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Paper 11
Entered: September 10, 2020

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BASF CORPORATION,
Petitioner,

v.

INGEVITY SOUTH CAROLINA, LLC,
Patent Owner.

PGR2020-00035
Patent 10,323,553 B2

Before CHRISTOPHER L. CRUMBLEY, CHRISTOPHER M. KAISER, and JULIA HEANEY, *Administrative Patent Judges*.

HEANEY, *Administrative Patent Judge*.

DECISION
Denying Institution of Post-Grant Review
35 U.S.C. § 324

I. INTRODUCTION

BASF Corporation ("Petitioner") filed a Petition to institute a post-grant review of claims 1–10, 14–28, 32–38, 51, 52, 55–57, 59, 64–72, and 76–82 of U.S. Patent No. 10,323,553 B2 (Ex. 1001, "the '553 patent"). Paper 2 ("Petition" or "Pet."). Ingevity South Carolina, LLC ("Patent Owner") filed a Preliminary Response. Paper 7 ("Prelim. Resp."). We authorized additional briefing for the parties to address the applicability of *McRO, Inc. v. Bandai Namco Games America Inc.*, 959 F.3d 1091 (Fed. Cir. 2020) to eligibility of the '553 patent for post-grant review. Petitioner filed a Reply (Paper 9, "Pet. Reply") and Patent Owner filed a Sur-Reply (Paper 10, "PO Sur-Reply").

Institution of a post-grant review is authorized by statute when "the information presented in the petition . . . would demonstrate that it is more likely than not that at least 1 of the claims challenged in the petition is unpatentable." 35 U.S.C. § 324(a) (2018). Upon consideration of the Petition, Preliminary Response, and the evidence of record, we determine that the information presented does not show it is more likely than not that Petitioner would prevail in establishing unpatentability of claims 1–10, 14–28, 32–38, 51, 52, 55–57, 59, 64–72, and 76–82 of the '553 patent.

A. Related Proceedings

The parties identify the following related proceeding involving the '553 patent: PGR2020-00037 ("'37 PGR"). Pet. 96; Paper 6, 2. The parties state they are not aware of any other judicial or administrative proceeding involving the '553 patent. *Id.*

Petitioner filed Reasons for Parallel Petitions and Petition Ranking in this proceeding ("'35 PGR") and the '37 PGR. Paper 3. In that paper,

Petitioner ranks the ’35 PGR Petition first, and argues that material differences between the petitions justifies instituting review in both proceedings. Paper 3. Patent Owner argues that we should exercise discretion to limit Petitioner to one petition. Prelim. Resp. 5. Because Petitioner ranks the ’35 PGR Petition first for consideration, we need not address Patent Owner’s argument for discretionary denial of institution.

B. The ’553 Patent

The ’553 patent, titled “Evaporative Fuel Vapor Emission Control Systems,” describes canister systems that employ activated carbon to adsorb fuel vapor emitted from motor vehicle fuel systems and reduce hydrocarbon air pollution. Ex. 1001, code (54), 1:29–33. The adsorbed fuel vapor can be “periodically removed from the activated carbon by purging the canister systems with ambient air [while the engine is turned on] to desorb the fuel vapor from the activated carbon,” after which the “regenerated carbon is then ready to adsorb additional fuel vapor.” *Id.* at 1:33–38; 53–58. According to the ’553 patent, however, “[t]he purge air does not desorb the entire fuel vapor adsorbed on the adsorbent volume, resulting in a residue hydrocarbon (‘heel’) that may be emitted to the atmosphere.” *Id.* at 1:58–61.

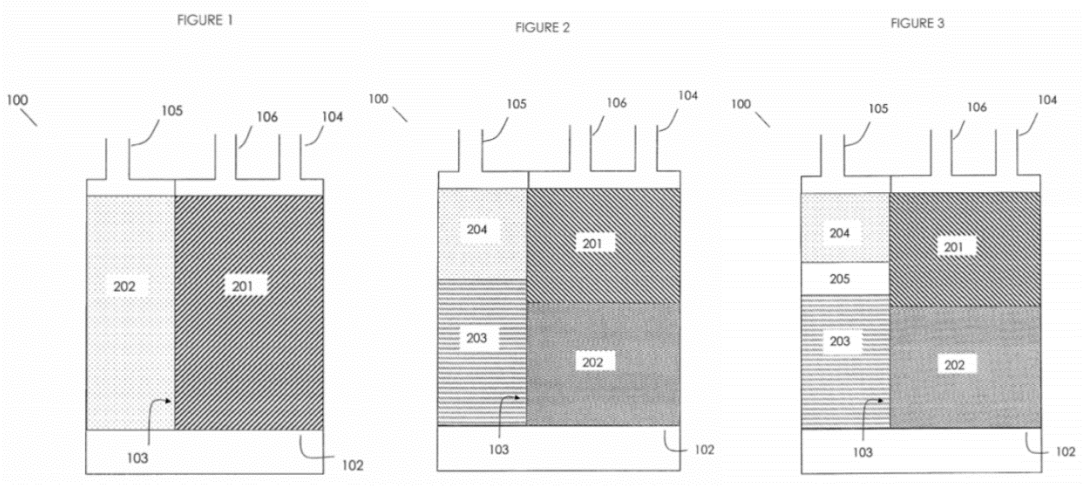
The ’553 patent states “[a]n increase in environmental concerns has continued to drive strict regulations of the hydrocarbon emissions from motor vehicles even when the vehicles are not operating.” Ex.1001, 1:39–41. “When a vehicle is parked in a warm environment during the daytime heating (i.e., diurnal heating), the temperature in the fuel tank increases resulting in an increased vapor pressure in the fuel tank.” *Id.* at 1:42–45. The ’553 patent explains that the “heel in local equilibrium with the gas phase also permits fuel vapors from the fuel tank to migrate through the

