416A <sup>t,u</sup>	R-134a/124/600 (59.0/39.5/1.5) <sup>v</sup>	A1	21000	96	6.0
417A <sup>t,u</sup>	R-125/134a/600 (46.6/50.0/3.4) <sup>w</sup>	A1	45000	200	12
418A	R-290/22/152a (1.5/96.0/2.5) <sup>x</sup>	A2			
419A	R-125/134a/E170 (77.0/19.0/4.0) <sup>y</sup>	A2			
420A	R-134a/142b (88.0/12.0) <sup>z</sup>	A1			

**TABLE 2 (continued)**  
**Data and Safety Classifications for Refrigerant Blends**

		RCL <sup>a</sup>			
Refrigerant	Composition (Mass %)	Safety			
Number		Group	(ppm v/v)	(g/m <sup>3</sup> )	(lb/Mcf)
Azeotropes <sup>b</sup>					
500	R-12/152a (73.8/26.2)	A1	29000	120	7.4
501	R-22/12 (75.0/25.0) <sup>c</sup>	A1	27000	100	6.4
502	R-22/115 (48.8/51.2)	A1	35000	160	10
503	R-23/13 (40.1/59.9)				
504 <sup>t</sup>	R-32/115 (48.2/51.8)		41000	130	8.4
505	R-12/31 (78.0/22.0) <sup>c</sup>				
506	R-31/114 (55.1/44.9)				
507A <sup>d</sup>	R-125/143a (50.0/50.0)	A1	69000	280	17
508A <sup>d</sup>	R-23/116 (39.0/61.0)	A1	55000	220	14
508B	R-23/116 (46.0/54.0)	A1	52000	200	13
509A <sup>d</sup>	R-22/218 (44.0/56.0)	A1	38000	190	12

<sup>a</sup> J.M. Calm, "Toxicity Data to Determine Refrigerant Concentration Limits," report DOE/CE/23810-110, Air-Conditioning and Refrigeration Technology Institute (ARTI) Arlington, VA, USA, September 2000 (and references therein).

<sup>b</sup> Azeotropic refrigerants exhibit some segregation of components at conditions of temperature and pressure other than those at which they were formulated. The extent of segregation depends on the particular azeotrope and hardware system configuration.

<sup>c</sup> The exact composition of this azeotrope is in question, and additional experimental studies are needed.

<sup>d</sup> R-507, R-508, and R-509 are allowed alternative designations for R-507A, R-508A, and R-509A due to a change in designations after assignment of R-500 through R-509. Corresponding changes were not made for R-500 through R-506.

<sup>e</sup> Composition tolerances are (±2.0/+0.5, -1.5/±1.0).

<sup>f</sup> Composition tolerances are (±2.0/±1.0/±2.0).

<sup>g</sup> Composition tolerances are (+0.2, -2.0/±2.0/±2.0).

<sup>h</sup> Composition tolerances for the individual components are (±2.0/±1.0/±1.0/±2.0) and for the sum of R-152a and R-142b are (+0.0, -2.0).

<sup>i</sup> Composition tolerances are (±2.0/±1.0/±1.0).

<sup>j</sup> Composition tolerances are (±2.0/±2.0/±1.0).

<sup>k</sup> Composition tolerances are (+0.5, -1.5/+1.5, -0.5).

<sup>l</sup> Composition tolerances are (+0.0, -1.0/+2.0, -0.0/+0.0, -1.0).

<sup>m</sup> Composition tolerances are (±1.0/±1.0).

<sup>n</sup> Composition tolerances are (±2.0/±2.0/±2.0).

<sup>o</sup> Composition tolerances are (±1.0/±2.0/+0.0/-1.0).

<sup>p</sup> Composition tolerances are (±2.0/±2.0/±2.0).

<sup>q</sup> Composition tolerances are (±2.0/±2.0/±0.5/+0.5, -1.0).

<sup>r</sup> The RCL values for these refrigerants are provisional based on data found in searches for other refrigerants, but not fully examined.

<sup>s</sup> The RCL values for these refrigerant blends are approximated in the absence of adequate data for a component comprising less than 4% m/m of the blend and expected to have only a small influence in an acute, accidental release.

<sup>v</sup> Composition tolerances are (+0.5, -1.0/+1.0, -0.5/+1.0, -0.2).

<sup>w</sup> Composition tolerances are (±1.1/±1.0/+0.1, -0.4).

<sup>x</sup> Composition tolerances are (±0.5/±1.0/±0.5).

<sup>y</sup> Composition tolerances are (±1.0/±1.0/±1.0).

<sup>z</sup> Composition tolerances are (+1.0, -0.0/+0.0, -1.0).

(This appendix is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

## APPENDIX

### 18-MONTH SUPPLEMENT

#### ADDENDA TO ANSI/ASHRAE STANDARD 34-2004

This supplement includes Addenda *a, b, c, e, f, k, n, o, p, q, r, s*, and *u* to ANSI/ASHRAE Standard 34-2004. The following table lists each addendum and describes the way in which the standard is affected by the change. It also lists the ASHRAE and ANSI approval dates for each addendum.

Addendum	Section(s) Affected	Description of Changes <sup>a</sup>	ASHRAE Approval (StdC/BOD)	ANSI Approval
34a	Table 2	Adds a designation of R-422B to the blend R-125/134a/600a (55.0/42.0/3.0) with tolerances of ( $\pm 1.0/\pm 1.0/+0.1,-0.5$ ) and a safety classification of A1.	1/21/06 1/26/06	4/10/06
34b	Table 2	Adds a designation of R-422C to the blend R-125/134a/600a (82.0/15.0/3.0) with tolerances of ( $\pm 1.0/\pm 1.0/+0.1,-0.5$ ) and a safety classification of A1.	1/21/06 1/26/06	4/10/06
34c	Table 2	Adds a designation of R-423A to the blend R-134a/227ea (52.5/47.5) with tolerances of ( $\pm 1.0/\pm 1.0$ ) and a safety classification of A1.	1/21/06 1/26/06	4/10/06
34e	Table 2	Adds a designation of R-424A to the blend R-125/134a/600a/600/601a (50.5/47.0/0.9/1.0/0.6) with tolerances of ( $\pm 1.0/\pm 1.0/+0.1,-0.2/+0.1,-0.2/+0.1,-0.2$ ) and a safety classification of A1.	1/21/06 1/26/06	4/10/06
34f	Table 2	Adds a designation of R-425A to the blend R-32/134a/227ea (18.5/69.5/12.0) with tolerances of ( $\pm 0.5/\pm 0.5/\pm 0.5$ ) and a safety classification of A1.	1/21/06 1/26/06	4/10/06
34k	Table 1	Adds a designation of R-601 for pentane (no safety classification) and a designation of R-601a for isopentane with a safety classification of A3.	6/25/05 6/30/05	7/1/05
34n	Section 4.5	Provides general guidance for numbering of C4-C8 alkanes.	1/21/06 1/26/06	4/10/06
34o	Table 2	Adds a designation of R-421A to the blend R-125/134a (58.0/42.0) and a safety classification of A1.	10/3/04 2/10/05	2/10/05
34p	Several	Revises the refrigerant flammability classification and specifies the flammability and fractionation testing procedures.	6/25/05 6/30/05	7/28/05
34q	Table 2	Adds a designation of R-422A to the blend R-125/134a/600a (85.1/11.5/3.4) with tolerances of ( $\pm 1.0/\pm 1.0/+0.1,-0.4$ ) and a safety classification of A1.	6/25/05 6/30/05	7/1/05
34r	Table 2	Adds a designation of R-421B to the blend R-125/134a (85.0/15.0) with tolerances of ( $\pm 1.0/\pm 1.0$ ) and a safety classification of A1.	6/25/06 6/30/05	7/1/05
34s	Table 1	Adds a designation for R-227ea for 1,1,1,2,3,3,3-heptafluoropropane and a safety classification of A1.	6/25/05 6/30/05	7/1/05
34u	Sections 3 and 7, Tables 1 and 2	Adds a new section to specify the criteria to determine recommended "Refrigerant Concentration Limits (RCL)" in occupied spaces and adds RCL values to Tables 1 and 2.	10/3/04 2/10/05	4/21/06



**POLICY STATEMENT DEFINING ASHRAE'S CONCERN  
FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES**

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the standards and guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive technical committee structure, continue to generate up-to-date standards and guidelines where appropriate and adopt, recommend, and promote those new and revised standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating standards and guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In Re Application of:

Docket No.: 821920-1030

PONDER, K., et al.,

Confirmation No.: 1006

Serial No.: 10/937,736

Group Art Unit: 1751

Filing Date: September 8, 2004

Examiner: John R. Hardee

For: **Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant**

**DECLARATION OF ANDY GBUR**

I, Andy Gbur, hereby declare as follows:

1. I am the Director of Operations for Intertek, ETL SEMKO Division.
2. My duties at Intertek include financial and technical oversight of the Refrigeration Chemistry laboratory.
3. My educational background includes B.S. in Chemistry from the Ohio State University
4. My work experience prior to joining Intertek includes I have been employed with Intertek (Integral Sciences) for the last 15 yrs since graduation.
5. I reviewed the published version of the above-identified patent application, U.S. 2005 0082510, and in particular, Figures 1 and 2, the text appearing in sections [0054-0057] and Table 2 appearing in the publication and noticed an obvious error in the application. The error relates to the description and labeling of the Pressure vs. Temperature profiles in Figure 1, the Temperature vs. Enthalpy profiles in Figure 2, and the related text appearing in paragraphs [0054-0057]. It is obvious to me that Figure 1 shows Pressure (liquid) vs. Temperature profiles for blends of 40/60, 45/55 and 42/58 of tetrafluoroethane and pentafluoroethane, respectively. It is also obvious to me that Figure 2 shows Temperature vs. Enthalpy profiles comparing a blend of 40/60 tetrafluoroethane and pentafluoroethane to R-22. Likewise, it is obvious to me that the

data in the middle three columns in Table 2 for P(60/40) is for 60% pentafluoroethane and 40% tetrafluoroethane, for P(58-42) is for 58% pentafluoroethane and 42% tetrafluoroethane, and for P(55-45) is for 55% pentafluoroethane and 45% tetrafluoroethane.

6. Based on my background and experience, it is my opinion that others skilled in the art of refrigerant compositions would also recognize these obvious errors in Figures 1 and 2, and in paragraphs [0054-0057] and how the descriptions and text should read. It is also my opinion that one skilled in the art of refrigerant compositions would recognize that the heading P(60-40) in Table 2 represents 60% pentafluoroethane and 40% tetrafluoroethane, the heading P(58-42) represents 58% pentafluoroethane and 42% tetrafluoroethane, and the heading P(55-45) represents 55% pentafluoroethane and 45% tetrafluoroethane.

7. With reference to Figure 1, for example, it is my opinion that one skilled in the art of refrigerant compositions would recognize that as the concentration of pentafluoroethane drops in a composition of pentafluoroethane and tetrafluoroethane, the Pressure vs. Temperature profile curve would likewise drop because one skilled in the art would recognize that lowering the concentration of pentafluoroethane in such a composition would generally cause the vapor pressure of the composition at a given temperature to decrease as the amount of pentafluoroethane is decreased and not increase. Thus one skilled in the art of refrigerant compositions would recognize that the top curve in Figure 1 represents the Pressure vs. Temperature profile for a composition of pentafluoroethane and tetrafluoroethane having 60% pentafluoroethane, the next curve down would represent the profile for such a composition having 58% pentafluoroethane, and the third curve down would represent the profile for such a composition having 55% pentafluoroethane, as represented by the key in Figure 1. Likewise one skilled in the art would recognize that the Pressure vs. Temperature data

the middle three columns in Table 2 reflects a 60% pentafluoroethane composition in the left column of the three columns, labeled P(60-40), decreasing to 58% pentafluoroethane and then to 55% pentafluoroethane in the right column of the three columns consistent with the drop in pressures in the columns from left to right.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of this patent.

Respectfully submitted,

Date: 9-17-07

  
Andy Gbur

**RELATED PROCEEDINGS APPENDIX UNDER 37 C.F.R. § 41.37(c)(1)(x)**

None.

**NOTICE OF APPEAL FROM THE EXAMINER TO  
THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Docket No. (Optional):  
821920-1030

I hereby certify that this correspondence is being transmitted via  
EFS on

December 9, 2008

DATE

/akb/

Signature – Angela Kay Brathwaite

In re Application of  
Kenneth Ponder, et al.

Application Number  
10/937,736

Filed  
09/08/2004

For  
Refrigerant with Lubricating Oil for Replacement of R-  
22 Refrigerant

Group Art Unit  
1796

Examiner  
John R. Hardee

Applicant hereby **appeals** to the Board of Patent Appeals and interferences from the last decision of the examiner.

The fee for this Notice of Appeal is (37 CFR 1.17(b)) \$ 540.00

- ☒ Applicant claims small entity status. See 37 CFR 1.27. Therefore, the fee shown above is \$ 255.00 reduced by half, and the resulting fee is:
- ☐ A check in the amount of the fee is enclosed.
- ☐ Payment by credit card.
- ☐ The Director has already been authorized to charge fees in this application to a Deposit Account. I have enclosed a duplicate copy of this sheet.
- ☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 200778.
- ☒ A petition for an extension of time under 37 CFR 1.136(a) (PTO/SB/22) is enclosed.

**Warning: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.**

I am the

- ☐ applicant/inventor.
- ☐ assignee of record of the entire interest.  
See 37 CFR 3.71. Statement under 37 CFR 3.73(b)  
Is enclosed. (Form PTO/SB/96)
- ☒ attorney or agent of record.  
Registration No. 29,526
- ☐ Attorney or agent acting under 37 CFR 1.34(a).  
Registration No. if acting under 37 CFR 1.34(a)

  
Todd Deveau

December 9, 2008  
Date

Note: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below\*.

☒ \*Total of 2 forms are submitted.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In Re Application of:

Docket No.: 821920-1030

PONDER, K., et al.,

Art Unit: 1796

Serial No.: 10/937,736

Examiner: John R. Hardee

Filing Date: September 8, 2004

Confirmation No.: 1006

For: **Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant**

**STATEMENT OF SUBSTANCE OF INTERVIEW**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

This statement is timely submitted in response to the telephonic voicemail received 8 December 2008. Applicants wish to thank the Examiner for the telephonic voicemail. In the voicemail, Examiner Hardee acknowledged Applicants' submission of good and sufficient reasons as to why the declaration was not earlier presented [37 CFR 41.33(d)(1)] , filed 3 November 2008. Examiner Hardee agreed to enter the declaration of Kenneth M. Ponder, filed September 18, 2008, in order to place the application in better condition for appeal. Also, Examiner Hardee indicated that while he would enter the Declaration, he did not believe it placed the present application in condition for allowance.

Applicants elected to proceed by submitting an Appeal that is now being submitted.

Respectfully Submitted,

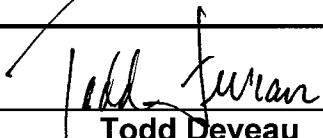
**THOMAS, KAYDEN, HORSTEMEYER  
& RISLEY, L.L.P.**

By

  
Todd Deveau, Reg. No. 29,526

600 Galleria Parkway, Suite 1500  
Atlanta, Georgia 30339  
(770) 933-9500



<b>PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)</b> <b>FY 2006</b> <i>(Fees pursuant to the Consolidated Appropriations act, 2005 (H.R. 4818).)</i>		Docket No. 821920-1030																												
Application Number: 10/937,736	Filed: September 8, 2004																													
For: Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant																														
Art Unit: 1796	Examiner: John R. Hardee																													
<p>This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.</p> <p>The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;"></th> <th style="width: 15%; text-align: center;"><u>Fees</u></th> <th style="width: 15%; text-align: center;"><u>Small Entity</u></th> <th style="width: 30%;"></th> </tr> <tr> <th></th> <th></th> <th style="text-align: center;"><u>Fees</u></th> <th></th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/> One month (37 CFR 1.17(a)(1))</td> <td style="text-align: center;">\$130</td> <td style="text-align: center;">\$65</td> <td style="text-align: center;">\$</td> </tr> <tr> <td><input type="checkbox"/> Two months (37 CFR 1.17(a)(2))</td> <td style="text-align: center;">\$490</td> <td style="text-align: center;">\$245</td> <td style="text-align: center;">\$</td> </tr> <tr> <td><input checked="" type="checkbox"/> Three months (37 CFR 1.17(a)(3))</td> <td style="text-align: center;">\$1110</td> <td style="text-align: center;">\$555</td> <td style="text-align: center;"><u>\$555.00</u></td> </tr> <tr> <td><input type="checkbox"/> Four months (37 CFR 1.17(a)(4))</td> <td style="text-align: center;">\$1730</td> <td style="text-align: center;">\$865</td> <td style="text-align: center;">\$</td> </tr> <tr> <td><input type="checkbox"/> Five months (37 CFR 1.17(a)(5))</td> <td style="text-align: center;">\$2350</td> <td style="text-align: center;">\$1175</td> <td style="text-align: center;">\$</td> </tr> </tbody> </table> <p><input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27</p> <p><input type="checkbox"/> A check in the amount of the fee is enclosed.</p> <p><input type="checkbox"/> Payment by credit card.</p> <p><input type="checkbox"/> The Director has already been authorized to charge fees in this application to a Deposit Account.</p> <p><input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any deficiencies in fees which may be required, or credit any overpayment to Deposit Account No. 200778.</p>				<u>Fees</u>	<u>Small Entity</u>				<u>Fees</u>		<input type="checkbox"/> One month (37 CFR 1.17(a)(1))	\$130	\$65	\$	<input type="checkbox"/> Two months (37 CFR 1.17(a)(2))	\$490	\$245	\$	<input checked="" type="checkbox"/> Three months (37 CFR 1.17(a)(3))	\$1110	\$555	<u>\$555.00</u>	<input type="checkbox"/> Four months (37 CFR 1.17(a)(4))	\$1730	\$865	\$	<input type="checkbox"/> Five months (37 CFR 1.17(a)(5))	\$2350	\$1175	\$
	<u>Fees</u>	<u>Small Entity</u>																												
		<u>Fees</u>																												
<input type="checkbox"/> One month (37 CFR 1.17(a)(1))	\$130	\$65	\$																											
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<input checked="" type="checkbox"/> Three months (37 CFR 1.17(a)(3))	\$1110	\$555	<u>\$555.00</u>																											
<input type="checkbox"/> Four months (37 CFR 1.17(a)(4))	\$1730	\$865	\$																											
<input type="checkbox"/> Five months (37 CFR 1.17(a)(5))	\$2350	\$1175	\$																											
<p><b>WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.</b></p> <p>I am the</p> <p><input type="checkbox"/> applicant/inventor.</p> <p><input type="checkbox"/> assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).</p> <p><input checked="" type="checkbox"/> attorney or agent of record. Registration Number: <b>29,526</b></p> <p><input type="checkbox"/> attorney or agent under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34:</p>																														
 <b>Todd Deveau</b>	<p style="text-align: center;"><u>December 9, 2008</u> Date</p> <p style="text-align: center;"><u>770-933-9500</u> Telephone Number</p>																													

The collection of information is required by CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, US Patent and Trademark Office, US Department of Commerce, PO Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, PO Box 1450 Alexandria, VA 22313-1450.

