UNITED STATES PATENT AND TRADEMARK OFFICE

USPTO Automated Interview Request (AIR)

Nov 30 2017

This paper requesting to schedule and/or conduct an interview is appropriate because:

This submission is requested to be accepted as an authorization for this interview to communicate via the internet. Recognizing that Internet communications are not secure, I hereby authorize the USPTO to communicate with the undersigned concerning scheduling of the interview via video conference, instant messaging, or electronic mail, and to conduct the interview in accordance with office practice including video conferencing.

Name(s):
Todd Deveau

S-signature:
/Todd Deveau/

Registration Number:
29526

U.S. Application Number:
13493491

Confirmation Number:
1039

E-mail Address:
todd.deveau@thomashorstemeyer.com

Phone Number:
7700339500

Proposed Time of Interview:
12-8-2017 10:30 AM ET

Prefered Interview Type:
Telephonic

I am the applicant or applicant's representative for this application.

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.
13/493,491	06/11/2012	Kenneth M. Ponder	821920-1032	1039

24504 7590 12/05/2017

THOMAS | HORSTEMEYER, LLP
3200 WINDY HILL ROAD, SE
SUITE 1600E
ATLANTA, GA 30339

EXAMINER
HARDEE, JOHN R

ART UNIT	PAPER NUMBER
1761	

NOTIFICATION DATE	DELIVERY MODE
12/05/2017	ELECTRONIC

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.

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

uspatents@tkhr.com
ozzie.liggins@tkhr.com
docketing@thomashorstemeyer.com

Applicant-Initiated Interview Summary	**Application No.** 13/493,491	**Applicant(s)** Ponder et al.	
	Examiner JOHN R HARDEE	**Art Unit** 1761	**AIA Status** No

All participants (applicant, applicants representative, PTO personnel):

(1) JOHN R. HARDEE. (3) _____.

(2) Mr. Todd Deveau. (4) _____.

Date of Interview: 30 November 2017.

Type: ☑ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☐ No.
If Yes, brief description: _____.

Issues Discussed ☐101 ☐112 ☐102 ☐103 ☑Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: _____.

Identification of prior art discussed: _____.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Mr. Deveau submitted an automated interview request. Noting that the application was after final, the examiner called Mr. Deveau to discuss the need for an interview. A declaration containing additional data which was prepared by the applicant is not present in the electronic file wrapper. The declaration may have been lost by the Office, or applicant may have forgotten to submit it with the response to the rejection of March 28, 2017. Upon consultation with his supervisor, the examiner called back to say that filing an RCE would be appropriate prior to filing the declaration..

Applicant recordation instructions: 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

Examiner recordation instructions: Examiners must summarize the substance of any interview of record. A complete and proper recordation of the substance of an interview should include the items listed in MPEP 713.04 for complete and proper recordation including the identification of the general thrust of each argument or issue discussed, a general indication of any other pertinent matters discussed regarding patentability and the general results or outcome of the interview, to include an indication as to whether or not agreement was reached on the issues raised.

☐ Attachment

/JOHN R HARDEE/ Primary Examiner, Art Unit 1761	

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 examiners 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 applicants 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 applicants 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 examiners 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 examiners initials.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:	Confirmation No.: 1039
Ponder et al.	Group Art Unit: 1761
Serial No.: 13/493,491	Examiner: Hardee, John R.
Filed: June 11, 2012	Docket No. 821920-1032

For: **REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT**

RESPONSE TO FINAL OFFICE ACTION AND REQUEST FOR CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0

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

Sir:

The final Office Action from Examiner John R. Hardee mailed on October 12, 2017 (Paper No./Mail Date 20171004), has been received and reviewed. Applicant submits herewith its Certification and Request for Consideration Under the After Final Consideration Pilot Program 2.0 [Form PTO/SB/434 (05-13)]. Applicant provides the following remarks in response and in support of its Request.

AUTHORIZATION TO DEBIT ACCOUNT

It is not believed that extensions of time or fees for net addition of claims are required beyond those that may otherwise be provided for in documents accompanying this paper. However, if additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required therefor (including, but not limited to, fees for net addition of claims) are hereby authorized to be charged to our Deposit Account No. 20-0778.

IN THE CLAIMS:

1 – 29. (Cancelled)

30. (Previously presented) In an apparatus designed for use with chlorodifluoromethane refrigerant, the improvement comprising substituting the chlorodifluoromethane with a refrigerant composition designed to achieve a phase change, the refrigerant composition comprising a combination of refrigerant gases, said refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane, the ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits a dew point at about -32°F or a bubble point at about -41.5°F at about one standard atmosphere of pressure,

wherein in the substitute refrigerant said pentafluoroethane is present in an amount of 59% to 57% by weight and said tetrafluoroethane is present in an amount of 41% to 43% by weight of the combined weight of the pentafluoroethane and tetrafluoroethane on the basis of the combined weights of said pentafluoroethane and said tetrafluoroethane totaling 100%, and

wherein the refrigerant composition further comprises non-refrigerant gas components, said non-refrigerant gas components including a lubricating oil, wherein the lubricating oil is present up to about 20% by weight of the refrigerant gases and is soluble in chlorodifluoromethane, tetrafluoroethane and pentafluoroethanes wherein the lubricating oil is selected from the group consisting of mineral oil, synthetic alkyl aromatic lubricants, and mixtures thereof.

31. (Previously Presented) In the apparatus of claim 30, wherein the blend exhibits a dew point at about -32°F and a bubble point at about -41.5°F at about one standard atmosphere of pressure.

32. (Previously Presented) A method for refilling an apparatus designed for use with a chlorodifluoromethane refrigerant, the method comprising:

(1) selecting a substitute refrigerant composition designed to achieve a phase change and comprising a combination of refrigerant gases, the refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane, the ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits a dew point at about -32°F or a bubble point at about -41.5°F at about one standard atmosphere of pressure, wherein in the substitute refrigerant said pentafluoroethane is present in an amount of 59% to 57% by weight and said tetrafluoroethane is present in an amount of 41% to 43% by weight of the combined weight of the pentafluoroethane and tetrafluoroethane on the basis of the combined weights of said pentafluoroethane and said tetrafluoroethane totaling 100%,

(2) supplying the substitute refrigerant composition under pressure, in a cylinder can fitted with an outlet compatible with a chlorodifluoromethane recharging manifold of the apparatus; and

(3) adding to said apparatus via the manifold the substitute refrigerant composition for chlorodifluoromethane, wherein the refrigerant composition further comprises non-refrigerant gas components, said non-refrigerant gas components including a lubricating oil, wherein the lubricating oil is present up to about 20% by weight of the refrigerant gases and is soluble in chlorodifluoromethane, tetrafluoroethane and pentafluoroethane, wherein the lubricating oil is selected from the group consisting of mineral oil, synthetic alkyl aromatic lubricants, and mixtures thereof.

33. (Previously Presented) The method of claim 32, wherein the blend exhibits a dew point at about -32°F and a bubble point at about -41.5°F at about one standard atmosphere of pressure.

34. (Previously Presented) A refrigerant composition comprising a combination of refrigerant gases, the refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane, the

ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits a dew point at about -32°F or a bubble point at about -41.5°F at about one standard atmosphere of pressure,

wherein in the substitute refrigerant said pentafluoroethane is present in an amount of 59% to 57% by weight and said tetrafluoroethane is present in an amount of 41% to 43% by weight of the combined weight of the pentafluoroethane and tetrafluoroethane on the basis of the combined weights of said pentafluoroethane and said tetrafluoroethane totaling 100%, and

wherein the refrigerant composition further comprises non-refrigerant gas components, said non-refrigerant gas components including a lubricating oil, wherein the lubricating oil is present up to about 20% by weight of the refrigerant gases and is soluble in chlorodifluoromethane, tetrafluoroethane and pentafluoroethane, wherein the lubricating oil is selected from the group consisting of mineral oil, synthetic alkyl aromatic lubricants, and mixtures thereof.

35. (Previously Presented) The refrigerant composition of claim 34, wherein the blend exhibits a dew point at about -32°F and a bubble point at about -41.5°F at about one standard atmosphere of pressure.

