

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. (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 napthenic distillate, and
 - 10-20% solvent refined light napthenic 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

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Docket No. 821920-1030

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) FY 2006 <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	
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</u> <u>Fees</u>
☐	One month (37 CFR 1.17(a)(1))	\$120	\$60 \$_____
☒	Two months (37 CFR 1.17(a)(2))	\$460	\$230 \$230
☐	Three months (37 CFR 1.17(a)(3))	\$1050	\$525 \$_____
☐	Four months (37 CFR 1.17(a)(4))	\$1640	\$820 \$_____
☐	Five months (37 CFR 1.17(a)(5))	\$2230	\$1115 \$_____
☒	Applicant claims small entity status. See 37 CFR 1.27		
☐	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.		
☒	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.		
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 Number: 29,526		
☐	attorney or agent under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34:		
_____ /Todd Deveau/ Todd Deveau		_____ May 16, 2008 Date _____ 770-933-9500 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

Application Number:	10937736			
Filing Date:	08-Sep-2004			
Title of Invention:	Refrigerant with lubricating oil for replacement of R22 refrigerant			
First Named Inventor/Applicant Name:	Kenneth M. Ponder			
Filer:	Todd Deveau./Virginia Keenan			
Attorney Docket Number:	821920-1030			
Filed as Small Entity				
Utility Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 2 months with \$0 paid	2252	1	230	230

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				230

Electronic Acknowledgement Receipt

EFS ID:	3315600
Application Number:	10937736
International Application Number:	
Confirmation Number:	1006
Title of Invention:	Refrigerant with lubricating oil for replacement of R22 refrigerant
First Named Inventor/Applicant Name:	Kenneth M. Ponder
Customer Number:	24504
Filer:	Todd Deveau./Virginia Keenan
Filer Authorized By:	Todd Deveau.
Attorney Docket Number:	821920-1030
Receipt Date:	16-MAY-2008
Filing Date:	08-SEP-2004
Time Stamp:	14:46:43
Application Type:	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 02f48aaec6cc46c473ddfcaaae021aa10efe3a0	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			616477		
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. <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. <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. <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.					

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.

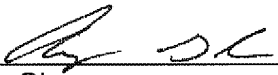
7. I have reviewed U.S. Patent 6,207,071 in the name of Takigawa. While Takigawa makes mention of refrigerants containing HFC-134a (1,1,1,2-tetrafluoroethane) and/or HFC-125 (pentafluoroethane), Takigawa does not disclose a single example of a refrigerant gas composition or blend combining only tetrafluoroethane 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.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 10/937,736		Filing Date 09/08/2004		☐ To be Mailed	
APPLICATION AS FILED – PART I										
(Column 1)			(Column 2)		SMALL ENTITY ☒		OR		OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)			RATE (\$)	FEE (\$)		
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A				N/A			
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A				N/A			
☐ 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 \$ =			
☐ 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).							
☐ 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			
APPLICATION AS AMENDED – PART II										
(Column 1)			(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY	
AMENDMENT	05/16/2008	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))	* 4	Minus	***5	= 0	X \$105 =	0	OR	X \$ =	
	☐ Application Size Fee (37 CFR 1.16(s))							OR		
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE	
AMENDMENT		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 \$ =	
	☐ Application Size Fee (37 CFR 1.16(s))							OR		
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	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.**

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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 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.

Office Action Summary	Application No. 10/937,736	Applicant(s) PONDER ET AL.	
	Examiner John R. Hardee	Art Unit 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) ☐ Notice of References Cited (PTO-892) | 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) ☐ Notice of Informal Patent Application |
| 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) ☐ 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



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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.

Interview Summary	Application No. 10/937,736	Applicant(s) PONDER ET AL.	
	Examiner John R. Hardee	Art Unit 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

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 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 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



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Docket No. 821920-1030

EXHIBIT A

Serial No. 10/937,736
Ponder et al.