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	10937736			
<b>Filing Date:</b>	08-Sep-2004			
<b>Title of Invention:</b>	Refrigerant with lubricating oil for replacement of R22 refrigerant			
<b>First Named Inventor/Applicant Name:</b>	Kenneth M. Ponder			
<b>Filer:</b>	Todd Deveau./Angela Brathwaite			
<b>Attorney Docket Number:</b>	821920-1030			
Filed as Large Entity				
<b>Utility under 35 USC 111(a) Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
Notice of appeal	1401	1	540	540
Filing a brief in support of an appeal	1402	1	540	540
<b>Post-Allowance-and-Post-Issuance:</b>				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
<b>Extension-of-Time:</b>				
Extension - 3 months with \$0 paid	1253	1	1110	1110
<b>Miscellaneous:</b>				
<b>Total in USD (\$)</b>				<b>2190</b>

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	4425336
<b>Application Number:</b>	10937736
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1006
<b>Title of Invention:</b>	Refrigerant with lubricating oil for replacement of R22 refrigerant
<b>First Named Inventor/Applicant Name:</b>	Kenneth M. Ponder
<b>Customer Number:</b>	24504
<b>Filer:</b>	Todd Deveau./Angela Brathwaite
<b>Filer Authorized By:</b>	Todd Deveau.
<b>Attorney Docket Number:</b>	821920-1030
<b>Receipt Date:</b>	09-DEC-2008
<b>Filing Date:</b>	08-SEP-2004
<b>Time Stamp:</b>	19:18:57
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$2190
RAM confirmation Number	4982
Deposit Account	200778
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Appeal Brief Filed	00828990.PDF	2787559 e99acfa36c9d548eac8cc1c36b4f7d1f5e08a068	no	67
Warnings:					
Information:					
2	Notice of Appeal Filed	00828991.PDF	51376 c2ab4faa0d054582bfa516add57c838997ef7df	no	1
Warnings:					
Information:					
3	Applicant summary of interview with examiner	00828981.PDF	33868 3bc664a627709dc04cc24160f108a984f3740464	no	1
Warnings:					
Information:					
4	Extension of Time	00828982.PDF	56421 ed1e5b351a891395aa57718b1dd69feb44bc62ac	no	1
Warnings:					
Information:					
5	Fee Worksheet (PTO-06)	fee-info.pdf	33641 76e34f2099aaee65c838e3fbd45476de8767fa92	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			2962865		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>            If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>            If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>            If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In Re Application of:

Docket No.: 821920-1030

PONDER, K., et al.,

Art Unit: 1796

Serial No.: 10/937,736

Examiner: John R. Hardee

Filing Date: September 8, 2004

Confirmation No.: 1006

For: **Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant**

**REQUEST FOR ENTRY OF DECLARATION AND  
OTHER EVIDENCE AFTER FINAL OFFICE ACTION**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

The Advisory Action, Paper No./Mail Date 20080623, from Examiner John R. Hardee of Art Unit 1796, mailed September 25, 2008, has been received and carefully reviewed. Applicants respectfully request reconsideration of the non-entry of Applicants' Response and Amendment electronically filed on 18 September 2008, and in particular the non-entry of the Declaration and other evidence filed with said Response after the Final Office Action (See Box 8 of the Advisory Action), and thus consideration of the Declaration, in view of the following remarks. No new matter and, thus, no new issues are presented.

**AUTHORIZATION TO DEBIT ACCOUNT**

It is not believed that any extensions of time or fees are required, beyond those which may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required therefor (including fees for net addition of claims) are hereby authorized to be charged to deposit account no. 20-0778.

### IN THE CLAIMS

Please amend the claims to read as follows wherein changes in a claim are shown by double brackets for deleted matter and underlining for added matter:

1. (Previously presented) In an apparatus designed for use with chlorodifluoromethane refrigerant, the improvement comprising substituting the chlorodifluoromethane with a refrigerant composition containing a lubricant, the refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components,

(a) said refrigerant gases consisting of:

about 40% to about 45% by weight tetrafluoroethane; and

about 55% to about 60% by weight pentafluoroethane; and

(b) said non-refrigerant gas components including about 0.5% up to about 20% by weight of the refrigerant gases a lubricating oil that is soluble in chlorodifluoromethane, pentafluoroethane and tetrafluoroethane,

wherein the lubricating oil is selected from the group consisting of napthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.

2. (Original) The invention according to Claim 1, the lubricating oil having the following components:

65-88% hydrotreated light napthenic distillate, and

10-20% solvent refined light napthenic distillate petroleum.

3. (Previously presented) The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 60% by weight to said tetrafluoroethane present in an amount of about 40% by weight.

4. (Previously presented) The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight.

5. (Previously presented) The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 55% by weight to said tetrafluoroethane present in an amount of about 45% by weight.

6. (Previously presented) A method for refilling an apparatus designed for use with a chlorodifluoromethane refrigerant, the method comprising:

(1) supplying a substitute refrigerant composition under pressure, in a cylinder can fitted with an outlet compatible with a chlorodifluoromethane recharging manifold of the apparatus; and

(2) adding to said apparatus via the manifold the substitute refrigerant composition for chlorodifluoromethane, said substitute refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components,

(a) the refrigerant gases consisting of:

about 40% to about 45% by weight tetrafluoroethane; and

about 55% to about 60% by weight pentafluoroethane; and

(b) the non-refrigerant components including about 0.5% up to about 20% by weight of the refrigerant gases of a lubricating oil that is soluble in chlorodifluoromethane, pentafluoroethane and tetrafluoroethane,

wherein the lubricating oil is selected from the group consisting of napthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.

7. (Previously presented) The method according to claim 6, the lubricating oil having the following components:

65-85% hydrotreated light napthenic distillate, and

10-20% solvent refined light napthenic distillate petroleum.

8. (Previously presented) The method according to claim 6 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 60% by weight to said tetrafluoroethane present in an amount of about 40% by weight.

9. (Previously presented) The method according to claim 6 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight.



10. (Previously presented) The method according to claim 6 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 55% by weight to said tetrafluoroethane present in an amount of about 45% by weight.

11. – 20. (Cancelled)

21. (Previously presented) A refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components,

- (a) the refrigerant gases consisting of:
  - about 40% to about 45% by weight tetrafluoroethane; and
  - about 55% to about 60% by weight pentafluoroethane; and

- (b) the non-refrigerant gas components including about 0.5% up to about 20% by weight of the refrigerant gases of a lubricating oil,
  - wherein the lubricating oil is selected from the group consisting of napthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.

22. (Previously presented) A refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components,

- (a) the refrigerant gases consisting of:
  - about 40% to about 45% by weight tetrafluoroethane; and
  - about 55% to about 60% by weight pentafluoroethane; and

- (b) the non-refrigerant gas components including about 0.5% up to about 20% by weight of the refrigerant gases of a lubricating oil, the lubricating oil having the following components:

- 65-85% hydrotreated light napthenic distillate, and
  - 10-20% solvent refined light napthenic distillate petroleum.

23. (Previously presented) A refrigerant composition according to claim 21 wherein said pentafluoroethane is present in the ratio of about 60% by weight to said tetrafluoroethane present in an amount of about 40% by weight.

24. (Previously presented) A refrigerant composition according to claim 21 wherein said pentafluoroethane is present in the ratio of about 55% by weight to said tetrafluoroethane present in an amount of about 45% by weight with a napthenic lubricant.

25. (Previously presented) A refrigerant composition according to claim 21 wherein said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight with a napthenic lubricant.

26. (Cancelled)

27. (Previously presented) The refrigerant composition according to claim 21, wherein the lubricating oil further includes an acrylic polymer or a corrosion inhibitor or both.

28. (Cancelled)

29. (Previously presented) The refrigerant composition according to claim 21, wherein the lubricating oil is an alkylbenzene-based lubricating oil.

30. (Previously presented) The invention according to claim 1, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.

31. (Previously presented) The invention according to claim 1, wherein the lubricating oil includes an additive selected from the group consisting of acrylic polymer, a corrosion inhibitor and mixtures thereof.

32. (Cancelled)

33. (Previously presented) The invention according to claim 1, wherein the lubricating oil is an alkylbenzene-based lubricating oil.

34. (Previously presented) The method according to claim 6, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.

35. (Previously presented) The method according to claim 6, wherein the lubricating oil includes an additive selected from the group consisting of acrylic polymer, a corrosion inhibitor and mixtures thereof.

36. (Cancelled)

37. (Previously presented) The method according to claim 6, wherein the lubricating oil is an alkylbenzene-based lubricating oil.

38. (Previously presented) The invention according to claim 1, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

39. (Previously presented) The method of claim 6, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

40. (Previously presented) The refrigerant composition of claim 21, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

**REMARKS**

Claims 1-10, 21-25, 27, 29-31, 33-35 and 37-40 are pending in this application.

**INTERVIEW SUMMARY**

On October 28, 2008, Applicant and Examiner Hardy discussed the possibility of entering the Declaration filed September 18, 2008. Examiner Hardy agreed to consider the Declaration upon a showing of good and sufficient reason why the Declaration is necessary and was not presented earlier, per 37 CFR 1.116(e). Applicant respectfully presents its showing of good and sufficient reason below.

**CONSIDERATION OF AFFIDAVIT OR OTHER EVIDENCE**

Once a Final Office Action is issued, Applicant no longer has a right to unrestricted prosecution. However, Applicant is not barred from submitting an affidavit or other evidence after a Final Office Action issues. Any affidavit or other evidence which places an Application in condition for allowance or in better form for appeal may be entered at the discretion of the Examiner. An affidavit or other evidence filed after a Final Office Action but before the date of filing an appeal may be entered upon a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented in compliance with 37 CFR 1.116(e). MPEP 714.13.

Applicant submits that the Declaration of Kenneth M. Ponder, filed September 18, 2008, at least places this Application in better form for appeal. This Declaration is necessary as it clarifies and/or narrows the issues for consideration by the Board of Patent Appeals and Interferences. Applicant made no substantive amendments to the claims after the Non-Final Office Action, filed December 17, 2007. Therefore, Applicant respectfully submits that this Declaration should require only a cursory review and no further search by the Examiner.

It was not earlier presented because Applicant believed the prior responses placed this Application in condition for allowance, at least for the reasons set forth in those responses. Furthermore, no explicit request for unexpected properties was presented to Applicant until the mailing of the Final Office Action. Applicant was not presented the issue of unexpected results prior to the Final Office Action, filed June 27, 2008, in which the Office Action states, "If affiant believes that compositions as recited have unexpected properties *vis-à-vis* those which are exemplified, this assertion should be backed up with data." At that request, Applicant provided the requested unexpected results by way of the Declaration of Kenneth M. Ponder, filed September 18, 2008. Since the request of unexpected results was not presented until the Final

Office Action, Applicant was precluded from submitting evidence of unexpected results until after the close of prosecution. More particularly, Applicant presented no substantive amendment of the pending claims in response to the Non-Final Office Action of December 17, 2007 which would have warranted raising the issue of unexpected results for the first time in the Final Office Action. Put alternatively, no substantive changes occurred in the claims from Non-Final to Final Office Action which warranted a request for unexpected results. Accordingly, entry of the present Declaration as an earnest attempt to advance prosecution and reduce the number of issues for appeal is requested under 37 CFR 1.116(e).

**CONCLUSION**

In view of the foregoing, favorable reconsideration and entry of the present Declaration is hereby requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at 770-933-9500.

The Commissioner is authorized to charge Deposit Account 20-0778 for any deficiencies or credit any over payments.

Respectfully Submitted,

**THOMAS, KAYDEN, HORSTEMEYER  
& RISLEY, L.L.P.**

By

  
Todd Deveau, Reg. No. 29,526

600 Galleria Parkway, Suite 1500  
Atlanta, Georgia 30339  
(770) 933-9500

Docket No. 821920-1030

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	4224392
<b>Application Number:</b>	10937736
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1006
<b>Title of Invention:</b>	Refrigerant with lubricating oil for replacement of R22 refrigerant
<b>First Named Inventor/Applicant Name:</b>	Kenneth M. Ponder
<b>Customer Number:</b>	24504
<b>Filer:</b>	Todd Deveau./Virginia Keenan
<b>Filer Authorized By:</b>	Todd Deveau.
<b>Attorney Docket Number:</b>	821920-1030
<b>Receipt Date:</b>	03-NOV-2008
<b>Filing Date:</b>	08-SEP-2004
<b>Time Stamp:</b>	17:47:40
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Supplemental Response or Supplemental Amendment	00809927.PDF	310375 56a895081074e44549e9465b8f4ace0f69ad6e4a	no	8

### Warnings:

### Information:

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

**New Applications Under 35 U.S.C. 111**

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

**National Stage of an International Application under 35 U.S.C. 371**

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

**New International Application Filed with the USPTO as a Receiving Office**

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875					Application or Docket Number <b>10/937,736</b>		Filing Date <b>09/08/2004</b>		<input type="checkbox"/> To be Mailed			
<b>APPLICATION AS FILED – PART I</b>												
(Column 1)			(Column 2)		SMALL ENTITY <input checked="" type="checkbox"/> OR			OTHER THAN SMALL ENTITY				
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)		
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A			N/A			
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A			N/A			
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A			N/A			
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$	=		X \$	=		X \$	=		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$	=		X \$	=		X \$	=		
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).											
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))												
* If the difference in column 1 is less than zero, enter "0" in column 2.												
<b>APPLICATION AS AMENDED – PART II</b>												
(Column 1)			(Column 2)		(Column 3)			SMALL ENTITY OR			OTHER THAN SMALL ENTITY	
<b>AMENDMENT</b>	<b>11/03/2008</b>	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	* 26	Minus	** 43	= 0	X \$26 =	0		X \$	=		
	Independent (37 CFR 1.16(h))	* 4	Minus	***5	= 0	X \$110 =	0		X \$	=		
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))											
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))											
						TOTAL ADD'L FEE	0		TOTAL ADD'L FEE			
(Column 1)			(Column 2)		(Column 3)			SMALL ENTITY OR			OTHER THAN SMALL ENTITY	
<b>AMENDMENT</b>	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)			
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$	=	X \$	=			
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$	=	X \$	=			
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))											
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))											
						TOTAL ADD'L FEE		TOTAL ADD'L FEE				
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.												

Legal Instrument Examiner:  
/NICOLLE SCRIVNER/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.





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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/937,736

09/08/2004

Kenneth M. Ponder

821920-1030

1006

24504

7590

10/31/2008

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
600 GALLERIA PARKWAY, S.E.  
STE 1500  
ATLANTA, GA 30339-5994

EXAMINER

HARDEE, JOHN R

ART UNIT

PAPER NUMBER

1796

MAIL DATE

DELIVERY MODE

10/31/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Interview Summary</b>	<b>Application No.</b> 10/937,736	<b>Applicant(s)</b> PONDER ET AL.	
	<b>Examiner</b> John R. Hardee	<b>Art Unit</b> 1796	

All participants (applicant, applicant's representative, PTO personnel):

(1) John R. Hardee. (3) \_\_\_\_.

(2) Michael Barker. (4) \_\_\_\_.

Date of Interview: 28 October 2008.

Type: a) ☒ Telephonic    b) ☐ Video Conference  
c) ☐ Personal [copy given to: 1) ☐ applicant    2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes    e) ☒ No.  
If Yes, brief description: \_\_\_\_.

Claim(s) discussed: \_\_\_\_.

Identification of prior art discussed: \_\_\_\_.

Agreement with respect to the claims f) ☐ was reached.    g) ☐ was not reached.    h) ☒ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Discussed the possibility of applicant submitting good and sufficient reason why the declaration of 9/18/08 could not be submitted before final rejection. The examiner agreed to consider such a submission.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

/John R. Hardee/ Primary Examiner, Art Unit 1796	
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/937,736	09/08/2004	Kenneth M. Ponder	821920-1030	1006
24504 7590 09/25/2008 THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP 600 GALLERIA PARKWAY, S.E. STE 1500 ATLANTA, GA 30339-5994			EXAMINER HARDEE, JOHN R	
			ART UNIT 1796	PAPER NUMBER
			MAIL DATE 09/25/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<p align="center"><b>Advisory Action</b> <b>Before the Filing of an Appeal Brief</b></p>	<p><b>Application No.</b> 10/937,736</p>	<p><b>Applicant(s)</b> PONDER ET AL.</p>	
	<p><b>Examiner</b> John R. Hardee</p>	<p><b>Art Unit</b> 1796</p>	

**--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

THE REPLY FILED 18 September 2008 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:

- a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.
- b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**NOTICE OF APPEAL**

2. ☐ The Notice of Appeal was filed on \_\_\_\_\_. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

**AMENDMENTS**

3. ☐ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because
- (a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);
- (b) ☐ They raise the issue of new matter (see NOTE below);
- (c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
- (d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: \_\_\_\_\_. (See 37 CFR 1.116 and 41.33(a)).