36. (Previously Presented) The refrigerant composition according to claim 34, wherein the lubricating oil includes an additive selected from the group consisting of further includes an acrylic polymer, a corrosion inhibitor, a surfactant, a foaming agent, and mixtures thereof.

37. (Previously Presented) In the apparatus of claim 30, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.

38. (Previously Presented) In the apparatus of claim 30, wherein the lubricating oil includes an additive selected from the group consisting of an acrylic polymer, a corrosion inhibitor, a surfactant, a foaming agent, and mixtures thereof.

39. (Previously Presented) The method according to claim 32, wherein the apparatus is selected from the group consisting of refrigeration equipment, air-conditioning equipment, and HVAC equipment.

40. (Previously Presented) The method according to claim 32, wherein the lubricating oil includes an additive selected from the group consisting of an acrylic polymer, a corrosion inhibit, a surfactant, a foaming agent, and mixtures thereof.

41. (Previously Presented) In the apparatus of claim 30, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

42. (Previously Presented) The method of claim 32, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

43. (Previously Presented) The refrigerant composition of claim 34, wherein the tetrafluoroethane is 1,1,1,2-tetrafluoroethane.

44. (Previously Presented) In the apparatus of claim 41, 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.

45. (Previously Presented) The method according to claim 42, 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.

46. (Previously Presented) The refrigerant composition according to claim 43, 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.

47. (Previously Presented) In the apparatus of claim 30, wherein the blend exhibits a glide at about 9.5°F.

48. (Previously Presented) The method of claim 32, wherein the blend exhibits a glide at about 9.5°F.

49. (Previously Presented) The refrigerant composition of claim 34, wherein the blend exhibits a glide at about 9.5°F.

REMARKS

The Office Action presents a single issue, namely: claims 30-49 stand rejected under 35 USC 103(a) as obvious in view of US 6,207,071 (Takigawa et al.).

Claims 30-49 are pending.

First, Applicants thank the Examiner for the interview and issuance of the Interview Summary on December 5, 2017. Applicants note the kind suggestion for the filing of an RCE in the Interview Summary. However, there appears to be some confusion and inconsistencies between statements in the Non-final Office Action issued May 28, 2017, the Final Office Action issued October 12, 2017 and the Interview Summary. Thus, the Applicants feel the need to comment prior to taking further action.

The Non-final Office Action issued March 28, 2017 in Section 3, page 3-4 in responding to Applicants' prior comments stated:

> *Applicant's arguments filed February 28, 2017 have been fully considered but they are not persuasive. Arguments regarding chlorofluorocarbon substitutes versus hydrochlorofluorocarbons substitutes are well taken. As a courtesy to applicant, this action is NOT FINAL. Nonetheless, the reference does provide motivation to experiment within a relatively narrow range to find suitable hydrochlorofluorocarbons substitutes. The examiner has not argued, nor does he believe that all compositions falling within this narrow range will behave identically. This is the purpose of experimentation, and the motivation provided in the reference is more explicit than an "obvious to try" standard. The reference implicitly discloses a refrigerant composition consisting of 40% of 1,1, 1 ,2-tetrafluoroethane and 60% of pentafluoroethane at col. 8, line 39. This is the closest prior art. If applicant believes that compositions according to the current claims provide unexpected benefits over this composition, such should be demonstrated via timely filed declaration. Attorney arguments cannot take the place of evidence.*

In view of the comments in the Non-final Office Action that: "If Applicant believes that compositions according to the current claims provide unexpected benefits over this composition [the composition of the Takigawa reference], such should be demonstrated via timely filed Declaration. Any Attorney arguments cannot take the place of evidence", Applicants submitted their Response dated September 28, 2017 with which Applicants attempted to include the Second Declaration of Kenneth M. Ponder. It does not appear, however, that the Declaration

found its way into the Offices Electronic Records. The Second Declaration of Kenneth M. Ponder demonstrates the unexpected benefits over the cited reference, in particular the allegedly implicitly disclosed 40% 1,1,1,2-tetrafluoroethane (R-134a) and 60% pentafluoroethane (R-125).

The Final Office Action issued October 12, 2017 provides merely the following comment found in Section 4, pages 2-3 in reply to Applicants' submission:

> *Applicant's arguments filed September 28, 2017 have been fully considered but they are not persuasive. Applicant's arguments largely repeat those answered in the previous office action and remain non-persuasive for the reasons of record. Applicant argues that the Takigawa reference does not provide any teaching or suggestion on how to select a refrigerant composition to serve as a substitute specifically for R-22. This is not persuasive because the rejection was made for obviousness, not anticipation. Again, the examiner has not argued that all 40:60 to 60:40 mixtures of R-125 and R-134a will behave identically. The reference provides this relatively narrow window in which to experiment. Reproduction of the content of the declarations of Kenneth Ponder is appreciated. This information has been considered and commented upon previously. Applicant's citation of case law is well taken. Perhaps the issue is ripe for appeal and for additional guidance to be provided to both the examiner and the attorney by the PTAB.*

The Interview Summary, however, comments:

> *"Noting that the application was after final, the examiner called Mr. Deveau to discuss the need for an interview. A declaration containing additional data which was prepared by the applicant is not present in the electronic file wrapper. The declaration may have been lost by the Office, or applicant may have forgotten to submit it with the response to the rejection of March 28, 2017. Upon consultation with his supervisor, the examiner called back to say that filing an RCE would be appropriate prior to filing the declaration".*

Applicants appreciate the suggestion in the Interview Summary, but note that as stated in the Final Office Action: "Reproduction of the content of the Declarations of Kenneth Ponder is appreciated. This information has been considered." (Emphasis Added). Accordingly, there should be no need to file an RCE when the content of the Declaration that is the subject of the Interview Summary is stated by the Examiner to have already been considered.

Applicants further note the statement in the Final Office Action that "this information has been considered and commented on upon previously." Applicants respectfully submit this information while stated to have been considered, has not been commented upon previously other

than by the cursory statements in paragraphs 3 of the Non-final Office Action and 4 of the Final Office Action. Applicants respectfully submit that the response to arguments in both Final Office Actions does not address the points raised, particularly those raised in Applicants' Response filed on September 28, 2017 in response to the Non-final Office Action.

Applicants cannot find where the Examiner has addressed or commented upon:

1) the unexpected benefits of the present refrigerant;
2) that unexpectedly adjusting the present refrigerant blend so that the dew point more closely matches that of R-22 for which it is to serve as a substitute negatively impacts the GWP of the Applicants' blend;
3) where in Takigawa any teaching or suggestion can be found for determining a refrigerant blend that can serve as a substitute for HCFC-22 (R-22);
4) that the Examiner, while asserting that Takigawa provides motivation to experiment within "the relatively narrow range of 40:60 to 60:40 pentafluoroethane to tetrafluroethane, fails to identify any purpose or objective allegedly taught by Takigawa for such blind experimentation;
5) that a range of 40:60 to 60:40 is not at all a "relatively narrow range";
6) that various refrigerant blends within the 40:60 to 60:40 range are not suitable as substitutes for various types of refrigerants including, in particular, HCFC-22; and
7) why one might select a dew point for a refrigerant blend that does not approximate that of the refrigerant for which it is to act as a substitute, among other arguments.

Applicants respectfully request reconsideration and, if not withdrawal of the rejection, at least entry of this Response and the Second Declaration of Kenneth M. Ponder for the purposes of appeal based upon the amendments and remarks presented herein.

The presently pending claims are directed to a refrigerant consisting of a blend of tetrafluoroethane and pentafluoroethane to be a substitute for chlorodifluoromethane (HCFC-22). For example, claim 30 recites "the improvement comprising substituting the

chlorodifluoromethane (HCFC-22) with a refrigerant composition comprising a combination of refrigerant gases, said refrigerant gases consisting of a blend of tetrafluoroethane and pentafluoroethane, the ratio of the tetrafluoroethane to the pentafluoroethane being selected such that the blend exhibits a dew point at about -32°F or a bubble point at about -41.5°F at 1 standard atmosphere pressure, wherein in the substitute refrigerant pentafluoroethane is present in an amount of 59% to 57% by weight and tetrafluoroehtane is present in an amount of 41 % to 43% by weight of the combined weight of the pentafluoroethane and tetrafluoroethane on the basis of the combined weights of said pentafluoroethane and centrafluoroethane totaling 100%.

