

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DYNATEMP INTERNATIONAL, INC. and
FLUOROFUSION SPECIALTY CHEMICALS, INC.
Petitioners,

v.

R 421A LLC, d/b/a CHOICE REFRIGERANTS,
Patent Owner,

Case No. IPR2020-01660
U.S. Patent No. 9,982,179

**PETITIONERS' REPLY TO PATENT OWNER'S PRELIMINARY
RESPONSE TO THE PETITION**

Patent Owner's ("PO") Preliminary Response (Paper 9) makes the surprising claim that cyclopentane is a refrigerant gas to avoid prior art. It is not. It is a solvent that aids lubrication. Ex. 1007, 3:34-4:30; Ex. 1011, ¶0016.

Cyclopentane boils at 322° K (120° F). *See* <https://webbook.nist.gov/cgi/cbook.cgi?ID=C287923&Mask=4#Thermo-Phase>.¹ The claimed refrigerants pentafluoroethane (R-125) and tetrafluoroethane (R-134a) boil at -55° F and -15° F, respectively (Ex. 2015 at 2) and, unlike cyclopentane, are gases at NTP.

Refrigerants, "in a mechanical system, are compressed and condensed to reject heat into the environment and expanded and evaporated to absorb heat from the environment." Ex. 1011 ¶¶ 0003, 0033; *accord* Ex. 2015 at 1. ASHRAE is "[a]n accepted guide for refrigerant designations" (Ex. 1003 at 96, ¶ 4) and does not list cyclopentane as a refrigerant. *See* Ex. 2015 at p. 2-4. Even if cyclopentane could act as a refrigerant in some yet to be defined system, such is irrelevant. The purported invention relates to R-22 refrigerant systems (Paper 9 at 8-9) as does the prior art. *See, e.g.*, Ex. 1007 1:1, 7:31-33, 12:9-16; Ex. 1011 at ¶ 51. R-22 boils at -41° F. Ex. 2015 at 2. "[R]efrigerants with similar boiling points produce similar

¹ Petitioner is mindful of the Board's direction to not introduce new evidence. It is assumed the Board's direction did not preclude reference to basic science.

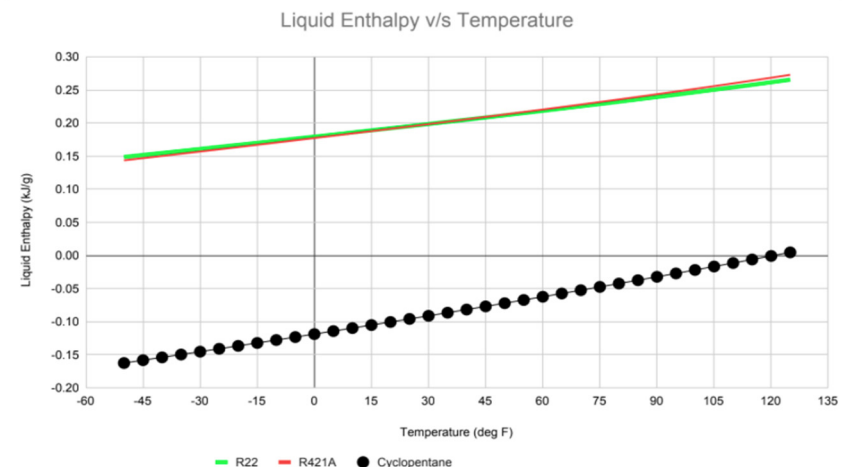
refrigeration effect with a given compressor.” *Id.* at 1. Cyclopentane has no “refrigeration effect” in a R-22 system because it boils at 120° F.

Cyclopentane is less than 5% of prior art R-125/R-134a blends. Ex. 1007 3:52-54; Ex. 1011 ¶ 0020. The prior art blend of compressed and liquified refrigerants evaporate in the evaporator, decreasing the blend temperature. Any cyclopentane present would transfer heat it absorbed from the condenser to the cooler evaporated refrigerants. Then, the cooled cyclopentane absorbs heat from the hotter refrigerants in the condenser. The cyclopentane in the blend cannot boil at “the evaporation temperature span of primary interest” to the inventor (-4 to 14° F.) or at the targeted -5° F. to 45° F. range. Ex. 1003 at 98 ¶ 7; Ex. 1004, p. 52, ¶ 6.

The NIST REFPROP program referenced by PO’s expert confirms cyclopentane absorbs heat in the condenser and ejects heat in the evaporator when used with a R-125/R-134a blend. *See* Ex. 2004 at ¶ 46, 49;

<https://pages.nist.gov/REFPROP-docs/#updates-to-version-100>. The REFPROP

generated graph to the right shows cyclopentane has negative enthalpy across the relevant temperature range—it acts as an anti-refrigerant.



March 8, 2021

Respectfully submitted,

/Edward M. Roney

Edward M. Roney IV (Reg. No. 62,048)

MICHAEL BEST & FRIEDRICH LLP

2501 Blue Ridge Road, Suite 390

Raleigh, NC 27607

984.220.8719 (t)

877.398.5240 (f)

emroney@michaelbest.com

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. §42.24(d), the undersigned certifies that this Petitioners' Reply to Patent Owner's Preliminary Response to the Petition complies with the type-volume limitation of 37 C.F.R. §42.24(b). The word count application of the word processing program used to prepare this Reply indicates that the Reply contains 412 words, excluding the parts of the brief exempted by 37 C.F.R. §42.24(a).

Respectfully submitted,

s/Edward M. Roney/
Edward M. Roney IV (Reg. No. 62,048)
Attorney for Petitioner

March 8, 2021

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6, I hereby certify that a true copy of this
PETITIONERS' REPLY TO PATENT OWNER'S PRELIMINARY RESPONSE
TO THE PETITION was served in its entirety via electronic mail, on the following
counsel of record for Patent Owner:

Jason M. Perilla
Todd Deveau
Scott P. Amy (*pro hac vice pending*)
THOMAS | HORSTEMEYER, LLP
3200 Windy Hill Rd.
Suite 1600E
Atlanta, Georgia 30339
Email: jason.perilla@thomashorstemeyer.com
todd.deveau@thomashorstemeyer.com
scott.amy@thomashorstemeyer.com

March 8, 2021

s/Edward M. Roney/
Edward M. Roney IV (Reg. No. 62,048)
Attorney for Petitioner