4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).
5. ☐ Applicant's reply has overcome the following rejection(s): \_\_\_\_\_.
6. ☐ Newly proposed or amended claim(s) \_\_\_\_\_ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).
7. ☐ For purposes of appeal, the proposed amendment(s): a) ☐ will not be entered, or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.
- The status of the claim(s) is (or will be) as follows:
- Claim(s) allowed: \_\_\_\_\_.
- Claim(s) objected to: \_\_\_\_\_.
- Claim(s) rejected: \_\_\_\_\_.
- Claim(s) withdrawn from consideration: \_\_\_\_\_.

**AFFIDAVIT OR OTHER EVIDENCE**

8. ☒ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).
9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

**REQUEST FOR RECONSIDERATION/OTHER**

11. ☐ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: \_\_\_\_\_.
12. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). \_\_\_\_\_
13. ☐ Other: \_\_\_\_\_.

/John R. Hardee/  
Primary Examiner, Art Unit 1796

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In Re Application of:

Docket No.: 821920-1030

PONDER, K., et al.,

Art Unit: 1796

Serial No.: 10/937,736

Examiner: John R. Hardee

Filing Date: September 8, 2004

Confirmation No.: 1006

For: **Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant**

**RESPONSE AND AMENDMENT**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

The final Office Action, Paper No./Mail Date 20080623, from Examiner John R. Hardee of Art Unit 1796, mailed June 27, 2007, has been received and carefully reviewed. Applicants respectfully request reconsideration and withdrawal of the rejections presented in the Office Action in view of the following remarks and amendment. No new matter and, thus, no new issues are presented.

**AUTHORIZATION TO DEBIT ACCOUNT**

It is not believed that any extensions of time or fees are required, beyond those which may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required therefor (including fees for net addition of claims) are hereby authorized to be charged to deposit account no. 20-0778.

## IN THE CLAIMS

Please amend the claims to read as follows wherein changes in a claim are shown by double brackets for deleted matter and underlining for added matter:

1. (Previously presented) In an apparatus designed for use with chlorodifluoromethane refrigerant, the improvement comprising substituting the chlorodifluoromethane with a refrigerant composition containing a lubricant, the refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components,

(a) said refrigerant gases consisting of:

about 40% to about 45% by weight tetrafluoroethane; and

about 55% to about 60% by weight pentafluoroethane; and

(b) said non-refrigerant gas components including about 0.5% up to about 20% by weight of the refrigerant gases a lubricating oil that is soluble in chlorodifluoromethane, pentafluoroethane and tetrafluoroethane,

wherein the lubricating oil is selected from the group consisting of napthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.

2. (Original) The invention according to Claim 1, the lubricating oil having the following components:

65-88% hydrotreated light napthenic distillate, and

10-20% solvent refined light napthenic distillate petroleum.

3. (Previously presented) The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 60% by weight to said tetrafluoroethane present in an amount of about 40% by weight.

4. (Previously presented) The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight.

5. (Previously presented) The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 55% by weight to said tetrafluoroethane present in an amount of about 45% by weight.

6. (Previously presented) A method for refilling an apparatus designed for use with a chlorodifluoromethane refrigerant, the method comprising:

(1) supplying a substitute refrigerant composition under pressure, in a cylinder can fitted with an outlet compatible with a chlorodifluoromethane recharging manifold of the apparatus; and

(2) adding to said apparatus via the manifold the substitute refrigerant composition for chlorodifluoromethane, said substitute refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components,

(a) the refrigerant gases consisting of:

about 40% to about 45% by weight tetrafluoroethane; and

about 55% to about 60% by weight pentafluoroethane; and

(b) the non-refrigerant components including about 0.5% up to about 20% by weight of the refrigerant gases of a lubricating oil that is soluble in chlorodifluoromethane, pentafluoroethane and tetrafluoroethane,

wherein the lubricating oil is selected from the group consisting of napthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.

7. (Previously presented) The method according to claim 6, the lubricating oil having the following components:

65-85% hydrotreated light napthenic distillate, and

10-20% solvent refined light napthenic distillate petroleum.

8. (Previously presented) The method according to claim 6 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 60% by weight to said tetrafluoroethane present in an amount of about 40% by weight.

9. (Previously presented) The method according to claim 6 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight.

10. (Previously presented) The method according to claim 6 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 55% by weight to said tetrafluoroethane present in an amount of about 45% by weight.

11. – 20. (Cancelled)

21. (Previously presented) A refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components,

(a) the refrigerant gases consisting of:

about 40% to about 45% by weight tetrafluoroethane; and

about 55% to about 60% by weight pentafluoroethane; and

(b) the non-refrigerant gas components including about 0.5% up to about 20% by weight of the refrigerant gases of a lubricating oil,

wherein the lubricating oil is selected from the group consisting of naphthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.

22. (Previously presented) A refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components,

(a) the refrigerant gases consisting of:

about 40% to about 45% by weight tetrafluoroethane; and

about 55% to about 60% by weight pentafluoroethane; and

(b) the non-refrigerant gas components including about 0.5% up to about 20% by weight of the refrigerant gases of a lubricating oil, the lubricating oil having the following components:

65-85% hydrotreated light naphthenic distillate, and

10-20% solvent refined light naphthenic distillate petroleum.

23. (Previously presented) A refrigerant composition according to claim 21 wherein said pentafluoroethane is present in the ratio of about 60% by weight to said tetrafluoroethane present in an amount of about 40% by weight.



24. (Previously presented) A refrigerant composition according to claim 21 wherein said pentafluoroethane is present in the ratio of about 55% by weight to said tetrafluoroethane present in an amount of about 45% by weight with a napthenic lubricant.

25. (Previously presented) A refrigerant composition according to claim 21 wherein said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight with a napthenic lubricant.

26. (Cancelled)

27. (Previously presented) The refrigerant composition according to claim 21, wherein the lubricating oil further includes an acrylic polymer or a corrosion inhibitor or both.

28. (Cancelled)

29. (Previously presented) The refrigerant composition according to claim 21, wherein the lubricating oil is an alkylbenzene-based lubricating oil.

30. (Previously presented) The invention according to claim 1, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.

31. (Previously presented) The invention according to claim 1, wherein the lubricating oil includes an additive selected from the group consisting of acrylic polymer, a corrosion inhibitor and mixtures thereof.

32. (Cancelled)

33. (Previously presented) The invention according to claim 1, wherein the lubricating oil is an alkylbenzene-based lubricating oil.

34. (Previously presented) The method according to claim 6, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.

35. (Previously presented) The method according to claim 6, wherein the lubricating oil includes an additive selected from the group consisting of acrylic polymer, a corrosion inhibitor and mixtures thereof.

36. (Cancelled)

37. (Previously presented) The method according to claim 6, wherein the lubricating oil is an alkylbenzene-based lubricating oil.

38. (Previously presented) The invention according to claim 1, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

39. (Previously presented) The method of claim 6, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

40. (Previously presented) The refrigerant composition of claim 21, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

## **REMARKS**

Claims 1-10, 21-25, 27, 29-31, 33-35 and 37-40 are pending in the above application.

The claims stand rejected under 35 U.S.C. 103(a) as allegedly unpatentable over Takigawa et al. (US 6,207,071).

Applicants respectfully request reconsideration and withdrawal of the rejections in view of the Remarks presented below.

### **1. The Present Claims**

The claims submitted herein include independent claims 1, 6, 21 and 22. All of the independent claims are directed to a refrigerant composition or a substitute refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components, the refrigerant gases consisting of about 40% to about 45% by weight tetrafluoroethane (HFC-134a), about 55% to about 60% by weight pentafluoroethane (HFC-125). The refrigerant gases are packaged with or include about 0.5% up to about 20% by weight of the refrigerant gases with a specified lubricating oil.

### **2. Rejection Under Section 103(a)**

The final rejection under 35 USC 103 (a) is based solely on Takigawa. Takigawa is directed to providing a refrigerator oil and a fluid composition containing said refrigerator oil (column 1, lines 14-15). In contrast, Applicants' disclosure is instead drawn to a particular combination of refrigerant gases.

The final Office Action contends that unexpected results are required and are the only means of rebutting an obviousness rejection. In this regard, the Office Action has erred in requiring unexpected results. An invention need not attain an unexpected result before a conclusion of nonobviousness may be reached. Panduit Corp. v. Dennison Mfg. Co., 774 F.2d 1082, 227 U.S.P.Q. 337 (Fed. Cir. 1985), remanded, 475 U.S. 809, 229 U.S.P.Q. 478 (1986), on remand, 810 F.2d 1561, 1 U.S.P.Q.2d 1593 (Fed. Cir. 1987). Unexpected results are but one alternative available to rebut an obviousness rejection. The reasons discussed below are equally valid means of rebutting an obviousness rejection.

This rejection is traversed for the following reasons:

- (1) No *prima facie* case of obviousness has been established; and
- (2) The claims are directed to a refrigerant composition having a superior property not possessed or taught by the prior art

Each of the aforementioned reasons are discussed in turn below:

(1) A *prima facie* case of obviousness requires that three basic criteria must be established by the Office Action, namely:

- A) A suggestion or motivation, either in the references or themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings;
- B) A reasonable expectation of success; and
- C) The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not be based on applicant's disclosure. MPEP 706.02(j).

The non-final Office Action mailed December 17, 2007 contends that the instant invention is obvious because the '071 patent recites all of the ingredients of the instant invention for inclusion in a refrigerant composition. *Id.*, at page 3. The Office Action further argues the '071 patent provides motivation to make the instantly claimed compositions, relying on the argument that the '071 patent discloses refrigerant compositions comprising:

"40% by weight or more of 1,1,1,2-tetrafluoroethane (HFC-134a) and/or an alkane fluoride having 1 to 3 carbon atoms, preferably 1 to 2 carbon atoms and containing 20% by weight or more, preferably 30% by weight or more, more preferably 40% by weight or more of pentafluoroethane (HFC-125)."

Put alternatively, the '071 patent discloses a refrigerant composition comprising 40% to 100% by weight of tetrafluoroethane and 20% to 100% by weight pentafluoroethane. In contrast, the claims recite a combination of refrigerant gases and non-refrigerant gas

components, the refrigerant gases consisting of about 40% to about 45% by weight tetrafluoroethane and about 55% to about 60% by weight pentafluoroethane.

Also, the '071 patent states there is "no restriction as to the kind of HFC to be mixed with" tetrafluoroethane and/or pentafluoroethane. col. 8, lines 29-34. The non-final Office Action mailed 12/17/2007 interpreted this statement to mean "no additional HFC need be added". Applicants respectfully take issue with this conclusion. This conclusion is not supported by the citation. This citation is a far cry from teaching that no HFC should be mixed with tetrafluoroethane and/or pentafluoroethane. The '071 patent specifically stipulates those HFC's "to be mixed" with tetrafluoroethane and/or pentafluoroethane. The phrase "to be mixed" indicates an additional HFC is mixed with tetrafluoroethane and/or pentafluoroethane. This indication is borne out by the examples, each of which comprises tetrafluoroethane and/or pentafluoroethane plus an additional HFC. col. 8, lines 35-55. Accordingly, the '071 patent does not teach any composition "consisting of" tetrafluoroethane and pentafluoroethane as the refrigerant gases in the composition.

The transitional phrase "consisting of" excludes any element, step, or ingredient not specified in the claim. In re Gray, 53 F.2d 520, 11 USPQ 255 (CCPA 1931); Ex parte Davis, 80 USPQ 448, 450 (Bd. App. 1948) ("consisting of" defined as "closing the claim to the inclusion of materials other than those recited except for impurities ordinarily associated therewith."). When the phrase "consists of" appears in a clause of the body of a claim, rather than immediately following the preamble, it limits only the element set forth in that clause; other elements are not excluded from the claim as a whole. Mannesmann Demag Corp. v. Engineered Metal Products Co., 793 F.2d 1279, 230 USPQ 45 (Fed. Cir. 1986).

Even if the '071 patent did teach a composition consisting of tetrafluoroethane (at 40% to 100%) and tetrafluoroethane (at 20% to 100%), the Office Action has not met the burden of providing motivation to select the narrower ranges specified by the instant invention. Instead, the Office Action notes, "In the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art, a prima facie case of obviousness exists." MPEP 2144.05(I). This statement may be true in so far as it goes, but applies to cases in which the ranges are similar or disclose a small number of distinct compositions. "A prior art reference that discloses a range encompassing a somewhat narrower claimed range is sufficient to establish a prima facie case of obviousness." In re Peterson, 315 F.3d 1325 (Fed. Cir. 2003). The rationale used by

the Peterson court is similar to that of the species-genus argument: A species can anticipate a genus, but a genus does not always anticipate a species.

Applied to this rejection, a reference disclosing a narrower range (species or sub-genus) would render obvious a broader claimed range (genus). However, the '071 patent does not disclose a narrower range than the instant invention; it is exactly opposite. The MPEP warns: "If the reference's disclosed range is so broad as to encompass a very large number of possible distinct compositions, this might present a situation analogous to the obviousness of a species when the prior art broadly discloses a genus." *Id.* See also, In re Baird, 16 F.3d 380 (Fed. Cir. 1994). Baird dealt with a prior art reference disclosing a broad genus of compounds. Applicant claimed a particular species, one of many encompassed by the broad range taught under the prior art reference. The court held that applicant's compound was nonobvious since the prior art reference made no suggestion that this particular compound, amongst the broad range it disclosed, would work well, or even at all. Similarly, in this case, the prior art makes no suggestion that the specific, claimed composition would work well or even at all.

Within the art relied upon, there is no suggestion or teaching to narrow the range of tetrafluoroethane from 40% to 100% down to the specific ranges of 40% to 45% and pentafluoroethane from 20% to 100% down to the specific ranges 55% to 60. In other words, there is no suggestion in Takigawa to select the specific ranges of the instant invention from the broad ranges listed at col. 8, lines 20-28. Moreover, there is no suggestion as noted above of a composition including refrigerant gases "consisting of" the specific ranges of the two gases recited in Applicants' claims. The Examiner may not pick and choose amongst the ranges until finding similar ranges in order to ground an obviousness rejection. Within Takigawa, there must be a suggestion or teaching toward selecting narrower ranges. The teaching can come from 'blaze marks' pointing toward the instant invention. However, there is no such teaching in Takigawa. See In re Baird, 16 F.3d 380 (Fed. Cir. 1994). Thus, the overlap in ranges of Takigawa and Applicants' recited composition does not suffice to establish a *prima facie* case of obviousness.

Nor is there any showing in the Office Actions of a reasonable expectation of success. Takigawa is directed to a different problem than that solved by Applicants' recited composition. Takigawa is directed to the question of providing a refrigerator oil and a fluid composition containing said oil. Column 1, lines 14-15. Takigawa does not address the problems solved by

Applicants' recited composition. Specifically, the refrigerant composition recited in Applicants' claims addresses problems, including:

- 1) High temperature application in the industry; and
- 2) Replacing R22 refrigerant without retrofitting existing refrigerant systems

Takigawa does not address these problems. Conversely, the claims provide a specific refrigerant composition capable of replacing R22 refrigerant in high temperature applications. Takigawa and the present claims attempt to solve different problems. Since Takigawa is directed to a different problem there is no reasonable expectation based on the teachings of Takigawa, in the absence of Applicants' disclosure, that Applicants' problems would be successfully addressed by the Office Action's hypothetical modification of Takigawa.

(2) Presence of a superior property not possessed by the prior art is evidence of nonobviousness. MPEP 716.02(III).

According to the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE) the presence or absence of even a small amount of a refrigerant gas is considered to materially affect the basic properties of a given refrigerant composition resulting in one refrigerant composition having different properties than another refrigerant composition consisting of the same refrigerant gases.

For example, refrigerants known under the ASHRAE designations R421A and R421B contain only pentafluoroethane and tetrafluoroethane, as the refrigerant gases. The ASHRAE designation R421A indicates a refrigerant with a gaseous ratio of 58/42 of pentafluoroethane to tetrafluoroethane. The ASHRAE designation R421B, covered by applicant's own U.S. Patent No. 7,320,763, indicates a refrigerant with a gaseous ratio of 85/15 of pentafluoroethane to tetrafluoroethane.

R421A and R421B, differing only in the ratio of pentafluoroethane and tetrafluoroethane, were developed to address different uses in the marketplace. R421A was developed to address high temperature applications, while R421B was developed to address low temperature applications. R421A and R421B are SNAP approved by the EPA for different uses. See, EPA, Substitute Refrigerants under SNAP as of June 18, 2008, Exhibit A hereto. Accordingly, R421A

and R421B are marketed toward different applications and meet different customer needs. In particular, R421A is superior to R421B in high temperature applications resulting from its temperature-pressure profile. R421B is superior to R421A in low temperature applications also resulting from its temperature-pressure profile. See, Declaration of Kenneth M. Ponder, submitted herewith. These different ASHRAE designations demonstrate that the industry recognizes that the presence or absence of even a small amount of refrigerant gas materially affects the basic properties of a given refrigerant composition.

As previously confirmed by Mr. Gbur's declaration, the different designations by ASHRAE among refrigerant blends having the same components in different proportions reflected by different uppercase letters is due to a recognition that even the same components in different proportions can produce refrigerant blend compositions having different refrigerant properties as typically reflected by differences in temperature/pressure profiles. Thus, as stated by Mr. Gbur, a refrigerant blend consisting of pentafluoroethane and tetrafluoroethane in a 58/42 ratio, reflected by ASHRAE designation R421A, would not render obvious a refrigerant blend consisting of pentafluoroethane and tetrafluoroethane in an 85/15 ratio. As shown by the differing ASHRAE designations, one skilled in the art does not expect the properties of one refrigerant composition with one set of proportions would be similar to the properties of another refrigerant composition, even when having the same gas components but in different proportions. Declaration of Andy Gbur, paragraph 6.