Claim 31, for example, recites the blend of refrigerant gases exhibits both a dew point at about -32ºF and a bubble point at about -41.5ºF.

The Declaration demonstrates the unexpected benefits provided by the above referenced refrigerant composition of the present claims. They show that the refrigerant recited in the present claims more closely approximates characteristics of HCFC-22 than the 60/40 composition previously relied upon by the Examiner as the closest prior art, particularly within the temperature range most needed for the refrigerant.

Additionally, the evidence shows that while the bubble point closely approximates that of HCFC-22, the dew point does not and that unexpectedly adjusting the refrigerant blend so that the dew point of the refrigerant blend more closely approximates that of HCFC-22 negatively impacts the Global Warning Potential (GWP) of the blend. Moreover, the present refrigerant blend while having been determined by the trade associations as an acceptable substitute for HCFC-22, it is not an acceptable substitute for refrigerant R-11.

Further, Applicants note the statement in the Final Office Action that:

> *"Applicant argues that the Takigawa reference does not provide any teaching or suggestion on how to select a refrigerant composition to serve as a substitute specifically for R-22. This is not persuasive because the rejection was made for obviousness, not anticipation*".

Applicants respectfully submit that this statement is nonsensical. In particular, when a rejection is made for obviousness, there must be some teaching or suggestion found in the prior art to modify the teachings of the prior art to meet all of the elements of a claim. This statement, in effect, concedes that Takigawa does not provide any such teaching or suggestion in regards to finding or determining a substitute for R-22 to reach the refrigerant composition of the present claims.

Further, Applicants have previously pointed out that Takigawa fails to provide any teaching for identifying or determining a substitute refrigerant for R-22. Moreover, Takigawa fails to teach or suggest referring to or using either or both bubble point and/or dew point for determining a substitute for R-22. The response by the Office evades these arguments by simply stating incorrectly that it is not necessary to find any such teaching or suggestion.

Instead, the response in the Non-final Office Action asserts that Takigawa provides "motivation to experiment within a relatively narrow range". However, the Office Actions fail to comment or explain where the motivation to experiment comes from. Stated another way, what purpose can the Office point to in Takigawa for such "motivation to experiment"? Applicants submit that experimentation for experimentation sake - without any purpose or objective - fails to meet the evidence required to support a rejection for obviousness.

Further, the Final Office Action appears to clarify that the reference to experimentation "within a relatively narrow range" is within the range of 40:60 to 60:40 mixtures of R-125 and R-132A". Applicants have shown, however, that the trade does not consider a range of from 40:60 to 60:40 to be a "relatively narrow range". In fact, the trade considers this is unacceptably large range when refrigerants are defined by percentages of, for example, ±1% and not an overall range of 20%.

Additionally, the evidence shows that refrigerants within such range of 40:60 to 60:40 would not behave identically, nor could they be expected to behave in a particular manner. For example, refrigerant blends within such range may be found to be acceptable as a substitute for

one type of refrigerant but not another type of refrigerant. More particularly, the evidence shows that there are refrigerants that could be considered within the range of 40:60 to 60:40 that are not suitable as substitutes for R-22.

Moreover, the Office Action relies on a blind "obvious to try" standard since it can point to nowhere in Takigawa where there is any suggestion as what one may be trying to achieve by such asserted "obvious to try" experimentation. Without evidence of motivation for the objective of finding a substitute for R-22, Takigawa cannot serve as a basis for "obvious to try" where the objective is unknown.

Stated another way, the Office Action has not stated what result-effective parameters are to be considered or involved in carrying out the blind "obvious to try" experimentation over a variation of 20% other than to find out if all compositions over the range of 20% would behave identically. This, however, would not lead one to determine an acceptable substitute for HCFC-22. Instead, such experimentation would only determine whether one composition within the 20% range behaves identically to another composition within the 20% range. The Examiner concedes, however, that not all refrigerant blends within the 20% range would be considered to behave identical. Then what is the purpose for the alleged "obvious to try" experimentation? Without the hindsight guidance of Applicants' specification why would one conduct such experimentation?

A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as "a routine experimentation". In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). Only result-effective variables can be optimized. The Office has failed to address this point. It has failed to describe what features are result-effective variables in finding an acceptable substitute for HCFC-22 as they are used in the claimed subject matter. Specifically, the Office has failed to state what the recognized result that is to be achieved. In addition, the Office does not provide any support for the assertion that these features are routinely optimized as is used in the claims. Rather the Office makes a conclusory assertion that

the amounts can be optimized without a reasonable argument to support its position. Thus, the Office has not met its prima facie case of obviousness. Accordingly, the claims are novel and non-obvious over Takigawa.

More particularly, Applicants presented remarks in their Response to the Non-Final Office Action supported by the Second Declaration of Kenneth Ponder showing just this. As demonstrated by those arguments and the Second Declaration of Kenneth Ponder and as previously argued and presented, the composition of the present claims is designated by ASHRAE as R421a consisting of 58% (+1.0 – 1.0%) and 42% R134a (+1.0, -1.0%). Furthermore, ASHRAE's designation providing formulation tolerances of +-1% for each of the 2 components shows that the composition referenced in the Office Action of 60% pentafluoroethane and 40% tetrafluoroethane does not fall within ASHRAE's designation nor within ASHRAE's formulation tolerances for the present R421a showing that ASHRAE considers a composition of 60% R125 and 40% R134a to be distinct from the present R421a.

Furthermore, as noted in the remarks in Applicants' Response to the Non-Final Office Action the present R421a composition offers a much closer approximation of the thermodynamic HCFC-22 (R22) pressure-temperature characteristics than the 60%/40% composition asserted to be taught by Takigawa and that such is an important consideration for replacement of HCFC-22 in for retrofit and specifically for thermostatic valve control of refrigerant flow metering and air conditioning and refrigeration machinery. In short, unexpectedly, R421a better approximates the pressure-temperature characteristics of HCFC-22 than a composition of 60% R-125 and 40% R134a. Furthermore, the R124a out performs a blend of 60% R125a and 40% R134a for average condensing temperatures. Additionally, the advantage of R421a over a 60/40% composition grows at higher temperatures, namely, when air conditioning and refrigeration modes increased, i.e., when they are most needed. Stated another way, **unexpectedly the "58/42" [R-421A (58% R125 / 42% R134a)] composition benefits are greatest when most needed** as compared to a

60% R125 / 40% R134a composition. See, Second Declaration of Kenneth Ponder, paragraphs 5-9.

These arguments are supported by the evidence submitted in Applicants last Response and by way of the Second Declaration of Kenneth Ponder. Additionally, just to be clear, these arguments are repeated, in part, below.

Previously submitted with the Supplemental IDS herewith are copies of the EPA's listing of Substitute Refrigerants Under SNAP as of October 4, 2011 that provides a list of acceptable substitutes for Class I (CFCs) under the SNAP program as of October 4, 2011 and the EPA's Summary of Substitute Refrigerants Listed in SNAP Notice 25 providing a listing of refrigerant substitutes for HCFC-22 (chlorodifluoromethane). Comparing the two lists one finds the following comparison of many refrigerants that are listed as a suitable replacement for one but not the other. Examples are provided in Tables 1 and 2 below.

Table 1

In Air Conditioning

	CFC	HCFC-22
HCFC 123	Yes	No
HCFC 125	Yes	No
HFC 236	Yes	No
R-290	No	Yes
R401A,B	Yes	No
R404A	No	Yes
R-406A	Yes	No
R407A	No	Yes
R409A	Yes	No
R410A,B	No	Yes
R416A	No	No
R417A	No	Yes
R421A	No	Yes
R422B	No	Yes
R424A	No	Yes

Table 2

In Commercial Refrigeration

	CFC	HCFC-22
HCFC 22	Yes	No
HCFC 152B	No	Yes
HFC 236	Yes	No
R290	No	Yes
R401A,B	Yes	No
R402A,B	Yes	No
R406A	Yes	No
R408A	Yes	No
R409	Yes	No
R410A,B	No	Yes
R411A,B	Yes	No
R416A	No	No
R417A	No	Yes
R421A	No	Yes
R422B	No	Yes
R424A	No	Yes

Thus, just because a refrigerant may be suitable or acceptable as a replacement for some CFC refrigerant, that neither Takigawa - nor the Examiner - identifies, does not automatically render it suitable for replacement of an HCFC refrigerant, and vice versa. In fact R416A (134a/125/600 in the ratio 59.0 (+0.5, -1.0)/39.5 (+1.0,-0.5)/1.5 (+1.0,-0.5) is not listed as a suitable replacement for either CFC-11 or HCFC-22. Further, there is simply no teaching or suggestion for such in Takigawa. This demonstrates the unpredictability in the art.