Environmental Protection Agency
Air and Radiation Stratospheric Protection Division 6205J

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.



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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				
FRIGC (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 XLT1			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.



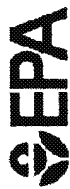
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Acceptable Substitutes for Class I (CFCs) Substances in Air Conditioning under the Significant New Alternatives Policy (SNAP) Program as of June 12, 2008 (continued)								
Substitutes (Name Used in Federal Register)	Trade Name	CFC-11 Centrifugal 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."

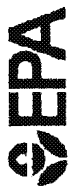
** In addition to the use conditions listed under (*), these refrigerants must be used with barrier hoses.



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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	Genetron® 245fa	11, 113, 114							R, N (11, 113)	N (11, 114)
HFE-4310mee		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		



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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 Warehouses	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, N	R, N		
R-422C	ICOR XLTI	502	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	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 ₂		11, 12, 13, 113, 114, 115, 13B1, 503							R, N	R, N
Cryogenic System Using Recaptured Liquid CO ₂ or Liquid Nitrogen	Cryo-Mechanical	12, 500		N						
Self-chilling cans using CO ₂		12, 502	R, N	R, N	R, N		R, N			
Volatile Methyl Siloxanes, Water, Mineral Oil		11, 12, 113, 114, 115							R, N	
C ₂ F ₆ , C ₂ F ₈ , C ₂ F ₁₀ , C ₃ F ₈ , C ₃ F ₁₀ , C ₃ F ₁₂ , C ₄ F ₁₀ , C ₄ F ₁₂ , C ₄ F ₁₄ , C ₅ F ₁₂ , C ₅ F ₁₄ , C ₅ F ₁₆ , C ₆ F ₁₄ , C ₆ F ₁₆ , C ₆ F ₁₈ , C ₇ F ₁₆ , C ₇ F ₁₈ , C ₇ F ₂₀ , C ₈ F ₁₈ , C ₈ F ₂₀ , C ₈ F ₂₂ , C ₉ F ₂₀ , C ₉ F ₂₂ , C ₉ F ₂₄ , C ₁₀ F ₂₂ , C ₁₀ F ₂₄ , C ₁₀ F ₂₆ , C ₁₁ F ₂₄ , C ₁₁ F ₂₆ , C ₁₁ F ₂₈ , C ₁₂ F ₂₆ , C ₁₂ F ₂₈ , C ₁₂ F ₃₀ , C ₁₃ F ₂₈ , C ₁₃ F ₃₀ , C ₁₃ F ₃₂ , C ₁₄ F ₃₀ , C ₁₄ F ₃₂ , C ₁₄ F ₃₄ , C ₁₅ F ₃₂ , C ₁₅ F ₃₄ , C ₁₅ F ₃₆ , C ₁₆ F ₃₄ , C ₁₆ F ₃₆ , C ₁₆ F ₃₈ , C ₁₇ F ₃₆ , C ₁₇ F ₃₈ , C ₁₇ F ₄₀ , C ₁₈ F ₃₈ , C ₁₈ F ₄₀ , C ₁₈ F ₄₂ , C ₁₉ F ₄₀ , C ₁₉ F ₄₂ , C ₁₉ F ₄₄ , C ₂₀ F ₄₂ , C ₂₀ F ₄₄ , C ₂₀ F ₄₆ , C ₂₁ F ₄₄ , C ₂₁ F ₄₆ , C ₂₁ F ₄₈ , C ₂₂ F ₄₆ , C ₂₂ F ₄₈ , C ₂₂ F ₅₀ , C ₂₃ F ₄₈ , C ₂₃ F ₅₀ , C ₂₃ F ₅₂ , C ₂₄ F ₅₀ , C ₂₄ F ₅₂ , C ₂₄ F ₅₄ , C ₂₅ F ₅₂ , C ₂₅ F ₅₄ , C ₂₅ F ₅₆ , C ₂₆ F ₅₄ , C ₂₆ F ₅₆ , C ₂₆ F ₅₈ , C ₂₇ F ₅₆ , C ₂₇ F ₅₈ , C ₂₇ F ₆₀ , C ₂₈ F ₅₈ , C ₂₈ F ₆₀ , C ₂₈ F ₆₂ , C ₂₉ F ₆₀ , C ₂₉ F ₆₂ , C ₂₉ F ₆₄ , C ₃₀ F ₆₂ , C ₃₀ F ₆₄ , C ₃₀ F ₆₆ , C ₃₁ F ₆₄ , C ₃₁ F ₆₆ , C ₃₁ F ₆₈ , C ₃₂ F ₆₆ , C ₃₂ F ₆₈ , C ₃₂ F ₇₀ , C ₃₃ F ₆₈ , C ₃₃ F ₇₀ , C ₃₃ F ₇₂ , C ₃₄ F ₇₀ , C ₃₄ F ₇₂ , C ₃₄ F ₇₄ , C ₃₅ F ₇₂ , C ₃₅ F ₇₄ , C ₃₅ F ₇₆ , C ₃₆ F ₇₄ , C ₃₆ F ₇₆ , C ₃₆ F ₇₈ , C ₃₇ F ₇₆ , C ₃₇ F ₇₈ , C ₃₇ F ₈₀ , C ₃₈ F ₇₈ , C ₃₈ F ₈₀ , C ₃₈ F ₈₂ , C ₃₉ F ₈₀ , C ₃₉ F ₈₂ , C ₃₉ F ₈₄ , C ₄₀ F ₈₂ , C ₄₀ F ₈₄ , C ₄₀ F ₈₆ , C ₄₁ F ₈₄ , C ₄₁ F ₈₆ , C ₄₁ F ₈₈ , C ₄₂ F ₈₆ , C ₄₂ F ₈₈ , C ₄₂ F ₉₀ , C ₄₃ F ₈₈ , C ₄₃ F ₉₀ , C ₄₃ F ₉₂ , C ₄₄ F ₉₀ , C ₄₄ F ₉₂ , C ₄₄ F ₉₄ , C ₄₅ F ₉₂ , C ₄₅ F ₉₄ , C ₄₅ F ₉₆ , C ₄₆ F ₉₄ , C ₄₆ F ₉₆ , C ₄₆ F ₉₈ , C ₄₇ F ₉₆ , C ₄₇ F ₉₈ , C ₄₇ F ₁₀₀ , C ₄₈ F ₉₈ , C ₄₈ F ₁₀₀ , C ₄₈ F ₁₀₂ , C ₄₉ F ₁₀₀ , C ₄₉ F ₁₀₂ , C ₄₉ F ₁₀₄ , C ₅₀ F ₁₀₂ , C ₅₀ F ₁₀₄ , C ₅₀ F ₁₀₆ , C ₅₁ F ₁₀₄ , C ₅₁ F ₁₀₆ , C ₅₁ F ₁₀₈ , C ₅₂ F ₁₀₆ , C ₅₂ F ₁₀₈ , C ₅₂ F ₁₁₀ , C ₅₃ F ₁₀₈ , C ₅₃ F ₁₁₀ , C ₅₃ F ₁₁₂ , C ₅₄ F ₁₁₀ , C ₅₄ F ₁₁₂ , C ₅₄ F ₁₁₄ , C ₅₅ F ₁₁₂ , C ₅₅ F ₁₁₄ , C ₅₅ F ₁₁₆ , C ₅₆ F ₁₁₄ , C ₅₆ F ₁₁₆ , C ₅₆ F ₁₁₈ , C ₅₇ F ₁₁₆ , C ₅₇ F ₁₁₈ , C ₅₇ F ₁₂₀ , C ₅₈ F ₁₁₈ , C ₅₈ F ₁₂₀ , C ₅₈ F ₁₂₂ , C ₅₉ F ₁₂₀ , C ₅₉ F ₁₂₂ , C ₅₉ F ₁₂₄ , C ₆₀ F ₁₂₂ , C ₆₀ F ₁₂₄ , C ₆₀ F ₁₂₆ , C ₆₁ F ₁₂₄ , C ₆₁ F ₁₂₆ , C ₆₁ F ₁₂₈ , C ₆₂ F ₁₂₆ , C ₆₂ F ₁₂₈ , C ₆₂ F ₁₃₀ , C ₆₃ F ₁₂₈ , C ₆₃ F ₁₃₀ , C ₆₃ F ₁₃₂ , C ₆₄ F ₁₃₀ , C ₆₄ F ₁₃₂ , C ₆₄ F ₁₃₄ , C ₆₅ F ₁₃₂ , C ₆₅ F ₁₃₄ , C ₆₅ F ₁₃₆ , C ₆₆ F ₁₃₄ , C ₆₆ F ₁₃₆ , C ₆₆ F ₁₃₈ , C ₆₇ F ₁₃₆ , C ₆₇ F ₁₃₈ , C ₆₇ F ₁₄₀ , C ₆₈ F ₁₃₈ , C ₆₈ F ₁₄₀ , C ₆₈ F ₁₄₂ , C ₆₉ F ₁₄₀ , C ₆₉ F ₁₄₂ , C ₆₉ F ₁₄₄ , C ₇₀ F ₁₄₂ , C ₇₀ F ₁₄₄ , C ₇₀ F ₁₄₆ , C ₇₁ F ₁₄₄ , C ₇₁ F ₁₄₆ , C ₇₁ F ₁₄₈ , C ₇₂ F ₁₄₆ , C ₇₂ F ₁₄₈ , C ₇₂ F ₁₅₀ , C ₇₃ F ₁₄₈ , C ₇₃ F ₁₅₀ , C ₇₃ F ₁₅₂ , C ₇₄ F ₁₅₀ , C ₇₄ F ₁₅₂ , C ₇₄ F ₁₅₄ , C ₇₅ F ₁₅₂ , C ₇₅ F ₁₅₄ , C ₇₅ F ₁₅₆ , C ₇₆ F ₁₅₄ , C ₇₆ F ₁₅₆ , C ₇₆ F ₁₅₈ , C ₇₇ F ₁₅₆ , C ₇₇ F ₁₅₈ , C ₇₇ F ₁₆₀ , C ₇₈ F ₁₅₈ , C ₇₈ F ₁₆₀ , C ₇₈ F ₁₆₂ , C ₇₉ F ₁₆₀ , C ₇₉ F ₁₆₂ , C ₇₉ F ₁₆₄ , C ₈₀ F ₁₆₂ , C ₈₀ F ₁₆₄ , C ₈₀ F ₁₆₆ , C ₈₁ F ₁₆₄ , C ₈₁ F ₁₆₆ , C ₈₁ F ₁₆₈ , C ₈₂ F ₁₆₆ , C ₈₂ F ₁₆₈ , C ₈₂ F ₁₇₀ , C ₈₃ F ₁₆₈ , C ₈₃ F ₁₇₀ , C ₈₃ F ₁₇₂ , C ₈₄ F ₁₇₀ , C ₈₄ F ₁₇₂ , C ₈₄ F ₁₇₄ , C ₈₅ F ₁₇₂ , C ₈₅ F ₁₇₄ , C ₈₅ F ₁₇₆ , C ₈₆ F ₁₇₄ , C ₈₆ F ₁₇₆ , C ₈₆ F ₁₇₈ , C ₈₇ F ₁₇₆ , C ₈₇ F ₁₇₈ , C ₈₇ F ₁₈₀ , C ₈₈ F ₁₇₈ , C ₈₈ F ₁₈₀ , C ₈₈ F ₁₈₂ , C ₈₉ F ₁₈₀ , C ₈₉ F ₁₈₂ , C ₈₉ F ₁₈₄ , C ₉₀ F ₁₈₂ , C ₉₀ F ₁₈₄ , C ₉₀ F ₁₈₆ , C ₉₁ F ₁₈₄ , C ₉₁ F ₁₈₆ , C ₉₁ F ₁₈₈ , C ₉₂ F ₁₈₆ , C ₉₂ F ₁₈₈ , C ₉₂ F ₁₉₀ , C ₉₃ F ₁₈₈ , C ₉₃ F ₁₉₀ , C ₉₃ F ₁₉₂ , C ₉₄ F ₁₉₀ , C ₉₄ F ₁₉₂ , C ₉₄ F ₁₉₄ , C ₉₅ F ₁₉₂ , C ₉₅ F ₁₉₄ , C ₉₅ F ₁₉₆ , C ₉₆ F ₁₉₄ , C ₉₆ F ₁₉₆ , C ₉₆ F ₁₉₈ , C ₉₇ F ₁₉₆ , C ₉₇ F ₁₉₈ , C ₉₇ F ₂₀₀ , C ₉₈ F ₁₉₈ , C ₉₈ F ₂₀₀ , C ₉₈ F ₂₀₂ , C ₉₉ F ₂₀₀ , C ₉₉ F ₂₀₂ , C ₉₉ F ₂₀₄ , C ₁₀₀ F ₂₀₂ , C ₁₀₀ F ₂₀₄ , C ₁₀₀ F ₂₀₆ , C ₁₀₁ F ₂₀₄ , C ₁₀₁ F ₂₀₆ , C ₁₀₁ F ₂₀₈ , C ₁₀₂ F ₂₀₆ , C ₁₀₂ F ₂₀₈ , C ₁₀₂ F ₂₁₀ , C ₁₀₃ F ₂₀₈ , C ₁₀₃ F ₂₁₀ , C ₁₀₃ F ₂₁₂ , C ₁₀₄ F ₂₁₀ , C ₁₀₄ F ₂₁₂ , C ₁₀₄ F ₂₁₄ , C ₁₀₅ F ₂₁₂ , C ₁₀₅ F ₂₁₄ , C ₁₀₅ F ₂₁₆ , C ₁₀₆ F ₂₁₄ , C ₁₀₆ F ₂₁₆ , C ₁₀₆ F ₂₁₈ , C ₁₀₇ F ₂₁₆ , C ₁₀₇ F ₂₁₈ , C ₁₀₇ F ₂₂₀ , C ₁₀₈ F ₂₁₈ , C ₁₀₈ F ₂₂₀ , C ₁₀₈ F ₂₂₂ , C ₁₀₉ F ₂₂₀ , C ₁₀₉ F ₂₂₂ , C ₁₀₉ F ₂₂₄ , C ₁₁₀ F ₂₂₂ , C ₁₁₀ F ₂₂₄ , C ₁₁₀ F ₂₂₆ , C ₁₁₁ F ₂₂₄ , C ₁₁₁ F ₂₂₆ , C ₁₁₁ F ₂₂₈ , C ₁₁₂ F ₂₂₆ , C ₁₁₂ F ₂₂₈ , C ₁₁₂ F ₂₃₀ , C ₁₁₃ F ₂₂₈ , C ₁₁₃ F ₂₃₀ , C ₁₁₃ F ₂₃₂ , C ₁₁₄ F ₂₃₀ , C ₁₁₄ F ₂₃₂ , C ₁₁₄ F ₂₃₄ , C ₁₁₅ F ₂₃₂ , C ₁₁₅ F ₂₃₄ , C ₁₁₅ F ₂₃₆ , C ₁₁₆ F ₂₃₄ , C ₁₁₆ F ₂₃₆ , C ₁₁₆ F ₂₃₈ , C ₁₁₇ F ₂₃₆ , C ₁₁₇ F ₂₃₈ , C ₁₁₇ F ₂₄₀ , C ₁₁₈ F ₂₃₈ , C ₁₁₈ F ₂₄₀ , C ₁₁₈ F ₂₄₂ , C ₁₁₉ F ₂₄₀ , C ₁₁₉ F ₂₄₂ , C ₁₁₉ F ₂₄₄ , C ₁₂₀ F ₂₄₂ , C ₁₂₀ F ₂₄₄ , C ₁₂₀ F ₂₄₆ , C ₁₂₁ F ₂₄₄ , C ₁₂₁ F ₂₄₆ , C ₁₂₁ F ₂₄₈ , C ₁₂₂ F ₂₄₆ , C ₁₂₂ F ₂₄₈ , C ₁₂₂ F ₂₅₀ , C ₁₂₃ F ₂₄₈ , C ₁₂₃ F ₂₅₀ , C ₁₂₃ F ₂₅₂ , C ₁₂₄ F ₂₅₀ , C ₁₂₄ F ₂₅₂ , C ₁₂₄ F ₂₅₄ , C ₁₂₅ F ₂₅₂ , C ₁₂₅ F ₂₅₄ , C ₁₂₅ F ₂₅₆ , C ₁₂₆ F ₂₅₄ , C ₁₂₆ F ₂₅₆ , C ₁₂₆ F ₂₅₈ , C ₁₂₇ F ₂₅₆ , C ₁₂₇ F ₂₅₈ , C ₁₂₇ F ₂₆₀ , C ₁₂₈ F ₂₅₈ , C ₁₂₈ F ₂₆₀ , C ₁₂₈ F ₂₆₂ , C ₁₂₉ F ₂₆₀ , C ₁₂₉ F ₂₆₂ , C ₁₂₉ F ₂₆₄ , C ₁₃₀ F ₂₆₂ , C ₁₃₀ F ₂₆₄ , C ₁₃₀ F ₂₆₆ , C ₁₃₁ F ₂₆₄ , C ₁₃₁ F ₂₆₆ , C ₁₃₁ F ₂₆₈ , C ₁₃₂ F ₂₆₆ , C ₁₃₂ F ₂₆₈ , C ₁₃₂ F ₂₇₀ , C ₁₃₃ F ₂₆₈ , C ₁₃₃ F ₂₇₀ , C ₁₃₃ F ₂₇₂ , C ₁₃₄ F ₂₇₀ , C ₁₃₄ F ₂₇₂ , C ₁₃₄ F ₂₇₄ , C ₁₃₅ F ₂₇₂ , C ₁₃₅ F ₂₇₄ , C ₁₃₅ F ₂₇₆ , C ₁₃₆ F ₂₇₄ , C ₁₃₆ F ₂₇₆ , C ₁₃₆ F ₂₇₈ , C ₁₃₇ F ₂₇₆ , C ₁₃₇ F ₂₇₈ , C ₁₃₇ F ₂₈₀ , C ₁₃₈ F ₂₇₈ , C ₁₃₈ F ₂₈₀ , C ₁₃₈ F ₂₈₂ , C ₁₃₉ F ₂₈₀ , C ₁₃₉ F ₂₈₂ , C ₁₃₉ F ₂₈₄ , C ₁₄₀ F ₂₈₂ , C ₁₄₀ F ₂₈₄ , C ₁₄₀ F ₂₈₆ , C ₁₄₁ F ₂₈₄ , C ₁₄₁ F ₂₈₆ , C ₁₄₁ F ₂₈₈ , C ₁₄₂ F ₂₈₆ , C ₁₄₂ F ₂₈₈ , C ₁₄₂ F ₂₉₀ , C ₁₄₃ F ₂₈₈ , C ₁₄₃ F ₂₉₀ , C ₁₄₃ F ₂₉₂ , C ₁₄₄ F ₂₉₀ , C ₁₄₄ F ₂₉₂ , C ₁₄₄ F ₂₉₄ , C ₁₄₅ F ₂₉₂ , C ₁₄₅ F ₂₉₄ , C ₁₄₅ F ₂₉₆ , C ₁₄₆ F ₂₉₄ , C ₁₄₆ F ₂₉₆ , C ₁₄₆ F ₂₉₈ , C ₁₄₇ F ₂₉₆ , C ₁₄₇ F ₂₉₈ , C ₁₄₇ F ₃₀₀ , C ₁₄₈ F ₂₉₈ , C ₁₄₈ F ₃₀₀ , C ₁₄₈ F ₃₀₂ , C ₁₄₉ F ₃₀₀ , C ₁₄₉ F ₃₀₂ , C ₁₄₉ F ₃₀₄ , C ₁₅₀ F ₃₀₂ , C ₁₅₀ F ₃₀₄ , C ₁₅₀ F ₃₀₆ , C ₁₅₁ F ₃₀₄ , C ₁₅₁ F ₃₀₆ , C ₁₅₁ F ₃₀₈ , C ₁₅₂ F ₃₀₆ , C ₁₅₂ F ₃₀₈ , C ₁₅₂ F ₃₁₀ , C ₁₅₃ F ₃₀₈ , C ₁₅₃ F ₃₁₀ , C ₁₅₃ F ₃₁₂ , C ₁₅₄ F ₃₁₀ , C ₁₅₄ F ₃₁₂ , C ₁₅₄ F ₃₁₄ , C ₁₅₅ F ₃₁₂ , C ₁₅₅ F ₃₁₄ , C ₁₅₅ F ₃₁₆ , C ₁₅₆ F ₃₁₄ , C ₁₅₆ F ₃₁₆ , C ₁₅₆ F ₃₁₈ , C ₁₅₇ F ₃₁₆ , C ₁₅₇ F ₃₁₈ , C ₁₅₇ F ₃₂₀ , C ₁₅₈ F ₃₁₈ , C ₁₅₈ F ₃₂₀ , C ₁₅₈ F ₃₂₂ , C ₁₅₉ F ₃₂₀ , C ₁₅₉ F ₃₂₂ , C ₁₅₉ F ₃₂₄ , C ₁₆₀ F ₃₂₂ , C ₁₆₀ F ₃₂₄ , C ₁₆₀ F ₃₂₆ , C ₁₆₁ F ₃₂₄ , C ₁₆₁ F ₃₂₆ , C ₁₆₁ F ₃₂₈ , C ₁₆₂ F ₃₂₆ , C ₁₆₂ F ₃₂₈ , C ₁₆₂ F ₃₃₀ , C ₁₆₃ F ₃₂₈ , C ₁₆₃ F ₃₃₀ , C ₁₆₃ F ₃₃₂ , C ₁₆₄ F ₃₃₀ , C ₁₆₄ F ₃₃₂ , C ₁₆₄ F ₃₃₄ , C ₁₆₅ F ₃₃₂ , C ₁₆₅ F ₃₃₄ , C ₁₆₅ F ₃₃₆ , C ₁₆₆ F ₃₃₄ , C ₁₆₆ F ₃₃₆ , C ₁₆₆ F ₃₃₈ , C ₁₆₇ F ₃₃₆ , C ₁₆₇ F ₃₃₈ , C ₁₆₇ F ₃₄₀ , C ₁₆₈ F ₃₃₈ , C ₁₆₈ F ₃₄₀ , C ₁₆₈ F ₃₄₂ , C ₁₆₉ F ₃₄₀ , C ₁₆₉ F ₃₄₂ , C ₁₆₉ F ₃₄₄ , C ₁₇₀ F ₃₄₂ , C ₁₇₀ F ₃₄₄ , C ₁₇₀ F ₃₄₆ , C ₁₇₁ F ₃₄₄ , C ₁₇₁ F ₃₄₆ , C ₁₇₁ F ₃₄₈ , C ₁₇₂ F ₃₄₆ , C ₁₇₂ F ₃₄₈ , C ₁₇₂ F ₃₅₀ , C ₁₇₃ F ₃₄₈ , C ₁₇₃ F ₃₅₀ , C ₁₇₃ F ₃₅₂ , C ₁₇₄ F ₃₅₀ , C ₁₇₄ F ₃₅₂ , C ₁₇₄ F ₃₅₄ , C ₁₇₅ F ₃₅₂ , C ₁₇₅ F ₃₅₄ , C ₁₇₅ F ₃₅₆ , C ₁₇₆ F ₃₅₄ , C ₁₇₆ F ₃₅₆ , C ₁₇₆ F ₃₅₈ , C ₁₇₇ F ₃₅₆ , C ₁₇₇ F ₃₅₈ , C ₁₇₇ F ₃₆₀ , C ₁₇₈ F ₃₅₈ , C ₁₇₈ F ₃₆₀ , C ₁₇₈ F ₃₆₂ , C ₁₇₉ F ₃₆₀ , C ₁₇₉ F ₃₆₂ , C ₁₇₉ F ₃₆₄ , C ₁₈₀ F ₃₆₂ , C ₁₈₀ F ₃₆₄ , C ₁₈₀ F ₃₆₆ , C ₁₈₁ F ₃₆₄ , C ₁₈₁ F ₃₆₆ , C ₁₈₁ F ₃₆₈ , C ₁₈₂ F ₃₆₆ , C ₁₈₂ F ₃₆₈ , C ₁₈₂ F ₃₇₀ , C ₁₈₃ F ₃₆₈ , C ₁₈₃ F ₃₇₀ , C ₁₈₃ F ₃₇₂ , C ₁₈₄ F ₃₇₀ , C ₁₈₄ F ₃₇₂ , C ₁₈₄ F ₃₇₄ , C ₁₈₅ F ₃₇₂ , C ₁₈₅ F ₃₇₄ , C ₁₈₅ F ₃₇₆ , C ₁₈₆ F ₃₇₄ , C ₁₈₆ F ₃₇₆ , C ₁₈₆ F ₃₇₈ , C ₁₈₇ F ₃₇₆ , C ₁₈₇ F ₃₇₈ , C ₁₈₇ F ₃₈₀ , C ₁₈₈ F ₃₇₈ , C ₁₈₈ F ₃₈₀ , C ₁₈₈ F ₃₈₂ , C ₁₈₉ F ₃₈₀ , C ₁₈₉ F ₃₈₂ , C ₁₈₉ F ₃₈₄ , C ₁₉₀ F ₃₈₂ , C ₁₉₀ F ₃₈₄ , C ₁₉₀ F ₃₈₆ , C ₁₉₁ F ₃₈₄ , C ₁₉₁ F ₃₈₆ , C ₁₉₁ F ₃₈₈ , C ₁₉₂ F ₃₈₆ , C ₁₉₂ F ₃₈₈ , C ₁₉₂ F ₃₉₀ , C ₁₉₃ F ₃₈₈ , C ₁₉₃ F ₃₉₀ , C ₁₉₃ F ₃₉₂ , C ₁₉₄ F ₃₉₀ , C ₁₉₄ F ₃₉₂ , C ₁₉₄ F ₃₉₄ , C ₁₉₅ F ₃₉₂ , C ₁₉₅ F ₃₉₄ , C ₁₉₅ F ₃₉₆ , C ₁₉₆ F ₃₉₄ , C ₁₉₆ F ₃₉₆										



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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	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, PFC-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 IR-125/134a/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						

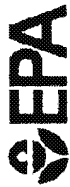
Key: R = Retrofit Uses, N = New Uses

*Acceptable only where no other alternatives are technically feasible due to safety or performance requirements.



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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						
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 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
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			
Hydrofluorother-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 XLTI	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 ₂		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 ₂		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.



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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."