More specifically, in reference to the '071 patent Mr. Gbur reviewed the '071 patent and concluded it is not obvious to one skilled in the art from a reading of the '071 patent to produce a refrigerant gas composition as instantly claimed. Id., at paragraph 7.

This information showing the non-obviousness of the present claims is further supported by the Declaration of Kenneth M. Ponder stating that R 421A, that is covered by the present claims, provides superior properties to those of R 421B in high temperature applications. Declaration of Kenneth M. Ponder, paragraph 6. And there is no teaching or suggestion in Takigawa of combining pentafluoroethane with tetrafluoroethane to create a refrigerant gas composition having a temperature-pressure profile that provides superior properties for use in high temperature applications. Id., at paragraph 7.



Evidence of unobvious or unexpected advantageous properties, such as superiority in a property the claimed compound shares with the prior art, can rebut *prima facie* obviousness. MPEP § 716.02(b) II. "Evidence that a compound is unexpectedly superior in one of a spectrum of common properties ... can be enough to rebut a *prima facie* case of obviousness." See, *In re Chupp*, 816, F.2d 643, 646, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987),

### **CONCLUSION**

In view of the foregoing, favorable reconsideration and allowance of the present application and pending claims is hereby courteously requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at 770-933-9500.

The Commissioner is authorized to charge Deposit Account 20-0778 for any deficiencies or credit any over payments.

Respectfully Submitted,

**THOMAS, KAYDEN, HORSTEMEYER  
& RISLEY, L.L.P.**

By



Todd Deveau, Reg. No. 29,526

600 Galleria Parkway, Suite 1500  
Atlanta, Georgia 30339  
(770) 933-9500

Docket No. 821920-1030

# **EXHIBIT A**

Serial No. 10/937,736  
Ponder et al.



## Substitute Refrigerants Under SNAP as of June 12, 2008

SNAP Information: <http://www.epa.gov/ozone/snap>

EPA has created the Significant New Alternatives Policy (SNAP) Program under section 612 of the Clean Air Act Amendments. SNAP evaluates alternatives to ozone-depleting substances. Substitutes are reviewed on the basis of ozone depletion potential, global warming potential, toxicity, flammability, and exposure potential as described in the March 18, 1994, final SNAP rule (59 FR 13044). Lists of acceptable and unacceptable substitutes will be updated periodically in the Federal Register. The following SNAP notices and subsequent final rules are included in this list: August 26, 1994 (59 FR 44240), January 13, 1995 (60 FR 3318), June 13, 1995 (60 FR 31092), July 28, 1995 (60 FR 38729), February 8, 1996 (61 FR 4736), May 22, 1996 (61 FR 25585), September 5, 1996 (61 FR 47012), October 16, 1996 (61 FR 54030), March 10, 1997 (62 FR 10700), June 3, 1997 (62 FR 30275), February 24, 1998 (63 FR 9151), May 22, 1998 (63 FR 28251), January 26, 1999 (64 FR 3861), March 3, 1999 (64 FR 10374), April 28, 1999 (64 FR 22982), June 8, 1999 (64 FR 30410), December 6, 1999 (64 FR 68039), April 11, 2000 (65 FR 19327), June 19, 2000 (65 FR 37900), December 18, 2000 (65 FR 78977), May 23, 2001 (66 FR 28379), March 22, 2002 (67 FR 13272), December 20, 2002 (67 FR 77927), August 21, 2003 (68 FR 50533), and October 1, 2004 (69 FR 58903), March 29, 2006 (71 FR 15589), September 28, 2006 (71 FR 55884), October 4, 2007 (72 FR 56628), and June 12, 2008 (73 FR 33304).

Acceptable Substitutes for Class I (CFCs) Substances in Air Conditioning under the Significant New Alternatives Policy (SNAP) Program as of June 12, 2008								
Substitutes (Name Used in Federal Register)	Trade Name	CFC-11 Centrifugal Chillers	CFC-12, CFC-114, R-500 Centrifugal Chillers	CFC-12, R-500 Reciprocating Chillers	CFC-12 Motor Vehicle AC	CFC-12 Industrial Process AC	CFC-114 Industrial Process AC	CFC-12, R-500 Residential Dehumidifiers
HCFC-123	123	R, N	N					
HCFC-22	22	N	N	N	R, N* (buses only)		N (only <115F)	R, N
HCFC-124	124		R, N (CFC-114 only)				R, N	
HFC-134a	134a	N	R, N	R, N	R, N*		N (only <125F)	R, N
HFC-152a	152a				N*** (no R)			
HFC-227ea		N	N	N				
HFC-236fa			R, N (CFC-114 only)					
HFC-245fa	Genetron® 245fa	R, N	R, N (CFC-114 only)				R, N	
R-401A, R-401B	MP-39, MP-66			R, N			R, N	R, N
R-406A	GHG		R, N (R-500 only)		R, N**			R

Key: R = Retrofit Uses, N = New Uses

\*These refrigerants are actually "acceptable subject to use conditions." The conditions include 1) the use of unique fittings, 2) the use of descriptive labels, and 3) a prohibition against topping off one refrigerant with another. Details may be found in EPA's fact sheet titled "Choosing and Using Alternative Refrigerants for Motor Vehicle Air Conditioning."

\*\* In addition to the use conditions listed under (\*), these refrigerants must be used with barrier hoses.

\*\*\*See (73 FR 33303) for use conditions.



Environmental Protection Agency  
Air and Radiation Stratospheric Protection Division 6205J

Acceptable Substitutes for Class I (CFCs) Substances in Air Conditioning under the  
Significant New Alternatives Policy (SNAP) Program as of June 12, 2008 (continued)

Substitutes (Name Used in Federal Register)	Trade Name	CFC-11 Centrifugal Chillers	CFC-12, CFC-114, R-500 Centrifugal Chillers	CFC-12, R-500 Reciprocating Chillers	CFC-12 Motor Vehicle AC	CFC-12 Industrial Process AC	CFC-114 Industrial Process AC	CFC-12, R-500 Residential Dehumidifiers
R-409A (HCFC Blend Gamma)	409A							R
R-411A, R-411B	411A, 411B			R, N				
FRIG-C (HCFC Blend Beta)	FRIGC FR-12, 416A		R, N (CFC-12, R-500 only)	R, N	R, N*			R, N
Free Zone (HCFC Blend Delta)	Freezone / RB-276		R, N (CFC-12, R-500 only)	R, N	R, N*			R, N
Hot Shot (HCFC Blend Omicron)	Hot Shot, KarKool, 414B		R, N (CFC-12, R-500 only)	R, N	R, N**	R, N	R, N	R, N
GHG-X4 (HCFC Blend Xi)	GHG-X4, Autofrost, McCool Chill-it, 414A		R, N (CFC-12, R-500 only)	R, N	R, N**			R, N
GHG-X5	GHG-X5		R, N (CFC-12, R-500 only)	R, N	R, N**			R, N
GHG-HP (HCFC Blend Lambda)	GHG-HP				R, N**			R, N
Freeze 12	Freeze 12		R, N (CFC-12, R-500 only)	R, N	R, N*			R, N
411C	G2018C		R, N (CFC-12, R-500 only)	R, N				
THR-02	THR-02		N (CFC-12 only)	N (CFC-12 only)		R, N		
Ikon A, Ikon-12 (Blend Zeta)	Ikon A, Ikon-12		R, N (CFC-12 only)		R, N*	R, N		
Ikon B	Ikon B		R, N (CFC-12 only)	N (CFC-12 only)		R, N		R, N (CFC-12 only)
FOR12A, FOR12B	FOR12A, FOR12B		R, N (CFC-12 only)	R, N (CFC-12 only)		R, N		
SP34E	SP34E			R, N (CFC-12 only)	R, N*			
HCFC-22/HCFC-142b			R, N (CFC-12 only)	R, N (CFC-12 only)				R, N (CFC-12 only)
R-420A	Choice R-420A		R, N (CFC-12, R-500 only)	R, N	R**	R, N		R, N
ISCEON 39TC	ISCEON 39TC		R, N (CFC-12 only)			R, N		
RS-24 (2002 formulation)						R, N		R, N (CFC-12 only)
R-407C	SUVA 407C, KLEA 407C			R, N (R-502)		R, N (R- 502)		R, N (R-502)
R-422C	ICOR XLTI			R, N (R-502)		R, N (R- 502)		R, N (R-502)
R-426A	RS-24 (new formulation)				R, N*	R, N		R, N

Key: R = Retrofit Uses, N = New Uses

\* These refrigerants are actually "acceptable subject to use conditions." The conditions include 1) the use of unique fittings, 2) the use of descriptive labels, and 3) a prohibition against topping off one refrigerant with another. Details may be found in EPA's fact sheet titled "Choosing and Using Alternative Refrigerants for Motor Vehicle Air Conditioning."



\*\* In addition to the use conditions listed under (\*), these refrigerants must be used with barrier hoses.



Acceptable Substitutes for Class I (CFCs) Substances in Air Conditioning under the Significant New Alternatives Policy (SNAP) Program as of June 12, 2008 (continued)								
Substitutes (Name Used in Federal Register)	Trade Name	CFC-11 Centrifugal Chillers	CFC-12, CFC-114, R-500 Centrifugal Chillers	CFC-12, R-500 Reciprocating Chillers	CFC-12 Motor Vehicle AC	CFC-12 Industrial Process AC	CFC-114 Industrial Process AC	CFC-12, R-500 Residential Dehumidifiers
Ammonia Vapor Compression		N	N					
Evaporative Cooling		N	N	N	N*			
Desiccant Cooling		N	N	N				
Ammonia / Water Absorption		N	N					
Water / Lithium Bromide Absorption		N	N					
Small Auxiliary Power Units in Tractor Trailers					R, N			

Key: R = Retrofit Uses, N = New Uses

\*These refrigerants are actually "acceptable subject to use conditions." The conditions include 1) the use of unique fittings, 2) the use of descriptive labels, and 3) a prohibition against topping off one refrigerant with another. Details may be found in EPA's fact sheet titled "Choosing and Using Alternative Refrigerants for Motor Vehicle Air Conditioning."

\*\* In addition to the use conditions listed under (\*), these refrigerants must be used with barrier hoses.



Acceptable Substitutes for Class I (CFCs) Substances in Commercial Refrigeration under the  
Significant New Alternatives Policy (SNAP) Program as of June 12, 2008

Substitutes (Name Used in Federal Register)	Trade Name	ODS Being Replaced	Cold Storage Ware- houses	Ref. Transport	Retail Food Ref.	Ice Machines	Vending Machines	Water Coolers	Non-Mecha- nical Heat Transfer	Very Low Temp. Ref.
HCFC-22	22	12, 502	R, N	R, N	R, N	N	R, N	N		
HFC-23	23	12, 13, 13B1, 503								R, N
HFC-134a	134a	12	R, N	R, N	R, N	N	R, N	R, N		
HFC-227ea		12	N		N					
HFC-236fa		114							R, N	
HFC-245fa	Cinetron® 245fa	11, 113, 114							R, N (11, 113)	N (11, 114)
HFE-4310mcc		all CFCs							R, N	
R-401A, R-401B	MP39, MP66	12	R, N	R, N	R, N	R, N	R, N	R, N		
R-402A, R-402B	HP80, HP81	502	R, N	R, N	R, N	R, N				
R-404A	HP62, 404A	502	R, N	R, N	R, N	R, N	R, N			
R-406A	GHG	12, 500	R	R	R	R	R	R		
R-407A, R-407B	Klea 407A, 407B	502	R, N	R, N	R, N	R, N				
R-408A (HCFC Blend Epsilon)	408A	502	R	R	R	R				
R-409A (HCFC Blend Gamma)	409A	12		R	R	R	R	R		
R-411A, R-411B	411A, 411B	12, 500, 502	R, N	R, N	R, N	R, N	R, N	R, N		
R-428A	RS-52	502	R, N	R, N	R, N	R, N				
R-507	AZ-50	502	R, N	R, N	R, N	R, N	R, N			
R-508A (PFC Blend Alpha)	KLEA 5R3	13, 13B1, 503								R, N
R-508B	SUVA 95	13, 13B1, 503								R, N
FRIGC (HCFC Blend Beta)	FRIGC FR-12, 416A	12, 500	R, N	R, N	R, N	R, N	R, N	R, N		
Free Zone (HCFC Blend Delta)	Free Zone / RB-276	12	R, N	R, N	R, N	R, N	R, N	R, N		
Hot Shot (HCFC Blend Omicron)	Hot Shot, KarKool, 414B	12, 500	R, N	R, N	R, N	R, N	R, N	R, N		
GHG-X4 (HCFC Blend Xi)	GHG-X4, Autofrost, McCool Chill-it, 414A	12, 500	R, N	R, N	R, N	R, N	R, N	R, N		
GHG-X5	GHG-X5	12, 500	R, N	R, N	R, N	R, N	R, N	R, N		



Acceptable Substitutes for Class I (CFCs) Substances in Commercial Refrigeration under the Significant New Alternatives Policy (SNAP) Program as of June 12, 2008 (continued)										
Substitutes (Name Used in the Federal Register)	Trade Name	ODS Being Replaced	Cold Storage Ware-houses	Ref. Transport	Retail Food Ref.	Ice Machines	Vending Machines	Water Coolers	Non-Mechanical Heat Transfer	Very Low Temp. Ref.
(HCFC Blend Lambda)	GHG-HP	12	R, N	R, N	R, N	R, N	R, N	R, N		
FREEZE 12	FREEZE 12	12	R, N	R, N	R, N	R, N	R, N	R, N		
411C	G2018C	12, 500, 502	R, N	R, N	R, N	R, N	R, N	R, N		
HCFC-22/HCFC-142b		12	R, N	R, N	R, N	R, N	R, N	R, N		
R-420A	Choice R-420A	12, 500	R, N	R, N	R, N	R, N	R, N	R, N		
R-421B	Choice R-421B	12, 502	R, N	R, N	R, N	R, N				
R-422C	ICOR XLT1	502	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N
R-426A	RS-24 (new formulation)	12	R, N	R, N	R, N	R, N	R, N	R, N		
Ammonia Vapor Compression		all	N		N	N				
Galden Fluids		11, 12, 113, 114, 115							R	
Evaporative/Desiccant Cooling		all	N							
Stirling Cycle		all		N						
Direct Nitrogen Expansion		all		N						
Pressure Stepdown		all	N							
CO <sub>2</sub>		11, 12, 13, 113, 114, 115, 13B1, 503							R, N	R, N
Cryogenic System Using Recaptured Liquid CO <sub>2</sub> or Liquid Nitrogen	Cryo-Mechanical	12, 500		N						
Self-chilling cans using CO <sub>2</sub>		12, 502	R, N	R, N	R, N		R, N			
Volatile Methyl Siloxanes, Water, Mineral Oil		11, 12, 113, 114, 115							R, N	
C <sub>2</sub> F <sub>6</sub> , C <sub>3</sub> F <sub>8</sub> , C <sub>4</sub> F <sub>10</sub> , C <sub>4</sub> F <sub>12</sub> , C <sub>5</sub> F <sub>12</sub> , C <sub>6</sub> F <sub>14</sub> , C <sub>6</sub> F <sub>18</sub> , C <sub>7</sub> F <sub>20</sub> , C <sub>8</sub> F <sub>22</sub> , C <sub>8</sub> F <sub>30</sub> , C <sub>10</sub> F <sub>24</sub> , C <sub>10</sub> F <sub>32</sub> , C <sub>12</sub> F <sub>30</sub> , C <sub>12</sub> F <sub>34</sub> , C <sub>12</sub> F <sub>40</sub> , and C <sub>15</sub> F <sub>50</sub>									R, N*	
NARM-502		13, 13B1, 503								R, N
THR-02	THR-02	12	R, N	R, N	R, N	R, N	R, N	R, N		
THR-04	THR-04	502	R, N	R, N	R, N	R, N	R, N	R, N		





Acceptable Substitutes for Class I (CFCs) Substances in Commercial Refrigeration under the  
Significant New Alternatives Policy (SNAP) Program as of June 12, 2008 (continued)

Substitutes (Name Used in Federal Register)	Trade Name	ODS Being Replaced	Cold Storage Ware- houses	Ref. Transport	Retail Food Ref.	Ice Machines	Vending Machines	Water Coolers	Non-Mecha- nical Heat Transfer	Very Low Temp. Ref.
HFE-7100, HFE-7200		11, 12, 113, 114, 115							R, N	
HFE-7100, HFE-7200 as a secondary heat transfer fluid in not-in-kind systems		12, 502, 13, 13B1, 503			N (12, 502)					N (13, 13B1, 503)
Ikon A, Ikon-12 (Blend Zeta)	Ikon A, Ikon-12	12	R, N	R, N	R, N	R, N	R, N	R, N		
Ikon B	Ikon B	12	R, N	R, N	R, N	R, N	R, N	R, N		
FOR12A, FOR12B	FOR12A, FOR12B	12	R, N	R, N	R, N	N	R, N	R, N		
SP34E	SP34E	12	R, N	R, N	R, N		R, N	R, N		
HFC-134a/HBr (92/8)		12, 502		N						
HFC-134a/HBr (92/8) as the primary heat transfer fluid in secondary-loop equipment		12, 502	N		N					
PFC-330ST, PFC-550HC, PFC- 660HC, PFC-1100HC, PFC- 1100LT, PGC-100, PGC-150, PGC-331ST, PFC-551HC, PFC- 661HC, PFC-1101HC, PGC-151	PFC-330ST, PFC- 550HC, PFC-660HC, PFC-1100HC, PFC- 1100LT, PGC-100, PGC-150, PFC- 331ST, PFC-551HC, PFC-661HC, PFC- 1101HC, PGC-151	13, 113, 114, blends thereof								R, N
PFC-1102HC, PFC-662HC, PFC-552HC and FLC-15	PFC-1102HC, PFC-662HC, PFC-552HC and FLC-15	13, 113, 114, blends thereof								N
Hydrofluorother 7000	HFE-7000	CFC-11 and CFC- 113							R, N	
ISCEON 39TC	ISCEON 39TC	12	R, N							
RS-24 (2002 formulation)		12	R, N	R, N	R, N	R, N	R, N	R, N		
NU-22 [R-125/(34a/600 (46.6/50.0/3.4)]	NU-22	502	R, N	R, N	R, N	R, N	R, N	R, N		
ISCEON 89	ISCEON 89	R-13B1								R, N
R-407C	SUVA 407C, KLEA 407C	502	R, N	R, N	R, N	R, N	R, N	R, N	R, N	
R-407D		12		R, N						

Key: R = Retrofit Uses, N = New Uses

\* Acceptable only where no other alternatives are technically feasible due to safety or performance requirements.