Attached hereto is a Table 7 including a listing of the refrigerants that are primarily offered in competition to my R-421A refrigerant along with their respective dew points and bubble points. The bubble point and dew point for HCFC-22 are -41.46 and -41.46°F, respectively. While the bubble point for my R-421A refrigerant closely approximates that of HCFC-22, the blend dew point does not; yet as shown above my R-421A refrigerant performs surprisingly well as a substitute for HCFC-22. In fact, the inventors found that to adjust the ratio of R125 and R134a in their refrigerant blend away from its 58% ± 1.0% R125 and 42% ±1.0% R134a so the dew point more closely matches the dew point of HCFC-22 would negatively impact the aforementioned Global Warming Potential (GWP). See, Second Declaration of Kenneth Ponder, paragraph 14.

Moreover referring again to the "Summary of Substitute Refrigerants Listed in SNAP Notice 25," Applicants previously noted to the Office that their present invention has received SNAP approval as a replacement for HCFC-22, but not CFC-11. The Summary includes a Table of SNAP approved refrigerant substitutes for HCFC-22 (chlorodifluoromethane) that lists approximately 45 to 50 differing refrigerant blends that are all approved substitutes for HCFC-22, including Applicants' present invention. This SNAP listing refutes the Examiner's reliance on the present invention being a "mere" optimization of the teachings of Takigawa, or stated in another way that it is simply "obvious to try" the teachings of Takigawa to arrive at the present invention. In view of the number of refrigerants listed as acceptable substitutes it appears the odds would be extremely low that one would arrive at Applicants' refrigerant based on Takigawa. See, Second Declaration of Kenneth Ponder, paragraph 11.

Included in this SNAP listing are numerous blends of refrigerants that comprise pentafluoroethane (R-125) and tetrafluoroethane (R-134A). Further, many of such refrigerants include pentafluoroethane in a range between 60 to 40% and tetrafluoroethane in a range of 40 to 60% such as: 1) R125/R290/R134A/R600A in a ratio of 55.01/1/42.5/1.5% by weight; 2) R32/R125/R134A in a ratio of 20/40/40% by weight (known as R407A); 3) R125/R134A/R600A in a ratio of 46.6/50.0/3.4% by weight (R417A); 4) R125/R134A/R600A in a ratio of 55.0/42.0/3.0

(R422B); 5) R125/R134A/R600A/R600/R601A in a ratio of 50.5/47.0/0.9/1.0/0.6% by weight (R424A); and 6) R125/R134A in a ratio of 50/50% by weight (R507A). As seen by the ASHRAE "R" designations, each of these refrigerant blends or compositions is considered by ASHRAE to be a different refrigerant offering properties different from those of the other ASHRAE designated refrigerants. See, Second Declaration of Kenneth Ponder, paragraph 12.

In Honeywell International Inc. v. Mexichem Amanco Holding S.A.D.E.C.V. et al., Appeal No. 2016-1996, August 1, 2017) the Federal Circuit Court of Appeals reviewed and rejected arguments presented by the U.S. Patent and Trademark Office, Patent Trial and Appeal Board, in which the Board found on reexamination claims to a refrigerant namely, 1,1,1,2-tetrafluoropropene (HFO-1234YF) unpatentable on grounds that are basically the same as those presented in the present Office Action. In Honeywell, the Federal Circuit found that the Board committed legal error by improperly relying on inherency to find obviousness of the claims. Additionally, the Federal Circuit found error by the Board, while noting the overall unpredictability in the refrigerant art, the Board asserted that "routine testing" would have led to the discovery of the claimed refrigerant. The Federal Circuit rejected the Board's assertion concerning "routine testing" and reversed the rejection of the claims. The Board noted:

> "A further point regarding so-called "routine testing" is that § 103 provides that "[p]atentability shall not be negated by the manner in which the invention was made." 35 U.S.C. § 103 (2012). That provision was enacted to ensure that routine experimentation does not necessarily preclude patentability. *See, e.g., In re Saether*, 492 F.2d 849, 854 (C.C.P.A. 1974) ("In his argument that 'mere routine experimentation' was involved in determining the optimized set of characteristics, the solicitor overlooks the last sentence of 35 U.S.C. § 103...Here we are concerned with the question of whether the claimed invention would have been obvious at the time it was made to a person having ordinary skill in the art-not how it was achieved." (internal citation omitted)); *In re Fay*, 347 F.2d 597, 602 (C.C.P.A. 1965) ("[W]e do not agree that 'routine experimentation' negatives patentability. The last sentence of section 103 states that 'patentability shall not be negatived by the manner in which the invention was made.").

Thus, as shown herein, the Examiner's reliance on the statement: "The person of ordinary skill in the refrigeration art would expect the recited compositions to have properties similar to those compositions which are exemplified" in Takigawa is not correct. As shown, Applicants' recited composition does not have properties similar to those compositions which according to the Examiner would also be exemplified in *Takigawa et al.*

CONCLUSION

In light of the foregoing remarks and for at least the reasons set forth above, Applicant respectfully submits that all objections and/or rejections have been traversed and that all pending claims are in condition for allowance. Favorable reconsideration and allowance of the present application and all pending claims are hereby courteously requested. 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 | HORSTEMEYER, LLP

By: /Todd Deveau/
Todd Deveau
Registration No. 29,526

3200 Windy Hill Road SE
Suite 1600E
Atlanta, Georgia 30339
Phone: 770.933.9500
Email: todd.deveau@thomashorstemeyer.com

ATTACHMENT OF TABLE 7

Table 7: Data for Selected Refrigerants (IP units)

properties	R-22	R-407C	R-410A	R-421A	R-422B	R-422D	R-427A	R-438A
molar mass (lb/mol)	0.190629	0.190046	0.180023	0.249359	0.238242	0.242366	0.199383	0.218479
normal boiling point (NBP)								
bubble point for blends (°F)	-41.46	-46.53	-60.60	-41.22	-42.36	-46.76	-46.33	-44.19
blend dew point (°F)	-41.46	-33.93	-60.49	-31.65	-32.39	-37.01	-33.16	-33.65
maximum temperature glide								
at NBP (°F)	0.000	12.587	0.142	9.569	9.769	8.747	12.164	11.349
at 86 °F (°F)	0.000	10.060	0.209	6.882	6.334	6.373	9.323	8.805
density at NBP								
saturated liquid (lb/ft^3)	87.97	66.19	64.36	91.19	87.28	87.81	86.46	86.64
saturated vapor (lb/ft^3)	0.2896	0.2881	0.2606	0.3731	0.3632	0.3718	0.3036	0.3319
latent heat of vaporization								
at NBP (Btu/lb)	100.6	107.2	117.4	82.5	84.2	85.8	101.8	92.8
at NBP (Btu/ft^3) vapor	29.53	30.88	30.60	30.78	30.58	30.40	30.83	30.80
at 140 °C (Btu/lb)	50.20	56.29	45.23	41.46	41.78	37.94	53.00	47.23
saturated vapor pressure								
at 68 °F (psia)	132.0	127.7	208.3	119.0	120.7	131.1	124.2	122.8
at 140 °F (psia)	352.1	366.8	556.1	338.3	340.3	364.3	355.0	349.7
critical point								
temperature (°F)	205.1	188.8	160.4	181.0	181.8	178.8	188.6	189.0
pressure (psia)	723.7	671.4	710.9	588.4	574.0	565.3	637.0	626.3
specific volume (ft^3/lb)	0.0308	0.0331	0.0349	0.0291	0.0304	0.0303	0.0327	0.0314
ozone depletion potential (ODP) relative to R-11								
scientific	0.04	0	0	0	0	0	0	0
regulatory (MP)	0.055							
global warming potential (GWP) for 100 yr ITH								
scientific relative to CO_2	1760	1700	2100	2600	2500	2700	2100	2200
ASHRAE 34 / ISO 817 safety classification	A1	A1	A1	A1	A1	A1	A1	A1
ASHRAE 34 Refrigerant Concentration Limit (RCL) lb/Mcf	13	18	28	17	18	18	18	4.9

The grey regions of Table 6 and Table 7 indicate inapplicable data, namely the absence of composition-based glide based for the single-compound R-22. They also signify inapplicable data for blends not directly regulated by ozone depletion potential (ODP) in international treaties (notably the Montreal Protocol) and most regulations, though regulatory consequences result indirectly based on mass-weighted formulations of the blends.

