

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ARKEMA INC. AND ARKEMA FRANCE,
Petitioner,

v.

HONEYWELL INTERNATIONAL INC.,
Patent Owner.

Case PGR2016-00011
Case PGR2016-00012¹
Patent 9,157,017 B2

Before MICHAEL P. TIERNEY, *Vice Chief Administrative Patent Judge*,
GRACE KARAFFA OBERMANN, and KRISTI L. R. SAWERT,
Administrative Patent Judges.

SAWERT, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 328(a) and 37 C.F.R. § 42.208

¹ Because resolution of issues common to both post-grant reviews resolves the outstanding disputes between the parties as to all challenged claims of the patent at issue, we exercise our discretion to issue a single Final Written Decision to be entered in each case.

I. INTRODUCTION

In these post-grant reviews designated PGR2016-00011 (“PGR11”) and PGR2016-00012 (“PGR12”), Arkema Inc. and Arkema France (collectively, “Petitioner”) challenge the patentability of claims 1–20 of U.S. Patent No. 9,157,017 B2 (Ex. 1001², “the ’017 patent”), assigned to Honeywell International Inc. (“Patent Owner”). We have jurisdiction under 35 U.S.C. § 6. For the reasons discussed below, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–20 (“the challenged claims”) are unpatentable. This Final Written Decision is issued pursuant to 35 U.S.C. § 328(a) and 37 C.F.R. § 42.208.

A. Procedural History

Petitioner filed two Corrected Petitions for post-grant review of claims 1–20 of the ’017 patent. PGR11 Paper 3 (“PGR11 Pet.”); PGR12 Paper 7 (“PGR12 Pet.”). On September 2, 2016, pursuant to 35 U.S.C. § 324, we instituted post-grant reviews of claims 1–20 of the ’017 patent on certain grounds of unpatentability alleged in the Petitions. *See* PGR11 Paper 13 (“PGR11 Dec. on Inst.”); PGR12 Paper 13 (“PGR12 Dec. on Inst.”).

After institution, Patent Owner filed Patent Owner Responses. *See* PGR11 Paper 24 (“PGR11 Resp.”); PGR12 Paper 22 (“PGR12 Resp.”). And Petitioner filed Replies. PGR11 Paper 31 (“PGR11 Reply”); PGR12 Paper 27 (“PGR12 Reply”). In PGR11, both parties filed motions to exclude evidence, and the briefing on those motions included oppositions and

² Unless otherwise noted, all exhibits referenced in this Decision were entered into the record in both PGR11 and PGR12. For ease of reference, we refer to the exhibits filed in PGR12 only unless otherwise noted.

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replies. *See* PGR11 Papers 36, 38, 41, 42, 45, 47, 50, 51, 52. Also in PGR11, Patent Owner filed Observations on Statements in Petitioner’s Reply following Board authorization. PGR11 Paper 40.

The Board held a consolidated oral hearing on June 7, 2017. A transcript has been entered into the record. PGR11 Paper 53; PGR12 Paper 33 (“Tr.”).

B. Related Matters

Petitioner filed a Corrected Petition for *inter partes* review of the ’017 patent on February 26, 2016. The Board denied institution on the grounds presented in that Petition. *Arkema Inc. v. Honeywell Int’l Inc.*, Case IPR2016-00643 (PTAB Sept. 2, 2016) (Paper 11). In addition, both parties identify several proceedings in the United States and in the United States Patent and Trademark Office (“Office”) involving the ’017 patent and patents related to the ’017 patent, as well as several proceedings in other countries involving foreign counterparts to the ’017 patent and its related patents. PGR11 Pet. 3–7; PGR12 Pet. 2–3; PGR11 Paper 11, 1–4; PGR12 Paper 11, 1–4.

C. The ’017 Patent

The ’017 patent, titled “Compositions Containing Fluorine Substituted Olefins and Methods and Systems Using Same,” is directed to “the use of fluorine substituted olefins, including tetra- and penta-fluoropropenes, in a variety of applications.” Ex. 1001 (Abstract). Those applications, according to the ’017 patent, include “methods of depositing catalyst on a solid support, methods of sterilizing articles, cleaning methods and compositions, methods of applying medicaments, fire extinguishing/suppression

compositions and methods, flavor formulations, fragrance formulations, and inflating agents.” *Id.* The written description of the ’017 patent states that a preferred use of the disclosed fluorine substituted olefins is in “refrigeration systems, and [in] methods and systems utilizing such compositions.” *Id.* at 1:30–32.

The ’017 patent explains that “[c]oncern has increased in recent years about potential damage to the earth’s atmosphere and climate” from “certain chlorine-based compounds” such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs). *Id.* at 2:1–6. The ’017 patent states that these compounds are widely used in air-conditioning and refrigeration systems, but have become “disfavored because of the ozone-depleting properties.” *Id.* at 2:6–9. Thus, the ’017 patent explains, there is “an increasing need for new fluorocarbon and hydrocarbon compounds and compositions” for refrigeration. *Id.* at 2:9–12. In particular, “it has become desirable to retrofit chlorine-containing refrigeration systems by replacing chlorine-containing refrigerants with non-chlorine-containing refrigerant compounds that will not deplete the ozone layer.” *Id.* at 2:12–16.

But, the ’017 patent teaches, “any potential substitute refrigerant must also possess the properties present in many of the most widely used fluids,” including “excellent heat transfer properties, chemical stability, low- or no-toxicity, non-flammability and lubricant compatibility.” *Id.* at 2:17–22. Of these properties, lubricant compatibility and flammability are especially important properties. *Id.* at 2:23–24 & 52–53. Lubricant compatibility (or miscibility) “is of particular importance,” the ’017 patent explains, in that the substitute refrigerant must be “compatible with the lubricant utilized in

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the compressor unit[] used in most refrigeration systems.” *Id.* at 2:23–27. The ’017 patent states that the “lubricant should be sufficiently soluble in the refrigeration liquid over a wide range of operating temperatures.” *Id.* at 2:35–37. Otherwise, the lubricant becomes viscous and “lodge[s] in the coils of the evaporator of the refrigeration, air-conditioning or heat pump system” and “thus reduce[s] the system efficiency.” *Id.* at 2:37–42. As to flammability, the ’017 patent states that “it is considered either important or essential in many applications . . . to use compositions [that] are non-flammable,” particularly in heat-transfer applications. *Id.* at 2:53–56. “Unfortunately,” the ’017 patent teaches, “many HFCs, which might otherwise be desirable for use[] in refrigerant compositions are not nonflammable.” *Id.* at 2:61–63. The ’017 patent lists fluoroalkene 1,1,1-trifluoropropene (HFO-1243zf) as an example of a flammable compound. *Id.* at 2:63–67.

The ’017 patent discloses “compositions comprising one or more C₃ or C₄ fluoroalkenes, preferably compounds having Formula I as follows:



where X is a C₂ or a C₃ unsaturated, substituted or unsubstituted, alkyl radical, each R is independently Cl, F, Br, I or H, and z is 1 to 3.” *Id.* at 3:40–50. The ’017 patent states that these compositions, referred to as “hydrofluoro-olefins or ‘HFOs,’” “satisf[y]” the “above-noted need[s].” *Id.* at 3:42–43; 4:1–2. The ’017 patent states that preferred compositions include compounds of Formula II, depicted below:

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