Acceptable Substitutes for Class I (CFCs) Substances in Non-Commercial Refrigeration under the  
Significant New Alternatives Policy (SNAP) Program as of June 12, 2008

Substitutes (Name Used in Federal Register)	Trade Name	ODS Being Replaced	Industrial Process Refrigeration	Ice Skating Rinks	Household Refrigerators	Household Freezers
HCFC-123	123	11	R, N			
HCFC-22	22	12, 502	R, N	R, N	R, N	R, N
HFC-23		13, 13B1, 503	R, N			
HFC-134a	134a	12	R, N		R, N	R, N
HFC-152a		12			N	N
HFC-227ea		12	N			
HFC-236fa		114	R, N			
HFC-245fa	Genetron® 245fa	114	R, N			
R-401A, R-401B	MP-39, MP-66	12	R, N	R	R, N	R, N
R-402A, R-402B	HP-80, HP-81	502	R, N			R, N
R-403B	Isceon 69-L	13, 13B1, 503	R, N*			
R-404A	HP-62, 404A	502	R, N			R, N
R-406A	GHG	12, 500	R		R	R
R-407A, R-407B	Klea 407A, 407B	502	R, N	R, N		
R-408A (HCFC Blend Epsilon)	408A	502	R			
R-409A (HCFC Blend Gamma)	409A	12			R	R
R-411A, R-411B	411A, 411B	12, 500, 502	R, N			
R-428A	RS-52	502		R, N	R, N	R, N
R-507	AZ-50	502	R, N			
R-508A (PFC Blend Alpha)	KLEA SR3	13, 13B1, 503	R, N			
R-508B	Suva 95	13, 13B1, 503	R, N			
FRIGC (HCFC Blend Beta)	FRIGC FR-12, 416A	12, 500	R, N		R, N	R, N
Free Zone (HCFC Blend Delta)	Free Zone / RB-276	12	R, N	R, N	R, N	R, N
Hot Shot (HCFC Blend Omicron)	Hot Shot, KarKool, 414B	12, 500	R, N	R, N	R, N	R, N
GHG-X4 (HCFC Blend Xi)	GHG-X4, Autofrost	12, 500	R, N	R, N	R, N	R, N



	McCool Chill-It, 414A			
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Acceptable Substitutes for Class I (CFCs) Substances in Non-Commercial Refrigeration under the Significant New Alternatives Policy (SNAP) Program as of June 12, 2008 (continued)						
Substitutes (Name Used in Federal Register)	Trade Name	ODS Being Replaced	Industrial Process Refrigeration	Ice Skating Rinks	Household Refrigerators	Household Freezers
GHG-X5	GHG-X5	12, 500	R, N		R, N	R, N
R-420A	Choice R-420A	12, 500	R, N	R, N	R, N	R, N
(HCFC Blend Lambda)	GHG-HP	12	R, N		R, N	R, N
FREEZE 12	FREEZE 12	12	R, N	R, N	R, N	R, N
411C	G2018C	12, 500, 502	R, N	R, N		
NARM-502	NARM-502	13, 503	R, N			
THR-01	THR-01	12			N	N
THR-02	THR-02	12	R, N		N	N
THR-04	THR-04	502	R, N	R, N	R, N	
HCFC-22/HCFC-142b		12	R, N		R, N	R, N
Ikon A, Ikon-12 (Blend Zeta)	Ikon A, Ikon-12	12	R, N		N	N
Ikon B	Ikon B	12	R, N		N	N
FOR12A, FOR12B	FOR12A, FOR12B	12	R, N		R, N	R, N
SP34E	SP34E	12			R, N	R, N
HFE-7100, HFE-7200 as a secondary heat transfer fluid in not-in-kind systems		11, 12, 114, 115, 502	R, N			
HFC-134a/HBr (92/8)		12, 502	N			
Hydrofluoroether-7000	HFE-7000	11, 113	R, N			
ISCEON 39TC	ISCEON 39TC	12	R, N			
RS-24 (2002 formulation)		12	R, N	R, N	R, N	R, N
R-407C	SUVA 407C, KLEA 407C	502	R, N	R, N	R, N	R, N
R-421B	Choice R-421B	12, 502	R, N	R, N	R, N	R, N
R-422C	ICOR XLT1	502	R, N			
R-426A	RS-24 (new formulation)	12	R, N	R, N	R, N	R, N



Acceptable Substitutes for Class I (CFCs) Substances in Non-Commercial Refrigeration under the Significant New Alternatives Policy (SNAP) Program as of June 12, 2008 (continued)						
Substitutes (Name Used in Federal Register)	Trade Name	ODS Being Replaced	Industrial Process Refrigeration	Ice Skating Rinks	Household Refrigerators	Household Freezers
CO <sub>2</sub>		13, 13B1, 503	R, N			
Ammonia Vapor Compression		12, 502	R, N	R, N		
Ammonia Absorption		12			N	N
Propane, Propylene, Butane, HC Blend A, B	HC-12a, OZ-12	all	R, N*			
Self-chilling cans using CO <sub>2</sub>		12, 502			R, N	
Evaporative/Desiccant Cooling		all	N			

Key: R = Retrofit Uses, N = New Uses \*Prohibited for other end-uses. See the list of unacceptable refrigerants below.



Unacceptable Substitute Refrigerants Significant New Alternatives Policy (SNAP) Program as of June 12, 2008				
Substitutes (Name Used in Federal Register)	Trade Name	ODS Being Replaced	End-Uses	Reason
All flammable refrigerants, including OZ-12 (Hydrocarbon Blend A) and HC-12a (Hydrocarbon Blend B), except for HFC-152a in new MVAC equipment		CFC-12	Motor Vehicle Air Conditioning, retrofit and new	lack of adequate risk assessment that characterizes incremental flammability risk
OZ-12 (Hydrocarbon Blend A) and HC-12a (Hydrocarbon Blend B)	OZ-12, HC-12a	CFC-12	All end-uses other than Industrial Process Refrigeration, retrofit and new	lack of adequate risk assessment that characterizes incremental flammability risk
R-141b		CFC-11	Centrifugal Chillers, new	high ODP, other substitutes with lower overall risk have been identified
R-176*		CFC-12	All end-uses, retrofit and new	contains CFC-12
R-403B		R-502	All end-uses other than Industrial Process Refrigeration, retrofit and new	contains a perfluorocarbon that exhibits extremely high GWP and very long lifetime
R-405A		CFC-12	All end-uses, retrofit and new	contains a perfluorocarbon that exhibits extremely high GWP and very long lifetime
MT-31		all CFCs and HCFCs	All end-uses, retrofit and new	a chemical contained in this blend presents an unacceptable toxicity risk
Hexafluoropropylene (HFP) and all HFP-containing blends		all CFCs and HCFCs	All end-uses, retrofit and new	presents an unacceptable toxicity risk
Self-Chilling Cans using HFC-134a or HFC-152a		CFC-12, HCFC-22, R-502	Household Refrigeration, Transport Refrigeration, Vending Machines, Cold Storage Warehouses and Retail Food Refrigeration; retrofit and new	unacceptably high greenhouse gas emissions from direct release of refrigerant to the atmosphere
NARM-22		HCFC-22	All end-uses, retrofit and new	contains HCFC-22

\* R-176 contains CFC-12, HCFC-22, and HCFC-142b. It is a different product from RB-276, typically sold under the name "Freezone."



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Acceptable Substitutes for Class II (HCFCs) Substances in Air Conditioning and Refrigeration  
under the Significant New Alternatives Policy (SNAP) Program as of June 12, 2008

Substitutes (Name Used in Federal Register)	Trade Name	Household and Light Commercial AC	Commercial Comfort Air Conditioning	Industrial Process Refriger- ation	Industrial Process Air Conditioning	Bus and Passenger Train AC	Cold Storage Warehouse Systems	Ice Skating Rinks	Refriger- ated Transport	Retail Food Refriger- ation	Ice Machines	Very Low Temp Refriger- ation	Household and other Refrigerated Appliances
R-410A	AZ-20	N	N	N	N	N	N	N	N	N	N	N	N
R-410B	Suva 9100	N	N	N	N		N	N	N	N	N		N
R-404A	HP62	R, N	R, N	R, N	R, N		R, N	R, N	R, N	R, N	R, N		R, N
R-407C	Suva 407C, KLEA 407C	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N		R, N
R-421A	Choice R421A	R, N	R, N	R, N	R, N		R, N	R, N	R, N	R, N	R, N		R, N
R-421B	Choice R421B			R, N			R, N	R, N	R, N	R, N	R, N		R, N
R-422B	ICOR XAC1	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N		R, N
R-422C	ICOR XLT1	R, N	R, N	R, N	R, N		R, N	R, N	R, N	R, N	R, N		R, N
R-422D	ISCEON MO29	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N		R, N
R-424A	RS-44 (new formulation)	R, N	R, N	R, N	R, N		R, N	R, N	R, N	R, N	R, N		R, N
R-428A	RS-52			N			R, N	R, N	R, N	R, N	R, N		R, N
R-134a	HFC-134a	N	-	-	-	R, N	-	-	-	-	-	N (141b)	-
R-245fa	Gengdron- 245fa		R, N (123)										
R-507A	AZ-50	R, N	R, N	R, N	R, N		R, N	-	R, N	R, N	R, N		R, N
R-417A	Isceon 59, NU- 22	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N		R, N
R-125/134a/600a (28.1/70.0/1.9)		R, N	R, N	R, N	R, N	R, N			R, N				
Hydrofluoroether- 7000	HFE-7000											R, N	
RS-44 (2003 formulation)		R, N	R, N	R, N	R, N		R, N	R, N	R, N	R, N	R, N		R, N
RS-45 (proposed ASHRAE: R-434A)	RS-45	R, N	R, N	R, N	R, N		R, N	R, N	R, N	R, N	R, N		R, N
125/290/134a/600a (55.0/1.0/42.5/1.5)	ICOR AT-22	R, N	R, N	R, N	R, N		R, N	R, N	R, N	R, N	R, N		R, N
ISCEON 79	ISCEON 79			R, N			R, N	R, N	R, N	R, N	R, N		R, N
KDD5	KDD5	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N	R, N		R, N
Self-chilling cans using CO <sub>2</sub>		-	-	-	-		R, N	-	R, N	R, N	-		R, N
Ammonia		N <sup>1</sup>	N <sup>2</sup>	N <sup>1</sup>	N <sup>1</sup>		N <sup>3</sup>	N <sup>3</sup>	-	N <sup>4</sup>	N <sup>3</sup>		N <sup>1</sup>



Acceptable Substitutes for Class II (HCFCs) Substances in Air Conditioning and Refrigeration under the Significant New Alternatives Policy (SNAP) Program as of June 12, 2008													
Substitutes (Name Used in Federal Register)	Trade Name	Household and Light Commercial AC	Commercial Comfort Air Conditioning	Industrial Process Refriger- ation	Industrial Process Air Conditioning	Bus and Passenger Train AC	Cold Storage Warehouse Systems	Ice Skating Rinks	Refriger- ated Transport	Retail Food Refriger- ation	Ice Machines	Very Low Temp Refriger- ation	Household and other Refrigerated Appliances
Evaporative Cooling		N	N	-	N		-	-	-	-	-	-	-
Desiccant Cooling		N	N	-	N		-	-	-	-	-	-	-
Water/Lithium bromide		-	N	-	-		-	-	-	-	-	-	-
THR-03	THR-03	N <sup>5</sup>	N	R, N	N		N	N	R, N	N	N		N
HFE-7100, HFE- 7200 for secondary heat transfer in NIK systems				N									

Key: R = Retrofit Uses, N = New Uses, (-) = Not submitted for review against this end use or not practical to use the substitute refrigerant in this end use.

1. Absorption systems. 2. Absorption chillers or vapor compression with secondary loop. 3. Vapor compression or absorption systems. 4. Vapor compression with a secondary loop. 5. Only approved for window air conditioning units.



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Description of Class II End Uses		
End Use	Air Conditioning and Refrigeration Systems or Applications	Ozone Depleting Substance
Household and Light Commercial Air Conditioning	Heat pumps, central air conditioning, direct-expansion commercial air conditioners, packaged terminal air conditioners, room air conditioners, and split system air conditioners	HCFC-22
Commercial Comfort Air Conditioning	Reciprocating, centrifugal and screw chillers	HCFC-22, CFC-12, R-500, and CFC-11
Industrial Process Refrigeration	Refrigeration applications within the chemical, pharmaceutical and petrochemical industries, the oil and gas industry, the metallurgical industry, civil engineering, sports and leisure facilities, and food processing.	HCFC-22, CFC-12, R-500, and R-502
Industrial Process Air Conditioning	Air conditioning systems that perform a critical mission in a high-temperature industrial environment, such as cooling a control cab on a crane in a foundry or protecting a computer room in a steel mill.	HCFC-22, CFC-12, and CFC-114
Cold Storage Warehouse Systems	Public and private facilities used to store meat, produce, dairy products, frozen food, and other perishable goods.	HCFC-22, R-502 and CFC-12
Bus and Passenger Train Air Conditioning	Motor vehicle air conditioning systems for buses and passenger trains.	HCFC-22
Ice Skating Rinks	Ice Skating Rinks	HCFC-22, CFC-12, and R-502
Refrigerated Transport	Refrigeration systems in trucks, trailers, railcars, ships, intermodal containers, on board ships, and air conditioning systems in buses and passenger trains.	CFC-12, R-500 and R-502
Retail Food Refrigeration	Stand alone refrigeration cases found in small markets, convenience stores, restaurants and other food establishments, large systems found in supermarkets, and HCFC-22 systems found in a wide variety of retail and service establishments.	HCFC-22, CFC-12, and R-502
Ice Machines	Small, medium, and large ice makers used by a number of entities including restaurants and hotels.	CFC-12
Household and Other Refrigerated Appliances	Refrigerators, freezers, water coolers, vending machines, and dehumidifiers.	CFC-12 and R-502

I. Substitution through retrofit is only applicable to HCFC-22 systems.

Refrigerant blends that contain Class II Ozone Depleting Substances include, but are not limited to: R-401A, R-401B, R-402A, R-402B, R-403B, R-406A, R-408A, R-409A, R-411A, R-411B, R-411C, R-414A, R-414B, and R-416A.