Doc Code: A.NE.AFCP
Document Description: After Final Consideration Pilot Program Request

PTO/SB/434 (05-13)

CERTIFICATION AND REQUEST FOR CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0

Practitioner Docket No.:	Application No.:	Filing Date:
821920-1032	13/493,491	June 11, 2012
First Named Inventor:	**Title:**	
Kenneth M. Ponder	REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 REFRIGERANT	

APPLICANT HEREBY CERTIFIES THE FOLLOWING AND REQUESTS CONSIDERATION UNDER THE AFTER FINAL CONSIDERATION PILOT PROGRAM 2.0 (AFCP 2.0) OF THE ACCOMPANYING RESPONSE UNDER 37 CFR 1.116.

1. The above-identified application is (i) an original utility, plant, or design nonprovisional application filed under 35 U.S.C. 111(a) [a continuing application (*e.g.*, a continuation or divisional application) is filed under 35 U.S.C. 111(a) and is eligible under (i)], or (ii) an international application that has entered the national stage in compliance with 35 U.S.C. 371(c).
2. The above-identified application contains an outstanding final rejection.
3. Submitted herewith is a response under 37 CFR 1.116 to the outstanding final rejection. The response includes an amendment to at least one independent claim, and the amendment does not broaden the scope of the independent claim in any aspect.
4. This certification and request for consideration under AFCP 2.0 is the only AFCP 2.0 certification and request filed in response to the outstanding final rejection.
5. Applicant is willing and available to participate in any interview requested by the examiner concerning the present response.
6. This certification and request is being filed electronically using the Office's electronic filing system (EFS-Web).
7. Any fees that would be necessary consistent with current practice concerning responses after final rejection under 37 CFR 1.116, *e.g.*, extension of time fees, are being concurrently filed herewith. [There is no additional fee required to request consideration under AFCP 2.0.]
8. By filing this certification and request, applicant acknowledges the following:

- Reissue applications and reexamination proceedings are not eligible to participate in AFCP 2.0.
- The examiner will verify that the AFCP 2.0 submission is compliant, *i.e.*, that the requirements of the program have been met (see items 1 to 7 above). For compliant submissions:
  - The examiner will review the response under 37 CFR 1.116 to determine if additional search and/or consideration (i) is necessitated by the amendment and (ii) could be completed within the time allotted under AFCP 2.0. If additional search and/or consideration is required but cannot be completed within the allotted time, the examiner will process the submission consistent with current practice concerning responses after final rejection under 37 CFR 1.116, *e.g.*, by mailing an advisory action.
  - If the examiner determines that the amendment does not necessitate additional search and/or consideration, or if the examiner determines that additional search and/or consideration is required and could be completed within the allotted time, then the examiner will consider whether the amendment places the application in condition for allowance (after completing the additional search and/or consideration, if required). If the examiner determines that the amendment does not place the application in condition for allowance, then the examiner will contact the applicant and request an interview.
    - The interview will be conducted by the examiner, and if the examiner does not have negotiation authority, a primary examiner and/or supervisory patent examiner will also participate.
    - If the applicant declines the interview, or if the interview cannot be scheduled within ten (10) calendar days from the date that the examiner first contacts the applicant, then the examiner will proceed consistent with current practice concerning responses after final rejection under 37 CFR 1.116.

Signature	Date
/Todd Deveau/	December 21, 2017
Name (Print/Typed) Todd Deveau	**Practitioner Registration No.** 29,526

Note: *This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. Submit multiple forms if more than one signature is required, see below*.*

☑ * Total of 1 forms are submitted.

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.

Summary of Substitute Refrigerants Listed in SNAP Notice 25

The table below provides additional information on the substitutes listed as acceptable in the end uses within the refrigeration and air conditioning sector noted in SNAP Notice 25. The first column provides the name of the substitute. Where available, we have listed the refrigerant using the ASHRAE designation (available at http://www.ashrae.org/technology/page/1933#mo). Alternate names or trade names, along with the Chemical Abstract Service Registry Number (CAS ID#), are in the second column. The third column refers to the previous *Federal Register* actions in which we found the substitute acceptable for one or more end uses within the refrigeration and air conditioning sector. The fourth through eighth columns provide information about the environmental, health, and safety properties. "ODP" is the ozone depletion potential of the substitute, relative to a value of 1.0 for CFC-11. "GWP" is the 100-year integrated global warming potential of a chemical or the weighted average of the GWPs of the chemicals in a blend, relative to a value of 1 for CO_2. (Technically, GWP only applies to individual chemicals; however, for a blend, an average weighted by the percentage composition provides a rough approximation of a blend's impact.) "VOC status" indicates whether the substitute contains any components that are defined as, or are exempt from the definition of, volatile organic compounds under Clean Air Act regulations (see 40 CFR 51.100(s)) addressing the development of SIPs to attain and maintain the national ambient air quality standards. Substitutes listed as "exempt" in the VOC status column contain only components that are not VOCs or that are exempt from the definition of VOC under those regulations. "Flammable" indicates whether the refrigerant is flammable, either through an ASHRAE classification of "2" or "3" in ASHRAE 34, or by flashpoint testing using ASTM E 681. Flammable refrigerants are hazardous waste and must be disposed of consistent with regulations under the Resource Conservation and Recovery

Act (RCRA). "Exposure limit" indicates the workplace exposure limits for the components of the refrigerant, typically as an 8-hour time-weighted average. "Type of exposure limit" indicates the source of the exposure limit, such as a Permissible Exposure Limit (PEL) from the U.S. Occupational Safety and Health Administration (OSHA), a Recommended Exposure Limit (REL) from the National Institutes of Occupational Safety and Health (NIOSH), a Threshold Limit Value (TLV) from the American Conference of Government Industrial Hygienists (ACGIH), a Workplace Environmental Exposure Limit (WEEL) from the American Industrial Hygiene Association (AIHA), an acceptable exposure limit from the substitute's manufacturer (manufacturer AEL), a Continuous Exposure Guidance Level (CEGL) from the National Research Council (NRC), or a recommendation from EPA (either a workplace acceptable exposure limit – AEL – or consumer exposure limit – CEL).

Summary of Information on Refrigerant Substitutes for HCFC-22 and Blends Containing HCFC-22 and/or HCFC-142b (see Notice 25 for specific end uses allowed)

Name of Substitute	Further Identification Information for Substitute[1]	Previous SNAP Federal Register Listings	ODP	GWP[2]	VOC status	Flammable	Exposure limits[3] (ppm)
Ammonia absorption; Ammonia/water absorption; Ammonia vapor compression/ secondary loop	NH_3; R-717; CAS ID # 7664-41-7	March 18, 1994 rule, 59 FR 13044; Notice 3, July 28, 1995; 60 FR 38729; Notice 5, September 5, 1996, 61 FR 47011	0	0	exempt	yes (ASHRAE class 2)	Ammonia: 50 (PEL)
C6 perfluoroketone	1,1,1,2,2,4,5,5,5-nonafluoro-4-(trifluoromethyl)-3-pentanone or FK–5–1–12mmy2; CAS ID # 756–13–8; Novec™ 649	Notice 24, September 30, 2009, 74 FR 50129	0	0.6-1.8	VOC	no	150 (Manufacturer AEL)
Cryogenic system using recaptured liquid CO_2 or liquid nitrogen		Notice 11, December 6, 1999, 64 FR 68039	0	N/A	exempt	no	N/A
Desiccant cooling		March 18, 1994 rule, 59 FR 13044; Notice 5, September 5, 1996, 61 FR 47011	0	N/A	N/A	N/A	N/A
Evaporative cooling		March 18, 1994 rule, 59 FR 13044; Notice 5, September 5, 1996, 61 FR 47011	0	N/A	N/A	N/A	N/A
HC Blend A	OZ-12	March 18, 1994 rule, 59 FR 13044	0	3	all compon-ents are VOCs	yes (ASHRAE class 3)	1000 (Manufacturer AEL)
HC Blend B	HC-12a	Notice 2, January 13, 1995; 60 FR 3318	0	4	all compon-ents are VOCs	yes (ASHRAE class 3).	1000 (Manufacturer AEL)