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Alternative Refrigerant Manufacturers

Refrigerant	Arkema	Dupont	Greenco I	Honeywell	ICI	ICOR	IKON	CFC Refimax	People's Welding Supply	Refrigerant Solutions LTD	RMS of Georgia	Rhodia Ltd.	Solpower	Technical Chemical	TechnoChem Co., Ltd. <sup>1</sup>	Tsinghua University of Beijing <sup>2</sup>
HCFC-123	800-343-7940 Forane 123	800-235-7882 Suva 123	703-643-2376	800-522-8001 Genetron 123	800-275-5532	800-357-4062	505-345-2707	800-406-2292	800-382-9006		800-347-5872		888-289-8866	800-527-0885		
HCFC-22	Forane 22	Freon 22		Genetron 22	Arcton-22											
HFC-134a	Forane 134a	Suva 134a		Genetron 134a	Klea 134a											
HCFC-124	Forane 124	HCFC-124		Genetron 124												
KDID5		KDID5														
R-401A, R-401B	Forane 401A, 401B	Suva MP39, MP66		MP39, MP66												
R-402A, R-402B	Forane 402A, 402B	Suva HP80, HP81		HP80, HP81												
R-404A	Forane 404A	Suva HP62		Genetron 404A												
R-406A									GHG							
R-407A, R-407B					Klea 407A, 407B											
R-407C	Forane 407C	Suva 407C (Suva 9000)			Klea 407C (Klea 66)											
R-408A	Forane 408A	Suva 408A		Genetron 408A												
R-409A	Forane 409A	Suva 409A		Genetron 409A												
R-411A, R-411B			R-411A, B													
R-420A											Choice R-420A					
R-428A										RS-52						
R-507		Suva 507		AZ-50												
R-508A (PFC Blend Alpha)					Klea 5R3											



Environmental Protection Agency  
Air and Radiation Stratospheric Protection Division 6205J

Alternative Refrigerant Manufacturers, con't																
Refrigerant	Arkema	Dupont	Greencool	Honeywell	ICI	ICOR	IKON	CFC Refimax	People's Welding Supply	Refrigerant Solutions LTD	RMS of Georgia	Rhodia Ltd.	Solpower	Technical Chemical	TechnoChem Co., Ltd. <sup>1</sup>	Tsinghua University of Beijing <sup>2</sup>
	800-343-7940	800-235-7882	703-643-2376	800-522-8001	800-275-5532	800-357-4062	505-345-2707	800-406-2292	800-382-9006		800-347-5872		888-289-8866	800-527-0885		
R-508B		Suva 95														
HCFC Blend Beta								FRIGC FR-12								
HCFC Blend Delta											Free Zone / RB-276					
GHG-X4									Autofrost / Chill-It							
GHG-X5									GHG-X5							
GHG-JIP									GHG-JIP							
Hot Shot						Hot Shot										
Blend Zeta							Ikon-12, Ikon A									
Ikon B							Ikon B							Freeze 12		
Freeze 12																
G2018C			R-411C													THR-02, THR-03
THR-02, THR-03																
Isceon 59/NTU-22		Isceon 59				NTU-22						Isceon 59				
Isceon 79		Isceon 79										Isceon 79				
Isceon 89		Isceon 89										Isceon 89				
FOR12A, FOR12B															FOR12A, FOR12B	
RS-45										RS-45						
SP34E													SP34E			

<sup>1</sup> and Inha University  
<sup>2</sup> and the Beijing Inoue Qinghua Refrigeration Technology Company LTD

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	3967481
<b>Application Number:</b>	10937736
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1006
<b>Title of Invention:</b>	Refrigerant with lubricating oil for replacement of R22 refrigerant
<b>First Named Inventor/Applicant Name:</b>	Kenneth M. Ponder
<b>Customer Number:</b>	24504
<b>Filer:</b>	Todd Deveau./Virginia Keenan
<b>Filer Authorized By:</b>	Todd Deveau.
<b>Attorney Docket Number:</b>	821920-1030
<b>Receipt Date:</b>	18-SEP-2008
<b>Filing Date:</b>	08-SEP-2004
<b>Time Stamp:</b>	17:05:07
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Oath or Declaration filed	00782473.PDF	108120 f0246da669ede2f8ad719f6890cb58e07235bade	no	3

### Warnings:

### Information:

2	Amendment After Final	00782485.PDF	1328952	no	30
			1b84f5b937745302d7f783fe26cd52c5d8a4730e		
<b>Warnings:</b>					
<b>Information:</b>					
<b>Total Files Size (in bytes):</b>				1437072	
<p><b>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</b></p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE****In Re Application of:****Docket No.: 821920-1030****PONDER, K., et al.,****Confirmation No.: 1006****Serial No.: 10/937,736****Group Art Unit: 1751****Filing Date: September 8, 2004****Examiner: John R. Hardee****For: Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant****DECLARATION OF KENNETH M. PONDER**

I, Kenneth M. Ponder, hereby declare as follows:

1. I am the President of RMS of Georgia, LLC and am a co-inventor named on the above application.
2. RMS of Georgia, LLC sells and distributes refrigerants and reclaims most refrigerants.
3. Among the refrigerants that RMS of Georgia, LLC sells and distributes are refrigerants known under ASHRAE designations R-421A and R-421B and SNAP approved by the EPA for different uses. The refrigerant having the ASHRAE designation R-421A is a refrigerant composition that is a mixture of R-125(pentafluoroethane) and R-134a (1,1,1,2-tetrafluoroethane) blended with a lubricant in which R-125 is present in an amount of about 58% by weight and R-134a is present in an amount of about 42% by weight of the refrigerant gases. R-421B, on the other hand, is also a mixture of R-125(pentafluoroethane) and R-134a (1,1,1,2-tetrafluoroethane) blended with a lubricant. R-421B, however, includes pentafluoroethane in the amount of about 85% by weight and 1,1,1,2-tetrafluoroethane in the amount of about 15% by weight of the refrigerant gases.

4. Our R-421B refrigerant comprised of about 85% by weight pentafluoroethane and about 15% tetrafluoroethane by weight of the refrigerant gases is covered by U.S. Patent No. 7,320,763 on which I am named as a co-inventor.

5. Our R-421A refrigerant was developed as a replacement for R-22 refrigerant that consists of chlorodifluoromethane. R-22 refrigerant could cover a wide array of temperatures. The industry has not yet found a single refrigerant composition that could replace R-22 for use over the entire array of temperatures over which R-22 was used. As a result, the industry has had to come up with multiple refrigerant compositions covering different arrays of temperatures.

6. Our R-421A and our R-421B refrigerants were developed to address different uses in the marketplace. In particular, R-421A was developed to address a higher temperature or (medium temp) application in the industry. By high or medium temperature applications I mean approximately -5°F to +45 °F. In contrast, R-421B was developed as a long term option for low temperature applications in the industry. By low temperature applications, I mean applications below about 0°F and generally in the range of below about -5°F to about -40°F. Accordingly, R-421A and R-421B are marketed by us and used by our customers for different applications to meet different needs, depending upon whether a high and medium temperature application or a low temperature application is the specified use by our customer.

7. Our refrigerant R-421A that includes 58% pentafluoroethane and 42% tetrafluoroethane, which would be covered by the presently pending claims in this application, is superior to R-421B that consists of 85% pentafluoroethane and 15% tetrafluoroethane in high and medium temperature applications because it has a different temperature-pressure profile than R-421B and because the temperature-pressure profile of R-421A is superior to that of R-421B for high and medium temperature applications.

8. I have read U.S. Patent No. 6,207,071 (Takigawa et al.) and do not find any mention or suggestion in Takigawa of combining pentafluoroethane with tetrafluoroethane to create a composition including refrigerant gases consisting of pentafluoroethane and tetrafluoroethane to the exclusion of other refrigerant gases except for impurities ordinarily associated with those two gases having a temperature-pressure profile that provides superior properties for use in high and medium temperature applications as described above.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of this patent.

Respectfully submitted,

Date: 9/18/08

  
Kenneth M. Ponder

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875					Application or Docket Number <b>10/937,736</b>		Filing Date <b>09/08/2004</b>		<input type="checkbox"/> To be Mailed	
<b>APPLICATION AS FILED – PART I</b>										
(Column 1)			(Column 2)			SMALL ENTITY <input checked="" type="checkbox"/> OR		OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)		RATE (\$)	FEE (\$)			
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A				
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A				
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A				
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$	=		X \$	=			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$	=		X \$	=			
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.										
<b>APPLICATION AS AMENDED – PART II</b>										
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
<b>AMENDMENT</b>	<b>09/18/2008</b>	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 26	Minus	** 43	= 0	X \$25 =	0		X \$	=
	Independent (37 CFR 1.16(h))	* 4	Minus	***5	= 0	X \$105 =	0		X \$	=
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))									
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE	0		TOTAL ADD'L FEE	
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
<b>AMENDMENT</b>		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$	=		X \$	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$	=		X \$	=
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))									
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))									
						TOTAL ADD'L FEE			TOTAL ADD'L FEE	
<p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.</p> <p>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".</p> <p>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".</p> <p>The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.</p>										

Legal Instrument Examiner:  
/nicole c. lawrence/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.





# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
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Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/937,736

09/08/2004

Kenneth M. Ponder

821920-1030

1006

24504

7590

07/29/2008

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
600 GALLERIA PARKWAY, S.E.  
STE 1500  
ATLANTA, GA 30339-5994

EXAMINER

HARDEE, JOHN R

ART UNIT

PAPER NUMBER

1796

MAIL DATE

DELIVERY MODE

07/29/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Interview Summary</b>	<b>Application No.</b> 10/937,736	<b>Applicant(s)</b> PONDER ET AL.	
	<b>Examiner</b> John R. Hardee	<b>Art Unit</b> 1796	

All participants (applicant, applicant's representative, PTO personnel):

(1) John R. Hardee. (3)\_\_\_\_\_.

(2) Atty. Deveau. (4)\_\_\_\_\_.

Date of Interview: 28 July 2008.

Type: a) ☒ Telephonic b) ☐ Video Conference  
c) ☐ Personal [copy given to: 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☒ No.

If Yes, brief description: \_\_\_\_\_.

Claim(s) discussed: \_\_\_\_\_.

Identification of prior art discussed: \_\_\_\_\_.

Agreement with respect to the claims f) ☐ was reached. g) ☒ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Attorney believed the ASHRAE evidence presented in the affidavit of 5/16/2008 had not been directly addressed. The examiner explained his position that a combination of two ASHRAE refrigerants would be expected to have refrigerant properties, and that determination of which particular application it was best suited for amounted to routine optimization.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

/John R. Hardee/  
Primary Examiner, Art Unit 1796

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

Examiner's signature, if required



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/937,736

09/08/2004

Kenneth M. Ponder

821920-1030

1006

24504

7590

06/27/2008

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP  
600 GALLERIA PARKWAY, S.E.  
STE 1500  
ATLANTA, GA 30339-5994

EXAMINER

HARDEE, JOHN R

ART UNIT

PAPER NUMBER

1796

MAIL DATE

DELIVERY MODE

06/27/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/937,736	<b>Applicant(s)</b> PONDER ET AL.	
	<b>Examiner</b> John R. Hardee	<b>Art Unit</b> 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10, 21-25, 27, 29-31, 33-35 and 37-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10, 21-25, 27, 29-31, 33-35 and 37-40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____.                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____.  | 6) <input type="checkbox"/> Other: ____.                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. Claims 1-10, 21-25, 27, 29-31, 33-35 and 37-40 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Takigawa et al., US 6,207,071 for the reasons of record in the previous office action.
2. Applicant's affidavit and arguments filed May 16, 2008 have been fully considered but they are not persuasive. Applicant argues that the Takigawa reference fails to exemplify a composition containing, as refrigerant gases, only tetrafluoroethane and pentafluoroethane. While this is correct, it is not persuasive because the reference provides motivation to make such a composition. The rejection was made under 103, not 102. If applicant believes that the recited compositions have unexpected properties, affidavit evidence to that effect should be provided in a timely filed affidavit. Attorney arguments are not a substitute for evidence, nor are those of the affiant. Where unobvious results are relied upon as a basis for patentability, a proper comparative showing is a minimum requirement. *In re Eisenhut*, 114 USPQ 287. Objective evidence of unobvious results must be commensurate in scope with the claims. *In re Prater*, 162 USPQ 541. *In re Tiffin*, 172 USPQ 292.
3. The affidavit has been carefully considered, but it is not persuasive for the same reasons. Affiant notes that none of the examples in the Takigawa reference consist (as far as gases go) only of tetrafluoroethane and pentafluoroethane. Affiant then draws the conclusion that it would not be obvious to make such a composition, based on the examples provided. Affiant and his attorney are reminded that a reference may be relied

upon for all that it teaches. The teachings of a reference are not confined to what is preferred or exemplified. If affiant believes that compositions as recited have unexpected properties vis-à-vis those which are exemplified, this assertion should be backed up with data. The examiner notes that simply providing refrigeration is not an unexpected property.

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, Dr. John R. Hardee, whose telephone number is (571) 272-1318. The examiner can normally be reached on Monday through Friday from 8:00 until 4:30. In the event that the examiner is not available, his supervisor, Mr. Harold Pyon, may be reached at (571) 272-1498.

The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/John R. Hardee/  
Primary Examiner  
June 23, 2008

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In Re Application of:

PONDER, K., et al.,

Serial No.: 10/937,736

Filing Date: September 8, 2004

Docket No.: 821920-1030

Art Unit: 1796

Examiner: John R. Hardee

Confirmation No.: 1006

For: **Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant**

**RESPONSE AND AMENDMENT**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

Sir:

The non-final Office Action, Paper No./Mail Date 20071213, from Examiner John R. Hardee of Art Unit 1796, mailed December 17, 2007, has been received and carefully reviewed. Applicants respectfully request reconsideration and withdrawal of the rejections presented in the Office Action in view of the following remarks and amendment. No new matter and, thus, no new issues are presented.

**AUTHORIZATION TO DEBIT ACCOUNT**

It is not believed that any extensions of time or fees are required, beyond those which may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required therefor (including fees for net addition of claims) are hereby authorized to be charged to deposit account no. 20-0778.



## IN THE CLAIMS

Please amend the claims to read as follows wherein changes in a claim are shown by double brackets for deleted matter and underlining for added matter:

1. (Currently amended) In an apparatus designed for use with chlorodifluoromethane refrigerant, the improvement comprising substituting the chlorodifluoromethane with a refrigerant composition containing a lubricant, the refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components,

(a) said refrigerant gases consisting of:

about 40% to about 45% by weight tetrafluoroethane; and

about 55% to about 60% by weight[[; and]] pentafluoroethane; and

(b) said non-refrigerant gas components including about 0.5% up to about 20% by weight of the refrigerant gases a lubricating oil that is soluble in chlorodifluoromethane, pentafluoroethane and tetrafluoroethane,

wherein the lubricating oil is selected from the group consisting of napthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.

2. (Original) The invention according to Claim 1, the lubricating oil having the following components:

65-88% hydrotreated light napthenic distillate, and

10-20% solvent refined light napthenic distillate petroleum.

3. (Previously presented) The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 60% by weight to said tetrafluoroethane present in an amount of about 40% by weight.

4. (Previously presented) The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight.

5. (Previously presented) The invention according to claim 1 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 55% by weight to said tetrafluoroethane present in an amount of about 45% by weight.

6. (Previously presented) A method for refilling an apparatus designed for use with a chlorodifluoromethane refrigerant, the method comprising:

(1) supplying a substitute refrigerant composition under pressure, in a cylinder can fitted with an outlet compatible with a chlorodifluoromethane recharging manifold of the apparatus; and

(2) adding to said apparatus via the manifold the substitute refrigerant composition for chlorodifluoromethane, said substitute refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components,

(a) the refrigerant gases consisting of:

about 40% to about 45% by weight tetrafluoroethane; and

about 55% to about 60% by weight pentafluoroethane; and

(b) the non-refrigerant components including about 0.5% up to about 20% by weight of the refrigerant gases of a lubricating oil that is soluble in chlorodifluoromethane, pentafluoroethane and tetrafluoroethane,

wherein the lubricating oil is selected from the group consisting of napthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.

7. (Previously presented) The method according to claim 6, the lubricating oil having the following components:

65-85% hydrotreated light napthenic distillate, and

10-20% solvent refined light napthenic distillate petroleum.

8. (Previously presented) The method according to claim 6 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 60% by weight to said tetrafluoroethane present in an amount of about 40% by weight.

9. (Previously presented) The method according to claim 6 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight.

10. (Previously presented) The method according to claim 6 wherein in the substitute refrigerant said pentafluoroethane is present in the ratio of about 55% by weight to said tetrafluoroethane present in an amount of about 45% by weight.

11. – 20. (Cancelled)

21. (Previously presented) A refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components,

(a) the refrigerant gases consisting of:

about 40% to about 45% by weight tetrafluoroethane; and

about 55% to about 60% by weight pentafluoroethane; and

(b) the non-refrigerant gas components including about 0.5% up to about 20% by weight of the refrigerant gases of a lubricating oil,

wherein the lubricating oil is selected from the group consisting of naphthenic based lubricants, paraffinic based lubricants, and mixtures thereof, mineral oil, polyol ester, synthetic alkyl aromatic lubricants, synthetic alkyl aromatic lubricants mixed with mineral oil, and synthetic alkyl aromatic lubricants mixed with polyol ester.

22. (Currently amended) [[The invention according to claim 21,]] A refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components,

(a) the refrigerant gases consisting of:

about 40% to about 45% by weight tetrafluoroethane; and

about 55% to about 60% by weight pentafluoroethane; and

(b) the non-refrigerant gas components including about 0.5% up to about 20% by weight of the refrigerant gases of a lubricating oil, the lubricating oil having the following components:

65-85% hydrotreated light naphthenic distillate, and

10-20% solvent refined light naphthenic distillate petroleum.

23. (Currently amended) A refrigerant composition according to claim 21 wherein said pentafluoroethane is present in the ratio of about 60% by weight to said tetrafluoroethane present in an amount of about 40% by weight.

24. (Currently amended) A refrigerant composition according to claim 21 wherein said pentafluoroethane is present in the ratio of about 55% by weight to said tetrafluoroethane present in an amount of about 45% by weight with a napthenic lubricant.

25. (Currently amended) A refrigerant composition according to claim 21 wherein said pentafluoroethane is present in the ratio of about 58% by weight to said tetrafluoroethane present in an amount of about 42% by weight with a napthenic lubricant.

26. (Cancelled)

27. (Currently amended) The refrigerant composition according to claim 21, wherein the lubricating oil further includes an acrylic polymer or a corrosion inhibitor or both.

28. (Cancelled)

29. (Currently amended) The refrigerant composition according to claim 21, wherein the lubricating oil is an alkylbenzene-based lubricating oil.

30. (Previously presented) The invention according to claim 1, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.

31. (Previously presented) The invention according to claim 1, wherein the lubricating oil includes an additive selected from the group consisting of acrylic polymer, a corrosion inhibitor and mixtures thereof.

32. (Cancelled)

33. (Previously presented) The invention according to claim 1, wherein the lubricating oil is an alkylbenzene-based lubricating oil.

34. (Previously presented) The method according to claim 6, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.

35. (Previously presented) The method according to claim 6, wherein the lubricating oil includes an additive selected from the group consisting of acrylic polymer, a corrosion inhibitor and mixtures thereof.

36. (Cancelled)

37. (Previously presented) The method according to claim 6, wherein the lubricating oil is an alkylbenzene-based lubricating oil.

38. (Previously presented) The invention according to claim 1, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

39. (Previously presented) The method of claim 6, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

40. (Currently amended) The [[invention]] refrigerant composition of claim 21, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

## **REMARKS**

Claims 1-10, 21-25, 27, 29-31, 33-35 and 37-40 are pending in the above application.

The claims stand rejected under 35 U.S.C. 103(a) as allegedly unpatentable over Takigawa et al. (US 6,207,071). Claims 23-25, 27, 29 and 40 clarify their preambles and present the preambles in a form consistent with their base independent claims. Claim 22 is amended to present it in independent form. Applicants respectfully request reconsideration and withdrawal of the rejections in view of the Remarks presented below.

### **1. The Present Claims**

The claims submitted herein include independent claims 1, 6, 21 and 22. All of the independent claims are directed to a refrigerant composition or a substitute refrigerant composition comprising a combination of refrigerant gases and non-refrigerant gas components, the refrigerant gases consisting of about 40% to about 45% by weight tetrafluoroethane, about 55% to about 60% by weight pentafluoroethane, which refrigerant gases are packaged with or include about 0.5% up to about 20% by weight with a specified lubricating oil.

### **2. Rejection Under Section 103(a)**

The rejection under Section 103(a) is based solely on Takigawa is traversed on the grounds that : 1) Takigawa fails to disclose the particular combination or blend of refrigerant gases recited in independent claims 1, 6, 21 and 22 and, in fact, teaches away from Applicants' combination of refrigerant gases, and 2) contrary to the statement at page 3 of the Office Action a person of ordinary skill in the refrigeration art would not expect Applicants' recited compositions to have properties similar to those compositions which are exemplified in Takigawa.

First, as acknowledged in the Office Action, Takigawa does not disclose a composition which reads on Applicant's claims with sufficient specificity to constitute anticipation. Applicant further notes that Takigawa provides no example anywhere of a refrigerant composition consisting only of tetrafluoroethane (HFC-134a) and pentafluoroethane (HFC-125). All of the examples of refrigerant compositions provided in Takigawa disclose either a refrigerant composition consisting only of tetrafluoroethane alone, pentafluoroethane alone, tetrafluoroethane in combination with a refrigerant gas other than pentafluoroethane (such as HFC-134a/HFC-32), or pentafluoroethane in combination with a refrigerant gas other than tetrafluoroethane (such as HFC-125/HFC-32), or a combination of tetrafluoroethane and pentafluoroethane that also includes a third refrigerant gas (such as a mixture of HFC-134a/HFC-32/HFC-125 or HFC-125/HFC-134a/HFC-143a). See, Column 8, lines 35-55 and the Examples beginning at Column 10, line 5. If it were so obvious from Takigawa that a refrigerant

composition could consist only of tetrafluoroethane and pentafluoroethane, one would think that Takigawa would provide at least one example of a refrigerant composition consisting only of pentafluoroethane and tetrafluoroethane to the exclusion of another refrigerant gas, in any proportion let alone the proportions recited in Applicants' claims. These Examples when considered together teach away from Applicants' combination of refrigerant gases recited in the pending claims.

Second, according to the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE) the presence or absence of even a small amount of a refrigerant gas is considered to materially effect the basic properties of a given refrigerant composition. For example, ASHRAE has granted the designation R417A to a refrigerant composition comprised of 46.6% pentafluoroethane (R125), 50.0% tetrafluoroethane (R134a) and 3.4% n-butane (R600). See Addendum c, to ANSI/ASHRAE Standard 34-2001 (2003), included in Applicant's Information Disclosure Statement previously filed on or about August 13, 2007. In contrast, ASHRAE has granted the designation R422D to a refrigerant blend of 65.1% pentafluoroethane (R125), 31.5% tetrafluoroethane (R134a) and 3.4% isobutane (R600a). See Addendum h to ANSI/ASHRAE Standard 34-2004 (2006), included in Applicant's Information Disclosure Statement, *Id.* ASHRAE, on the other hand, has granted the designation R421 to a refrigerant composition comprising pentafluoroethane and tetrafluoroethane without butane. (See Addendum a, b, c, e, f, k, n, o, p, q, r, s and u to ANSI/ASHRAE Standard 34-2004 (2006), included in Application's Information Disclosure Statement, *Id.* These different ASHRAE designations show that the industry recognizes that the presence or absence of even a small amount of refrigerant gas such as n-butane materially affects the basic properties of a given refrigerant composition.

Furthermore, even refrigerant compositions consisting of blends having the same refrigerant gas components with different proportions are provided with different designations, typically in the form of a different uppercase letter. See Addendum e to ANSI/ASHRAE Standard 34-2001 (2003), Section 4.4.1, included in Applicants' Information Disclosure Statement, *Id.* This is noted in Takigawa in reference to R410A (a 50-50 blend of HFC-32/HFC-125) and R410B (a 45-55 blend of HFC-32/HFC-125). See Column 8, lines 51-53. Additionally, for example, ASHRAE has granted differing refrigerant designation numbers to refrigerant compositions consisting of difluoromethane (HFC-32), pentafluoroethane (HFC-125) and tetrafluoroethane (HFC-134a) where these three components are present in different proportions as evidenced by designation numbers R407A (a 20-40-40 proportion blend), R407B (a 10-70-20 proportion blend), R407C (a 23-25-52 proportion blend), R407D (a 15-15-70

proportion blend), and R407E (a 25-15-60 proportion blend). See Addendum c to ANSI/ASHRAE Standard 34-2001 (2003), Id.

Further showing that differences in proportions of the same refrigerant gas components is considered to create different refrigerant gas compositions worthy of different ASHRAE designations is the Second Declaration of Andy Gbur submitted herewith. Mr. Gbur served on the ASHRAE Standard Project Committee 34 that issued both Addendum c and Addendum e noted above. As confirmed by Mr. Gbur, the different designations by ASHRAE among refrigerant blends having the same components in different proportions reflected by different uppercase letters is due to a recognition that even the same components in different proportions can produce refrigerant blend compositions having different refrigerant properties as typically reflected by differences in temperature/pressure profiles of refrigerant blend compositions having different proportions. Thus, for example, in the above case a refrigerant blend consisting of the three refrigerant gases difluoromethane, pentafluoroethane and tetrafluoroethane, knowledge by one skilled in the art of the 20-40-40 composition reflected by ASHRAE designation R407A would not render obvious the other combinations of the same three components designated as R407B, R407C, R407D and R407E. Further, contrary to the position in the Office Action, one skilled in the art would not expect that the properties of one refrigerant composition with one set of proportions would be similar to the properties of another refrigerant composition even when having the same components but in different proportions. In fact, the different ASHRAE designations (such as R407A , R407B, etc.) show that a person of ordinary skill in the art would expect those compositions to have different refrigerant properties.

More specifically, in reference to Takigawa, Mr. Gbur has reviewed the Takigawa reference and concludes that it would not be obvious to one skilled in the art from a reading of Takigawa to produce a refrigerant gas composition consisting of about 40% to about 45% by weight tetrafluoroethane, and about 55% to about 60% by weight pentafluoroethane as recited in Applicants' claims.



## CONCLUSION

In view of the foregoing, favorable reconsideration and allowance of the present application and pending claims is hereby courteously requested. If, in the opinion of the Examiner, a telephonic conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at 770-933-9500.

The Commissioner is authorized to charge Deposit Account 20-0778 for any deficiencies or credit any over payments.

Respectfully Submitted,

**THOMAS, KAYDEN, HORSTEMEYER  
& RISLEY, L.L.P.**

By /Todd Deveau/  
Todd Deveau, Reg. No. 29,526

600 Galleria Parkway, Suite 1500  
Atlanta, Georgia 30339  
(770) 933-9500

Docket No. 821920-1030

<b>PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a)</b> <b>FY 2006</b> <i>(Fees pursuant to the Consolidated Appropriations act, 2005 (H.R. 4818).)</i>		Docket No. <b>821920-1030</b>
Application Number: <b>10/937,736</b>	Filed: <b>September 8, 2004</b>	
For: <b>Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant</b>		
Art Unit: <b>1796</b>	Examiner: <b>John R. Hardee</b>	
This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.		
The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):		
	<u>Fees</u>	<u>Small Entity Fees</u>
<input type="checkbox"/> One month (37 CFR 1.17(a)(1))	\$120	\$60 \$_____
<input checked="" type="checkbox"/> Two months (37 CFR 1.17(a)(2))	\$460	\$230 <b>\$230</b>
<input type="checkbox"/> Three months (37 CFR 1.17(a)(3))	\$1050	\$525 \$_____
<input type="checkbox"/> Four months (37 CFR 1.17(a)(4))	\$1640	\$820 \$_____
<input type="checkbox"/> Five months (37 CFR 1.17(a)(5))	\$2230	\$1115 \$_____
<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27		
<input type="checkbox"/> A check in the amount of the fee is enclosed.		
<input type="checkbox"/> Payment by credit card.		
<input type="checkbox"/> The Director has already been authorized to charge fees in this application to a Deposit Account.		
<input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any deficiencies in fees which may be required, or credit any overpayment to Deposit Account No. 20-0778.		
<b>WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.</b>		
I am the		
<input type="checkbox"/> applicant/inventor.		
<input type="checkbox"/> assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).		
<input checked="" type="checkbox"/> attorney or agent of record. Registration Number: <b>29,526</b>		
<input type="checkbox"/> attorney or agent under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34:		
_____ /Todd Deveau/ <b>Todd Deveau</b>	_____ <b>May 16, 2008</b> Date  _____ <b>770-933-9500</b> Telephone Number	

The collection of information is required by CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, US Patent and Trademark Office, US Department of Commerce, PO Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, PO Box 1450 Alexandria, VA 22313-1450.

## Electronic Patent Application Fee Transmittal

<b>Application Number:</b>	10937736			
<b>Filing Date:</b>	08-Sep-2004			
<b>Title of Invention:</b>	Refrigerant with lubricating oil for replacement of R22 refrigerant			
<b>First Named Inventor/Applicant Name:</b>	Kenneth M. Ponder			
<b>Filer:</b>	Todd Deveau./Virginia Keenan			
<b>Attorney Docket Number:</b>	821920-1030			
Filed as Small Entity				
<b>Utility Filing Fees</b>				
<b>Description</b>	<b>Fee Code</b>	<b>Quantity</b>	<b>Amount</b>	<b>Sub-Total in USD(\$)</b>
<b>Basic Filing:</b>				
<b>Pages:</b>				
<b>Claims:</b>				
<b>Miscellaneous-Filing:</b>				
<b>Petition:</b>				
<b>Patent-Appeals-and-Interference:</b>				
Post-Allowance-and-Post-Issuance:				
<b>Extension-of-Time:</b>				
Extension - 2 months with \$0 paid	2252	1	230	230

EXHIBIT 1005

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				230

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	3315600
<b>Application Number:</b>	10937736
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1006
<b>Title of Invention:</b>	Refrigerant with lubricating oil for replacement of R22 refrigerant
<b>First Named Inventor/Applicant Name:</b>	Kenneth M. Ponder
<b>Customer Number:</b>	24504
<b>Filer:</b>	Todd Deveau./Virginia Keenan
<b>Filer Authorized By:</b>	Todd Deveau.
<b>Attorney Docket Number:</b>	821920-1030
<b>Receipt Date:</b>	16-MAY-2008
<b>Filing Date:</b>	08-SEP-2004
<b>Time Stamp:</b>	14:46:43
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$230
RAM confirmation Number	59
Deposit Account	200778
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:					
Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	00713125.PDF	153496 223a9625c1cec947c5d5b6bb1c40b82735843878	no	3
Warnings:					
Information:					
2	Amendment - After Non-Final Rejection	00713112.PDF	402610 55ba61fb303bb88f6bc28595940a6e78ef7ec03a	no	10
Warnings:					
Information:					
3	Extension of Time	00713124.PDF	52215 09438b27bd99c11713ccbe5cc9ba5d51bbd60f90	no	1
Warnings:					
Information:					
4	Fee Worksheet (PTO-06)	fee-info.pdf	8156 02f48aaac6cc46c473ddfcaaae021aa10efe3a0	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			616477		
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><b><u>New Applications Under 35 U.S.C. 111</u></b>  If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><b><u>National Stage of an International Application under 35 U.S.C. 371</u></b>  If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><b><u>New International Application Filed with the USPTO as a Receiving Office</u></b>  If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Docket No.: 821920-1030

PONDER, K., et al.,

Confirmation No.: 1006

Serial No.: 10/937,736

Group Art Unit: 1751

Filing Date: September 8, 2004

Examiner: John R. Hardee

For: **Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant**

**SECOND DECLARATION OF ANDY GBUR**

I, Andy Gbur, hereby declare as follows:

1. I am the Director of Operations for Intertek, ETL SEMKO Division.
2. My duties at Intertek include financial and technical oversight of the Refrigeration Chemistry laboratory.
3. My educational background includes B.S. in Chemistry from the Ohio State University.
4. My work experience prior to joining Intertek includes I have been employed with Intertek (Integral Sciences) for the last 15 yrs since graduation.
5. I have served on the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc. (ASHRAE) Standard Project Committee 34 from 2002 to 2007. The work of this Committee includes review and issuance of ASHRAE standards and adoption and publication of amendments to standards in the form of addenda, such as Addendum c and Addendum e to ANSI/ASHRAE Standard 34-2001, copies of which are attached hereto. I served on this Committee when both Addendum c and Addendum e were approved and issued by the Committee.
6. Our Committee in ASHRAE recognizes that blends of refrigerant gases having the same components in different proportions can produce refrigerant blend compositions having different refrigerant properties as typically reflected by differences

in temperature/pressure profiles of the refrigerant blend compositions. ASHRAE gives each different blend a distinct designation number, or Refrigerant Number. In the case of blends having the same components but differing only in the proportions of the components the differences are identified by designating each different blend with the same Refrigerant Number to show the blends have the same components but with a different uppercase letter to recognize the different blends result in different refrigerants. See Addendum e. Thus, for example, ASHRAE has granted different refrigerant designation numbers to refrigerant compositions consisting of difluoromethane (HFC-32), pentafluoroethane (HFC-125) and tetrafluoroethane (HFC-134a) where these three refrigerant components are present in different proportions as evidenced by designation numbers R407A (a 20-40-40 proportion blend), R407B (a 10-70-20 proportion blend), R407C (a 23-25-52 proportion blend), R407D (a 15-15-70 proportion blend), and R407E (a 25-15-60 proportion blend). See Addendum c to ANSI/ASHRAE Standard 34-2001 (2003). One skilled in the refrigerant art would expect that, for example, refrigerant R407A would have different refrigerant properties than those of refrigerant R407B.

7. I have reviewed U.S. Patent 6,207,071 in the name of Takigawa. While Takigawa makes mention of refrigerants containing HFC-134a (1,1,1,2-tetrafluoroethane) and/or HFC-125 (pentafluoroethane), Takigawa does not disclose a single example of a refrigerant gas composition or blend combining only tetrafluoroethane and pentafluoroethane to the exclusion of another refrigerant gas component. Every example provided that includes a combination of tetrafluoroethane and pentafluoroethane also involves the addition of at least one additional refrigerant gas component, such as HFC-32 (difluoromethane). See, for example, Column 8, lines 35-55, and the Examples beginning at Column 10, line 5. Thus, Takigawa fails to teach a refrigerant composition consisting of tetrafluoroethane and pentafluoroethane as the only refrigerant gas components in the composition in any particular proportion. Further,

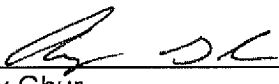


in view of the different designations by ASHRAE of even the same refrigerant gas components provided in different proportions (such as R407A, R407B, etc.) in my opinion it would not be obvious to one skilled in the art of refrigerant gas compositions to produce a refrigerant gas composition containing only about 40% to about 45% by weight tetrafluoroethane and about 55% to about 60% by weight pentafluoroethane from the teachings in the Takigawa patent. It should be noted that ASHRAE does not consider components such as lubricants or corrosion inhibitors to be refrigerant gas components, but instead additives. Additives are not considered to affect the refrigerant properties of a refrigerant gas composition and thus may or may not be included or added to any such refrigerant composition.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of this patent.

Respectfully submitted,

Date: 5-16-8

  
\_\_\_\_\_  
Andy Gbur

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875					Application or Docket Number <b>10/937,736</b>		Filing Date <b>09/08/2004</b>		<input type="checkbox"/> To be Mailed	
<b>APPLICATION AS FILED – PART I</b>										
(Column 1)			(Column 2)		SMALL ENTITY <input checked="" type="checkbox"/> OR			OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)
<input type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A			N/A	
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A			N/A	
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$	=		X \$	=		X \$	=
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$	=		X \$	=		X \$	=
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL				
<b>APPLICATION AS AMENDED – PART II</b>										
(Column 1)			(Column 2)		SMALL ENTITY OR			OTHER THAN SMALL ENTITY		
AMENDMENT	05/16/2008	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 26	Minus	** 43	= 0	X \$25 =	0		X \$	=
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 5	= 0	X \$105 =	0		X \$	=
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))										
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
						TOTAL ADD'L FEE	0		TOTAL ADD'L FEE	
(Column 1)			(Column 2)		SMALL ENTITY OR			OTHER THAN SMALL ENTITY		
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$	=		X \$	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$	=		X \$	=
<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))										
<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
						TOTAL ADD'L FEE			TOTAL ADD'L FEE	
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.										

Legal Instrument Examiner:  
/VANESSA BARBER/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/937,736	09/08/2004	Kenneth M. Ponder	821920-1030	1006
24504 7590 12/17/2007 THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP 600 GALLERIA PARKWAY, S.E. STE 1500 ATLANTA, GA 30339-5994			EXAMINER HARDEE, JOHN R	
			ART UNIT 1796	PAPER NUMBER
			MAIL DATE 12/17/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/937,736	<b>Applicant(s)</b> PONDER ET AL.	
	<b>Examiner</b> John R. Hardee	<b>Art Unit</b> 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10, 21-25, 27, 29-31, 33-35 and 37-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10, 21-25, 27, 29-31, 33-35 and 37-40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |  |
|---|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                      | 5) <input type="checkbox"/> Notice of Informal Patent Application                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 1-10, 21-25, 27, 29-31, 33-35 and 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takigawa et al., US 6,207,071. The reference discloses lubricating oil compositions and their use in compositions comprising R134a and R125 (col. 1, lines 13+). The reference further discloses the use of hydrofluorocarbons as replacements for chlorofluorocarbons (col. 1, lines 20+). Suitable lubricants include the alkylbenzene oils described at col. 2, lines 30+. Refrigerants include alkane fluorides containing 40% or more of R134a in admixture with alkyl fluorides containing, most preferably, 40% or more of R125 (col. 8, lines 20+). The reference further discloses that there is "no restriction as to the kind of HFC to be mixed with" the disclosed refrigerants. The examiner takes the position that this can reasonably be construed to mean that no additional HFC need be added, and that the disclosure reads on refrigerant compositions consisting of 40-60% R134a and 60-40% of R125.. Conventional additives may be added, including those disclosed at the top of col. 8. The examiner takes the position that anticorrosion additives are conventional, and that their use would be obvious over this disclosure. Lubricant compositions comprising naphthenic mineral oil and polyol polyesters are disclosed in Table 1. The examiner takes the position that "naphthenic mineral oil" has a genus-species relationship with the lubricant recited in claim 2, so its use would be obvious over the

disclosure in the absence of unexpected results. Note the disclosure in Evaluation Tests 2 and 3 of refrigerant being premixed with lubricant prior to charging a compressor. The disclosed lubricating refrigerant compositions are useful in a variety of refrigeration apparatus, as disclosed at the top of col. 9. This reference differs from the claimed subject matter in that it does not disclose a composition which reads on applicant's claims with sufficient specificity to constitute anticipation.