Name of Substitute	Further Identification Information for Substitute[1]	Previous SNAP Federal Register Listings	ODP	GWP[2]	VOC status	Flammable	Exposure limits[3] (ppm)
HFC-134a	1,1,1,2-tetrafluoroethane; CAS ID # 811-97-2	March 18, 1994 SNAP rule (58 FR 13044); Notice 19, October 1, 2004; 69 FR 58903	0	1,430	exempt	no	1000 (WEEL)
HFC-152a	1,1-difluoroethane; CAS ID # 75-34-3	March 18, 1994 rule, 59 FR 13044; Notice 11, December 6, 1999, 64 FR 68039	0	124	exempt	yes (ASHRAE class 2)	1000 (WEEL)
HFC-227ea	1,1,1,2,3,3,3-heptafluoropropane; CAS ID # 431-89-0	March 18, 1994 SNAP rule (58 FR 13044)	0	3,220	exempt	no	1000 (Manufacturer AEL)
HFC-245fa	1,1,1,3,3-pentafluoropropane; CAS ID # 460-73-1	Notice 13, June 19, 2000, 65 FR 37900; Notice 20, March 29, 2006; 71 FR 15589	0	1,030	exempt	no	300 (WEEL)
HFC-4310mee	1,1,1,2,3,4,4,5,5,5-decafluoropentane; CAS ID # 138495-42-8	Notice 10, June 8, 1999; 64 FR 30410	0	1,640	exempt	no	200 (Manufacturer 8-hr AEL) 400 (Manufacturer ceiling limit AEL)
HFE-7000	1,1,1,2,2,3,3-heptafluoro-3-methoxy-propane; HFE-347mcc3; CAS ID # 375-03-1	Notice 16, March 22, 2002; 76 FR 13272	0	575	exempt	no	75 (Manufacturer AEL)
HFE-7100	Methoxynonafluor-obutane, iso and normal; HFE-449s1; CAS ID # 163702-07-6	Notice 10, June 8, 1999; 64 FR 30410; Notice 14, December 18, 2000; 65 FR 78977	0	297	exempt	no	750 (WEEL)
HFE-7200	Ethoxynonafluoro-butane, iso and normal; HFE-569sf2; CAS # 163702-05-4	Notice 14, December 18, 2000; 65 FR 78977	0	59	exempt	no	200 (Manufacturer AEL)
HFO-1234ze	HFC-1234ze; trans-1,3,3,3-tetrafluoroprop-1-ene; CAS ID # 29118-24-9	Notice 24, September 30, 2009, 74 FR 50129	0	6	VOC[4]	no	1000 (EPA Recommended 8-hr AEL) 10000 (Preliminary EPA Recommended 30- min consumer exposure limit)[5]

Name of Substitute	Further Identification Information for Substitute[1]	Previous SNAP Federal Register Listings	ODP	GWP[2]	VOC status	Flammable	Exposure limits[3] (ppm)
Nitrogen direct gas expansion		March 18, 1994 rule, 59 FR 13044	0	N/A	exempt	no	N/A; ACGIH lists nitrogen as a simple asphyxiant.
Pressure stepdown		March 18, 1994 rule, 59 FR 13044	0	N/A	exempt	N/A	N/A
R-125/134a/600a (28.1%/70.0%/ 1.9% by weight)	Blend of HFC-125/HFC-134a/isobutane (HFC-125 is 1,1,1,2,2-pentafluoroethane, CAS ID # 354-33-6; R-600a is isobutane, CAS ID # 75-28-5) (NU-22 original composition)	Notice 16, March 22, 2002, 67 FR 13272	0	1,990	one component is VOC	blend not flammable	R-125: 1000 (WEEL) R-134a: 1000 (WEEL) R-600a: 800 (10-hr REL)
R-125/290/134a/ 600a (55.0%/1.0%/42. 5%/1.5% by weight)	Blend of HFC-125/ propane/HFC-134a/isobutane (ICOR AT-22)	Notice 20, March 29, 2006; 71 FR 15589	0	2,530	some components are VOCs	blend not flammable	R-125: 1000 (WEEL) R-290: 1000 (PEL) R-134a: 1000 (WEEL) R-600a: 800 (10-hr REL)
R-290	Propane; CAS ID # 74-98-6	March 18, 1994 rule, 59 FR 13044	0	3	VOC	yes (ASHRAE class 3)	1000 (PEL)
R-404A	R-125/143a/134a (44.0/52.0/4.0) (HFC-143a is 1,1,1-trifluoroethane, CAS ID # 420-46-2)	March 18, 1994 rule, 59 FR 13044; Notice 16, March 22, 2002; 67 FR 13272; Notice 17, December 20, 2002, 67 FR 77927	0	3,920	exempt	blend not flammable	R-125: 1000 (WEEL) R-143a: 1000 (WEEL) R-134a: 1000 (WEEL)
R-407A	R-32/125/134a (20.0/40.0/40.0) (HFC-32 is difluoromethane, CAS ID # 75-10-5)	Notice 1, August 26, 1994; 59 FR 44240; Notice 23, January 2, 2009; 74 FR 21	0	2,110	exempt	blend not flammable	R-134a: 1000 (WEEL) R-32: 1000 (WEEL) R-125: 1000 (WEEL)
R-407B	R-32/125/134a (10.0/70.0/20.0)	Notice 1, August 26, 1994; 59 FR 44240	0	2,800	exempt	blend not flammable	R-134a: 1000 (WEEL) R-32: 1000 (WEEL) R-125: 1000 (WEEL)

Name of Substitute	Further Identification Information for Substitute[1]	Previous SNAP Federal Register Listings	ODP	GWP[2]	VOC status	Flammable	Exposure limits[3] (ppm)
R-407C	R-32/125/134a (23.0/25.0/52.0)	Notice 4, February 8, 1996, 61 FR 4736; Notice 17, December 20, 2002; 67 FR 77927; Notice 18, August 21, 2003; 68 FR 50533; Notice 19, October 1, 2004; 69 FR 58903	0	1,770	exempt	blend not flammable	R-125: 1000 (WEEL) R-32: 1000 (WEEL) R-134a: 1000 (WEEL)
R-407D	R-32/125/134a (15.0/15.0/70.0)	Notice 21; September 28, 2006, 71 FR 56884	0	1,630	exempt	blend not flammable	R-32: 1000 (WEEL) R-125: 1000 (WEEL) R-134a: 1000 (WEEL)
R-410A	R-32/125 (50.0/50.0)	Notice 4, February 8, 1996, 61 FR 4736; Notice 17, December 20, 2002; 67 FR 77927; Notice 19, October 1, 2004; 69 FR 58903	0	2,090	exempt	blend not flammable	R-32: 1000 (WEEL) R-125: 1000 (WEEL)
R-410B	R-32/125 (45.0/55.0)	Notice 4, February 8, 1996, 61 FR 4736	0	2,230	exempt	blend not flammable	R-32: 1000 (WEEL) R-125: 1000 (WEEL)
R-417A	R-125/134a/600a (46.6/50.0/3.4) ISCEON-59/NU-22 (new formulation)	Notice 11, December 6, 1999, 64 FR 68039; Notice 16, March 22, 2002; 67 FR 13272; Notice 17, December 20, 2002; 67 FR 77927; Notice 20, March 29, 2006; 71 FR 15589	0	2,350	one compon-ent is VOC	blend not flammable	R-125: 1000 (WEEL) R-134a: 1000 (WEEL) R-600a: 800 (10-hr REL)
R-421A	Choice R421A; R-125/134a (58.0/42.0)	Notice 21; September 28, 2006, 71 FR 56884	0	2,630	exempt	no	R-125: 1000 (WEEL) R-134a: 1000 (WEEL)
R-421B	Choice R421B; R-125/134a (85.0/15.0)	Notice 21; September 28, 2006, 71 FR 56884	0	3,190	exempt	no	R-125: 1000 (WEEL) R-134a: 1000 (WEEL)