It would have been obvious at the time the invention was made to make such a composition, because this reference teaches that all of the ingredients recited by applicants are suitable for inclusion in a refrigerant composition. The person of ordinary skill in the refrigeration art would expect the recited compositions to have properties similar to those compositions which are exemplified, absent a showing to the contrary.

In the case where the claimed ranges overlap or lie inside ranges disclosed by the prior art, a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 USPQ2d 1934 (Fed Cir. 1990).

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, Dr. John R. Hardee, whose telephone number is (571) 272-1318. The examiner can normally be reached on Monday through Friday from 8:00 until 4:30. In the event that the examiner is not available, his supervisor, Mr. Harold Pyon, may be reached at (571) 272-1498.

The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8100.

Application/Control Number:  
10/937,736  
Art Unit: 1796

Page 4

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "J. Hardee", with a stylized, cursive script.

John R. Hardee  
Primary Examiner  
December 13, 2007



# UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/937,736	09/08/2004	Kenneth M. Ponder	821920-1030	1006
24504	7590	12/14/2007		
THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP 600 GALLERIA PARKWAY, S.E. STE 1500 ATLANTA, GA 30339-5994			EXAMINER HARDEE, JOHN R	
			ART UNIT	PAPER NUMBER
			1796	
			MAIL DATE	DELIVERY MODE
			12/14/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



<b>Interview Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/937,736	PONDER ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	John R. Hardee	1796	

All participants (applicant, applicant's representative, PTO personnel):

(1) John R. Hardee. (3) \_\_\_\_\_

(2) Atty. Deveau. (4) \_\_\_\_\_

Date of Interview: 11 December 2007.

Type: a) ☒ Telephonic b) ☐ Video Conference  
c) ☐ Personal [copy given to: 1) ☐ applicant 2) ☐ applicant's representative]

Exhibit shown or demonstration conducted: d) ☐ Yes e) ☒ No.

If Yes, brief description: \_\_\_\_\_

Claim(s) discussed: \_\_\_\_\_

Identification of prior art discussed: Takagawa et al., US 6,207,071.

Agreement with respect to the claims f) ☐ was reached. g) ☒ was not reached. h) ☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: Examiner agreed to get a third opinion regarding whether the reference fairly discloses a mixture of refrigerant gases consisting of R-125 and R-134a as presently claimed. Quality Assurance Specialist Katherine Gorgos agreed with the examiner that the refrigerant mixture is obvious over the reference.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Examiner Note: You must sign this form unless it is an Attachment to a signed Office action.

  
\_\_\_\_\_  
Examiner's signature, if required

## Summary of Record of Interview Requirements

### Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record

A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

### Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews

#### Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

#### 37 CFR §1.2 Business to be transacted in writing.

All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

- 1) A brief description of the nature of any exhibit shown or any demonstration conducted,
- 2) an identification of the claims discussed,
- 3) an identification of the specific prior art discussed,
- 4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
- 5) a brief identification of the general thrust of the principal arguments presented to the examiner,  
(The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
- 6) a general indication of any other pertinent matters discussed, and
- 7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

### Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In Re Application of:

Docket No.: 821920-1030

PONDER, K., et al.,

Art Unit: 1751

Serial No.: 10/937,736

Examiner: John R. Hardee

Filing Date: September 8, 2004

Confirmation No.: 1006

For: **Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant**

**RESPONSE AND AMENDMENT**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

The non-final Office Action Paper No./Mail Date 20070815, from Examiner John R. Hardee of Art Unit 1751, mailed August 20, 2007, has been received and carefully reviewed. Applicants respectfully request reconsideration and withdrawal of the rejections presented in the Office Action in view of the following remarks and amendments. No new matter and, thus, no new issues are presented.

**DEPOSIT ACCOUNT AUTHORIZATION**

It is not believed that any additional extensions of time or fees are required, beyond those that may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required therefor (including fees for net addition of claims) are hereby authorized to be charged to deposit account no. 20-0778.

## **REMARKS**

The non-Final Office Action presents two issues. One, the Specification is objected to under 35 U.S.C. 132a on the basis that it introduces new matter into the disclosure. Two, claims 1-10, 21-25, 27, 29-31, 33-35 and 37-40 stand rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement on the grounds that the claim(s) contains subject matter which was not described in the Specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention and is identified as a new matter rejection. More particularly, the Office Action comments that the Specification does not provide basis for switching the percentages of pentafluoroethane and tetrafluoroethane, and further, that the inherent properties of the compositions in Table 2 do not provide adequate basis in the absence of a teaching, available at the time of filing, that the disclosed mixtures possess the disclosed physical properties. Applicant respectfully traverses these rejections.

It is not new matter where one skilled in the art would not only recognize the existence of error in the Specification, but also the appropriate correction. In such a case, an amendment to correct such an error does not constitute new matter. See, MPEP Section 2163.07 (II Obvious Errors). Further, by disclosing in a patent application a device, or composition, that inherently performs a function, or has a property, operates according to a theory or has an advantage, a patent application necessarily discloses that function, theory or advantage, even though it says nothing explicit concerning it. In such case, the application may later be amended to recite the function, theory or advantage without introducing prohibited new matter. See, MPEP Section 2163.07(a).

Applicant respectfully submits that the present case fits the situations noted above which allow amendment without constituting new matter. More particularly, Applicant submits herewith the Declaration of Andy Gbur. In his Declaration, Mr. Gbur comments that he reviewed the published version of the above-identified patent application, U.S. Patent Publication 2005 0082510 and in particular, Figs. 1 and 2, the text appearing in Sections [0054-0057], corresponding to page 13, lines 1-15, and Table 2 appearing in the publication and that he noticed an obvious error in the application. Mr. Gbur states that the error he noticed relates to the description and labeling of the Pressure vs. Temperature profiles in Fig. 1, the Temperature vs. Enthalpy profiles in Fig. 2, and the related text appearing in the above noted paragraphs. He further comments

that it is obvious to him that Fig. 1 shows Pressure (liquid) vs. Temperature profiles for blends of 40/60, 45/55 and 42/58 of tetrafluoroethane and pentafluoroethane, respectively. He further states that it is also obvious to him that Fig. 2 shows Temperature vs. Enthalpy profiles comparing a blend of 40/60 tetrafluoroethane and pentafluoroethane to R-22. Mr. Gbur further states it is obvious to him that the data in the middle three columns in Table 2 for P(60/40) is for 60% pentafluoroethane and 40% tetrafluoroethane, for P(58-42) is for 58% pentafluoroethane and 42% tetrafluoroethane, and for P(55-45) is for 55% pentafluoroethane and 45% tetrafluoroethane.

Mr. Gbur states it is his opinion that others skilled in the art of refrigerant compositions would also recognize these obvious errors in Figures 1 and 2, and in paragraphs [0054-0057] and how the descriptions and text should read. He also states it is his opinion that one skilled in the art of refrigerant compositions would recognize that the heading P(60-40) in Table 2 represents 60% pentafluoroethane and 40% tetrafluoroethane, the heading P(58-42) represents 58% pentafluoroethane and 42% tetrafluoroethane, and the heading P(55-45) represents 55% pentafluoroethane and 45% tetrafluoroethane.

With reference to Fig. 1, for example, Mr. Gbur states it is his opinion that one skilled in the art of refrigerant compositions would recognize that as the concentration of pentafluoroethane drops in a composition of pentafluoroethane and tetrafluoroethane, the Pressure vs. Temperature profile curve would likewise drop because one skilled in the art would recognize that lowering the concentration of pentafluoroethane in such a composition would generally cause the vapor pressure of the composition at a given temperature to decrease as the amount of pentafluoroethane is decreased and not increase. Mr. Gbur states, thus, one skilled in the art of refrigerant compositions would recognize that the top curve in Figure 1 represents the Pressure vs. Temperature profile for a composition of pentafluoroethane and tetrafluoroethane having 60% pentafluoroethane, the next curve down would represent the profile for such a composition having 58% pentafluoroethane, and the third curve down would represent the profile for such a composition having 55% pentafluoroethane, as represented by the key in Figure 1. Mr. Gbur also states that likewise one skilled in the art would recognize that the Pressure vs. Temperature data the middle three columns in Table 2 reflects a 60% pentafluoroethane composition in the left column of the three columns, labeled P(60-40), decreasing to 58% pentafluoroethane and then to 55% pentafluoroethane in

the right column of the three columns consistent with the drop in pressures in the columns from left to right.

Accordingly, Applicant respectfully submits that the amendments presented previously do not present new matter. In particular, Applicant submits that the Specification does provide a basis for switching the percentages of pentafluoroethane and tetrafluoroethane, and further, that the inherent properties of the compositions in Table 2, as well as Figs. 1 and 2 and related text in the Specification do provide adequate basis and a teaching, available at the time of filing, that the disclosed mixtures possess the disclosed physical properties claimed.

**CONCLUSION**

In light of the foregoing remarks, Applicant respectfully submits that the application is in condition for allowance. If the Examiner has any questions about the above remarks, or if, in the opinion of the Examiner, a telephone conference would expedite the examination of this matter, the Examiner is invited to call the undersigned attorney at (770) 933-9500.

Respectfully Submitted,

**THOMAS, KAYDEN, HORSTEMEYER  
& RISLEY, L.L.P.**

By:           /todd deveau/            
Todd Deveau, Reg. No. 29,526

100 Galleria Parkway, Suite 1750  
Atlanta, Georgia 30339-5948  
(770) 933-9500

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	2393513
<b>Application Number:</b>	10937736
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1006
<b>Title of Invention:</b>	Refrigerant with lubricating oil for replacement of R22 refrigerant
<b>First Named Inventor/Applicant Name:</b>	Kenneth M. Ponder
<b>Customer Number:</b>	24504
<b>Filer:</b>	Todd Deveau./Laurie Delesandro
<b>Filer Authorized By:</b>	Todd Deveau.
<b>Attorney Docket Number:</b>	821920-1030
<b>Receipt Date:</b>	30-OCT-2007
<b>Filing Date:</b>	08-SEP-2004
<b>Time Stamp:</b>	15:02:13
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
------------------------	----

### File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1		00603681.pdf	180902 <small>213a951c26d313647597c01cc8479a33e9d5418d</small>	yes	4

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Amendment - After Non-Final Rejection	1	1
	Applicant Arguments/Remarks Made in an Amendment	2	4
Warnings:			
Information:			
Total Files Size (in bytes):		180902	
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>			



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In Re Application of:

Docket No.: 821920-1030

PONDER, K., et al.,

Confirmation No.: 1006

Serial No.: 10/937,736

Group Art Unit: 1751

Filing Date: September 8, 2004

Examiner: John R. Hardee

For: **Refrigerant with Lubricating Oil for Replacement of R-22 Refrigerant**

**DECLARATION OF ANDY GBUR**

I, Andy Gbur, hereby declare as follows:

1. I am the Director of Operations for Intertek, ETL SEMKO Division.
2. My duties at Intertek include financial and technical oversight of the Refrigeration Chemistry laboratory.
3. My educational background includes B.S. in Chemistry from the Ohio State University
4. My work experience prior to joining Intertek includes I have been employed with Intertek (Integral Sciences) for the last 15 yrs since graduation.
5. I reviewed the published version of the above-identified patent application, U.S. 2005 0082510, and in particular, Figures 1 and 2, the text appearing in sections [0054-0057] and Table 2 appearing in the publication and noticed an obvious error in the application. The error relates to the description and labeling of the Pressure vs. Temperature profiles in Figure 1, the Temperature vs. Enthalpy profiles in Figure 2, and the related text appearing in paragraphs [0054-0057]. It is obvious to me that Figure 1 shows Pressure (liquid) vs. Temperature profiles for blends of 40/60, 45/55 and 42/58 of tetrafluoroethane and pentafluoroethane, respectively. It is also obvious to me that Figure 2 shows Temperature vs. Enthalpy profiles comparing a blend of 40/60 tetrafluoroethane and pentafluoroethane to R-22. Likewise, it is obvious to me that the

data in the middle three columns in Table 2 for P(60/40) is for 60% pentafluoroethane and 40% tetrafluoroethane, for P(58-42) is for 58% pentafluoroethane and 42% tetrafluoroethane, and for P(55-45) is for 55% pentafluoroethane and 45% tetrafluoroethane.

6. Based on my background and experience, it is my opinion that others skilled in the art of refrigerant compositions would also recognize these obvious errors in Figures 1 and 2, and in paragraphs [0054-0057] and how the descriptions and text should read. It is also my opinion that one skilled in the art of refrigerant compositions would recognize that the heading P(60-40) in Table 2 represents 60% pentafluoroethane and 40% tetrafluoroethane, the heading P(58-42) represents 58% pentafluoroethane and 42% tetrafluoroethane, and the heading P(55-45) represents 55% pentafluoroethane and 45% tetrafluoroethane.

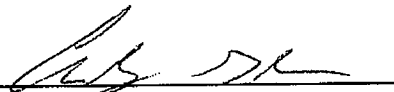
7. With reference to Figure 1, for example, it is my opinion that one skilled in the art of refrigerant compositions would recognize that as the concentration of pentafluoroethane drops in a composition of pentafluoroethane and tetrafluoroethane, the Pressure vs. Temperature profile curve would likewise drop because one skilled in the art would recognize that lowering the concentration of pentafluoroethane in such a composition would generally cause the vapor pressure of the composition at a given temperature to decrease as the amount of pentafluoroethane is decreased and not increase. Thus one skilled in the art of refrigerant compositions would recognize that the top curve in Figure 1 represents the Pressure vs. Temperature profile for a composition of pentafluoroethane and tetrafluoroethane having 60% pentafluoroethane, the next curve down would represent the profile for such a composition having 58% pentafluoroethane, and the third curve down would represent the profile for such a composition having 55% pentafluoroethane, as represented by the key in Figure 1. Likewise one skilled in the art would recognize that the Pressure vs. Temperature data

the middle three columns in Table 2 reflects a 60% pentafluoroethane composition in the left column of the three columns, labeled P(60-40), decreasing to 58% pentafluoroethane and then to 55% pentafluoroethane in the right column of the three columns consistent with the drop in pressures in the columns from left to right.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of this patent.

Respectfully submitted,

Date: 9-17-07

  
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Andy Gbur

## Electronic Acknowledgement Receipt

<b>EFS ID:</b>	2393619
<b>Application Number:</b>	10937736
<b>International Application Number:</b>	
<b>Confirmation Number:</b>	1006
<b>Title of Invention:</b>	Refrigerant with lubricating oil for replacement of R22 refrigerant
<b>First Named Inventor/Applicant Name:</b>	Kenneth M. Ponder
<b>Customer Number:</b>	24504
<b>Filer:</b>	Todd Deveau.
<b>Filer Authorized By:</b>	
<b>Attorney Docket Number:</b>	821920-1030
<b>Receipt Date:</b>	30-OCT-2007
<b>Filing Date:</b>	08-SEP-2004
<b>Time Stamp:</b>	15:07:48
<b>Application Type:</b>	Utility under 35 USC 111(a)

### Payment information:

Submitted with Payment	no
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### File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	00603686.pdf	107195 a12299a163da4d0fc0404dcd3d98f4402a9e47d	no	3

### Warnings:

<b>Information:</b>	
<b>Total Files Size (in bytes):</b>	107195
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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

<b>PATENT APPLICATION FEE DETERMINATION RECORD</b> Substitute for Form PTO-875					Application or Docket Number <b>10/937,736</b>		Filing Date <b>09/08/2004</b>		<input type="checkbox"/> To be Mailed	
<b>APPLICATION AS FILED – PART I</b>										
(Column 1)			(Column 2)			SMALL ENTITY <input checked="" type="checkbox"/> OR		OTHER THAN SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)		RATE (\$)	FEE (\$)			
<input checked="" type="checkbox"/> BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	<b>385</b>		N/A				
<input type="checkbox"/> SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A				
<input type="checkbox"/> EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A				
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$	=	OR	X \$	=			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$	=		X \$	=			
<input type="checkbox"/> APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.					TOTAL	<b>385</b>	TOTAL			
<b>APPLICATION AS AMENDED – PART II</b>										
(Column 1)			(Column 2)			SMALL ENTITY OR		OTHER THAN SMALL ENTITY		
<b>AMENDMENT</b>	<b>10/30/2007</b>	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	* 26	Minus	** 43	= 0	X \$25 =	0	OR	X \$	=
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 5	= 0	X \$105 =	0	OR	X \$	=
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))									
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE	<b>0</b>	OR	TOTAL ADD'L FEE	
<b>AMENDMENT</b>		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)		RATE (\$)	ADDITIONAL FEE (\$)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$	=	OR	X \$	=
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$	=	OR	X \$	=
	<input type="checkbox"/> Application Size Fee (37 CFR 1.16(s))									
	<input type="checkbox"/> FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	
<p>* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.</p> <p>** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".</p> <p>*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".</p> <p>The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.</p>										

Legal Instrument Examiner:  
Teresa J. Woodruff

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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