Name of Substitute	Further Identification Information for Substitute[1]	Previous SNAP Federal Register Listings	ODP	GWP[2]	VOC status	Flammable	Exposure limits[3] (ppm)
R-422A	ISCEON 79; R-125/134a/600a (85.1/11.5/3.4)	Notice 19, October 1, 2004; 69 FR 58903	0	3,140	one component is VOC	blend not flammable	R-125: 1000 (WEEL) R-134a: 1000 (WEEL) R-600a: 800 (10-hr REL)
R-422B	ICOR XAC1; R-125/134a/600a (55.0/42.0/3.0)	Notice 20, March 29, 2006; 71 FR 15589	0	2,530	one component is VOC	blend not flammable	R-125: 1000 (WEEL) R-134a: 1000 (WEEL) R-600a: 800 (10-hr REL)
R-422C	ICOR XLT1; R-125/134a/600a (82.0/15.0/3.0)	Notice 20, March 29, 2006; 71 FR 15589	0	3,390	one component is VOC	blend not flammable	R-125: 1000 (WEEL) R-134a: 1000 (WEEL) R-600a: 800 (10-hr REL)
R-422D	ISCEON MO29; R-125/134a/600a (65.1/31.5/3.4)	Notice 21; September 28, 2006, 71 FR 56884	0	2,730	one component is VOC	blend not flammable	R-125: 1000 (WEEL) R-134a: 1000 (WEEL) R-600a: 800 (10-hr REL)
R-423A	ISCEON 39TC, Centri-Cool; R-134a/227ea (52.5/47.5)	Notice 16, March 22, 2002; 76 FR 13272	0	2,280	exempt	no	R-134a: 1000 (WEEL) R-227ea: 1000 (Manufacturer AEL)
R-424A	RS-44 (new composition); R-125/134a/600a/600/601a (50.5/47.0/0.9/1.0/0.6)	Notice 21; September 28, 2006, 71 FR 56884; Notice 23; January 2, 2009, 74 FR 21	0	2,440	some components are VOCs	blend not flammable	R-125: 1000 (WEEL) R-134a: 1000 (WEEL) R-600a: 800 (10-hr REL) R-600: 800 (10-hr REL) R-601a: 600 (TLV)
R-426A	RS-24 (new composition); R-125/134a/600/601a (5.1/93.0/1.3/0.6)	Notice 21; September 28, 2006, 71 FR 56884	0	1,510	some components are VOCs	blend not flammable	R-125: 1000 (WEEL) R-134a: 1000 (WEEL) R-600: 800 (10-hr REL) R-601a: 600 (TLV)
R-427A	R-32/125/143a/134a (15.0/25.0/10.0/50.0)	Notice 23; January 2, 2009, 74 FR 21	0	2,140	exempt	no	R-32: 1000 (WEEL) R-125: 1000 (WEEL) R-143a: 1000 (WEEL) R-134a: 1000 (WEEL)

Name of Substitute	Further Identification Information for Substitute[1]	Previous SNAP Federal Register Listings	ODP	GWP[2]	VOC status	Flammable	Exposure limits[3] (ppm)
R-428A	R-125/143a/290/600a (77.5/20.0/0.6/1.9)	Notice 22, October 4, 2007; 72 FR 56628	0	3,610	some compon-ents are VOCs	blend not flammable	R-125: 1000 (WEEL) R-143a: 1000 (WEEL) R-290: 1000 (PEL) R-600a: 800 (10-hr REL)
R-434A	RS-45; R-125/143a/134a/600a (63.2/18.0/16.0/2.8)	Notice 22, October 4, 2007; 72 FR 56628	0	3,250	some compon-ents are VOCs	blend not flammable	R-125: 1000 (WEEL) R-143a: 1000 (WEEL) R-134a: 1000 (WEEL) R-600a: 800 (10-hr REL)
R-437A	KDD6; MO49 Plus™; R-125/134a/600/601 (19.5/78.5/1.4/0.6)	Notice 23, January 2, 2009, 74 FR 21	0	1,810	some compon-ents are VOCs	blend not flammable	Blend: 994 (Manufacturer AEL) R-125: 1000 (WEEL) R-134a: 1000 (WEEL) R-600: 800 (10-hr REL) R-601: 600 (TLV)
R-438A	KDD5, ISCEON MO99; R-32/125/134a/600/ 601a (8.5/45.0/44.2/1.7/ 0.6)	Notice 22, October 4, 2007; 72 FR 56628; Notice 24, September 30, 2009	0	2,270	some compon-ents are VOCs	blend not flammable	Blend: 995 (Manufacturer AEL) R-32: 1000 (WEEL) R-125: 1000 (WEEL) R-134a: 1000 (WEEL) R-600: 800 (10-hr REL) R-601a: 600 (TLV)
R-507A	R-125/143a (50.0/50.0)	March 18, 1994 rule, 59 FR 13044; Notice 5, September 5, 1996, 61 FR 47011; Notice 17, December 20, 2002; 67 FR 77927	0	3,990	exempt	blend not flammable	R-125: 1000 (WEEL) R-143a: 1000 (WEEL)
R-600	Butane; CAS ID # 106-97-8	March 18, 1994 rule, 59 FR 13044	0	3	VOC	yes (ASHRAE class 3)	800 (10-hr REL)
R-744	Carbon dioxide, CO_2; CAS ID # 124-38-9	March 18, 1994 rule, 59 FR 13044; Notice 2, January 13, 1995; 60 FR 3318	0	1	exempt	no	5000 (PEL or 10-hr REL)

Name of Substitute	Further Identification Information for Substitute[1]	Previous SNAP Federal Register Listings	ODP	GWP[2]	VOC status	Flammable	Exposure limits[3] (ppm)
R-1270	Propylene;1-propene; CAS ID # 115-07-1	March 18, 1994 rule, 59 FR 13044	0	5	VOC	yes (ASHRAE class 3)	500 (TLV)
RS-24 (2002 formulation)		Notice 17, December 20, 2002; 67 FR 77927	0	1,510	some compon-ents are VOCs	blend not flammable	Blend: 1000 (Manufacturer AEL) Components have TLVs, RELs, or WEELs ranging from 600-1000.
RS-44 (2003 formulation)		Notice 18, August 21, 2003, 68 FR 50533	0	2,420	some compon-ents are VOCs	blend not flammable	Blend: 1000 (Manufacturer AEL) Components have TLVs, RELs, or WEELs ranging from 600-1000.
Self-chilling can using recycled CO_2		Notice 8, February 24, 1998; 63 FR 9151	0	1	exempt	no	5000 (PEL or 10-hr REL)
SP34E		Notice 14, December 18, 2000, 65 FR 78977; Notice 15, May 23, 2001; 66 FR 28379	0	1,470 or less	one compon-ent is VOC	blend not flammable	1000 (Manufacturer AEL)
Stirling cycle		March 18, 1994 SNAP rule (58 FR 13044)	0	N/A	exempt	N/A	N/A
Volatile Methyl Siloxanes	Octamethylcyclo-tetrasiloxanes (e.g., D4, CAS ID # 556-67-2) and decamethylcyclo-pentasiloxanes (e.g., D5, CAS ID # 541-02-6) for heat transfer	Notice 3, July 28, 1995; 60 FR 38729	0	Low (< 20)	exempt	some comp-ounds are flammable	Depends on compound D4: 10 (Manufacturer AEL) D5: 10 (Manufacturer AEL)
Water		Notice 3, July 28, 1995; 60 FR 38729	0	0	exempt	no	N/A

Name of Substitute	Further Identification Information for Substitute[1]	Previous SNAP Federal Register Listings	ODP	GWP[2]	VOC status	Flammable	Exposure limits[3] (ppm)
Water/lithium bromide absorption	LiBr has CAS ID # 7550-35-8.	March 18, 1994 rule, 59 FR 13044; Notice 5, September 5, 1996, 61 FR 47011	0	0	exempt	no	LiBr: 1 mg/m^3 for 24 hr/day, 90 day exposure (CEGL); 3 mg/m^3 for 8 hr/day, 90 day exposure (CEGL adjusted for 8 hr workday)[6]

[1] Refrigerant blend compositions are identified by the ASHRAE convention of listing component compounds by their refrigerant ("R-") designation, separated by "/", followed by the percentage of each component in the same order, separated by "/".

[2] Hundred year Global Warming Potential, relative to 1 for CO_2. Blend values are averages, weighting the GWP of individual components by their percentage in the composition and rounding. For some blends with a confidential formulation, the blend value may be presented as a range. For some short-lived compounds that do not have a GWP value in the peer reviewed literature, EPA has provided an estimate with an upper limit, such as "< 20" or "≤5."

[3] Eight-hour time-weighted average worker exposure limit expressed in parts per million (ppm), unless otherwise stated.

[4] EPA has received a petition to exempt HFO-1234ze from the definition of VOC for purposes of SIPs to attain and maintain the NAAQS on the basis that the chemical has a low photochemical reactivity. EPA intends to address the request through notice-and-comment rulemaking.

[5] The derivations of EPA's recommended workplace AEL and preliminary consumer exposure limit (acute) are available at www.regulations.gov as item EPA-HQ-OAR-2003-0118-0250.

[6] EPA's analysis of the National Research Council CEGL and rationale for preliminary workplace exposure limit are available at www.regulations.gov as item EPA-HQ-OAR-2003-0118-0243.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:	Confirmation No.: 1039
Ponder et al.	Group Art Unit: 1761
Serial No.: 13/493,491	Examiner: Hardee, John R.
Filed: June 11, 2012	Docket No. 821920-1032

For: **REFRIGERANT WITH LUBRICATING OIL FOR REPLACEMENT OF R22 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.

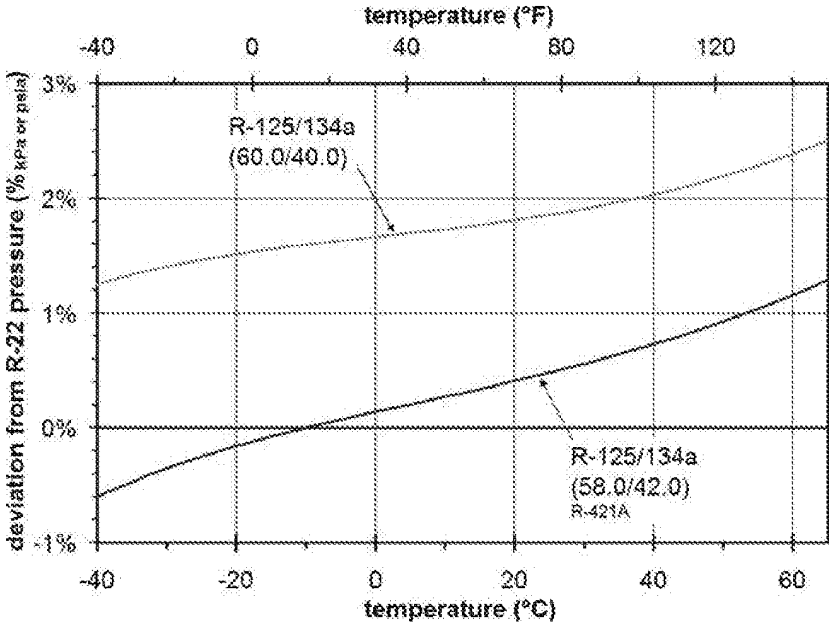
2. RMS of Georgia, LLC sells and distributes refrigerants and reclaims most refrigerants.

3. Among the refrigerants that RMS of Georgia, LLC sells and distributes are refrigerants known under ASHRAE designations R-421A and R-421B. Our R-421A and R-421B refrigerants are approved by ASHRAE and are SNAP approved by the U.S. Environmental Protection Agency (EPA) for use with or as a replacement or substitute for R-22 refrigerant for different uses, as described below. The refrigerant having the ASHRAE designation R-421A is a refrigerant composition of my present application that is a mixture of R-125 (pentafluoroethane) and R-134a (1,1,1,2-tetrofluoroethane) as the only refrigerant gases blended with a lubricant in which R-125 is present in an amount of 58%±1% by weight and R-134a is present in an amount of 42% ±1% by weight of the two refrigerant gases wherein the combined weight of the two gases totals 100%.

4. An accepted guide for refrigerant designations is ASHRAE Standard 34. Based on assignment in prior editions and addenda thereto, Addendum O, Table 2

to ASHRAE Standard 34-2004 identifies my R-421A-series refrigerant blend (along with adopted safety data and classifications for them) as a composition of R-125 and R-134a with formulation and tolerances of: "R-421A: R-125/134a (58.0% / 42.0%) (±1.0/±1.0)." As such, a composition of 60% R-125 / 40% 134a (60.0/40.0) is considered by ASHRAE as distinct from R-421A [58% R-125 / 42% 134a (58.0/42.0)] and does not fall within ASHRAE's formulation tolerances (±1.0/±1.0). Stated another way, a 60.0/40.0 (or "60/40") composition cannot be identified as within ASHRAE's designation and tolerances for a refrigerant designated or labeled R-421A. Were one to seek a Standard Designation for 60% R-125 / 40% 134a (60.0/40.0), it would be given consideration for a separate ASHRAE designation, in accordance with ASHRAE Standard 34.

5. The following figure shows the difference in deviations from the HCFC refrigerant R-22 (chlorodifluoromethane), the most widely used refrigerant from the late 1950s until 2010 and that most commonly used in residential air conditioners among other applications. Many blends, including R-421A (58% R125 / 42% R134a), were developed for and are marketed as Freon – 22 (R-22) replacements with the phase-out of ozone-depleting substances, of which Freon – 22 (R-22) is one.



6. As shown in the above figure, R-421A [58% R-125 / 42%134a (58.0/42.0)] offers a **much closer approximation of the thermodynamic R-22 pressure-temperature (P-T) characteristics** than 60% R-125 / 40% R134a (60.0/40.0), an important consideration for replacement of the HCFC refrigerant Freon – 22 (R22) and for retrofit and specifically for thermostatic expansion valve control of refrigerant flow metering in air conditioning and refrigeration machinery. Over the temperature range of -40 to +65 °C (-40 to +149 °F), the pressure deviation in (kPa or psia) for R-421A [58% R-125 / 42%134a (58.0/42.0)] compared to Freon -22 (R-22) deviates by -0.6 to +1.3% as contrasted to 1.3 to 2.5% for 60% R-125 / 40% R134a (60.0/40.0) with average deviations of 0.3% and 1.8%, respectively. Restated in terms of gauge pressure (psig), the corresponding ranges are -16.1 to 1.4% for and 33.9 to 2.6% with averages of -0.5 and 4.0%. In short, unexpectedly R-421A [58% R-125 / 42% R134a (58.0/42.0)] better approximates the pressure-temperature (P-T) characteristics of Freon (R-22) than 60% R-125 / 40% R134a (60.0/40.0).

7. For the evaporating temperature span of primary interest as a replacement for the HCFC refrigerant Freon – 22 (R-22) in air conditioning and refrigeration, namely -20 to +10 C (-4 to +14), the average pressure deviation compared to Freon – 22 (R-22) on an absolute pressure basis for R-421A [58% R-125 / 42% R134a (58.0/42.0)] is approximately 5% that of 60% R-125 / 40% R134a (60.0/40.0).

8. Predicated on a representative average evaporating temperature of 10 °C (50 °F) without superheat, R-421A [58% R-125 / 42% R134a (58.0/42.0)] outperforms 60% R-125 / 40% R134a by 0.15 to 1.04% for average condensing temperatures spanning 35-65 °C (95-149 °F) without sub-cooling. The calculations are based on theoretical-cycle calculations discounting compressor and motor efficiency, fan power and similar parasitic losses and also assuming ideal heat transfer and fluid flow; these