canister system as emissions," and "[s]uch emissions typically occur when a vehicle has been parked and subjected to diurnal temperature changes over a period of several days, commonly called 'diurnal breathing losses' ["DBL"]." *Id.* at 1:61–67. The '553 patent further states that the "California Low Emission Vehicle Regulation (LEV-III) requires canister DBL emissions not to exceed 20 mg." *Id.* at 2:6–8.

The '553 patent explains that DBL emissions may be "more severe for a hybrid vehicle that includes both an internal combustion engine and an electric motor," because, in such vehicles, "the internal combustion engine is turned off nearly half of the time during vehicle operation." Ex. 1001, 2:46–51. "Since the adsorbed fuel vapor on the adsorbents is purged only when the internal combustion engine is on, the adsorbents in the canister of a hybrid vehicle is purged with fresh air less than half of the time compared to conventional vehicles." *Id.* at 51–55. Yet, "[a] hybrid vehicle generates nearly the same amount of evaporative fuel vapor as the conventional vehicles." *Id.* at 55–57. The '553 patent explains "[t]he lower purge frequency of the hybrid vehicle can be insufficient to clean the residue hydrocarbon heel from the adsorbents in the canister, resulting in high diurnal breathing loss (DBL) emissions." *Id.* at 57–60. Therefore, according to the '553 patent, "it is desirable to have an evaporative emission control system with low diurnal breathing loss (DBL) emissions even when a low level of purge air is used, or when the adsorbents in the canister are purged less frequently such as in the case of hybrid vehicles, or both." *Id.* at 2:61–65.

The '553 patent describes several example embodiments of evaporative emission control canister systems to address the above

problems. Ex. 1001, 4:10–20. Figures 1–3 of the ’553 patent, reproduced below, depict a first group of canister system embodiments.



Figures 1–3 are evaporative emission control canister systems having “an initial adsorbent volume and subsequent adsorbent volume(s) ... located within a single canister.” *Id.* at 4:10–14. An “adsorbent volume” refers to “an adsorbent material or adsorbent containing material along vapor flow path, and may consist of a bed of particulate material, a monolith, honeycomb, sheet or other material.” *Id.* at 6:32–36. Figure 1 illustrates “[c]anister system 100 includ[ing] a support screen 102, a dividing wall 103, a fuel vapor inlet 104 from a fuel tank, a vent port 105 opening to an atmosphere, a purge outlet 106 to an engine, an initial adsorbent volume 201, and a subsequent adsorbent volume 202.” *Id.* at 4:24–28. The ’553 patent explains the operation of canister system 100 as follows:

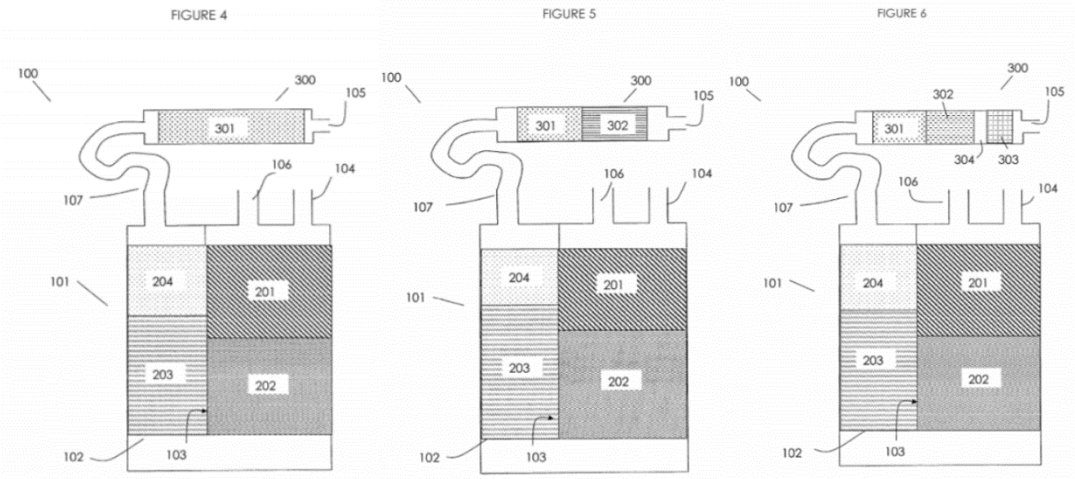
> When an engine is off, the fuel vapor from a fuel tank enters the canister system 100 through the fuel vapor inlet 104. The fuel vapor diffuses into the initial adsorbent volume 201, and then the subsequent adsorbent volume 202 before being released to the atmosphere through the vent port 105 of the canister system. Once the engine is turned on, ambient air is drawn into the canister system 100 through the vent port 105. The purge air

> flows through the subsequent adsorbent volume 202 and then the initial adsorbent volume 201, and desorbs the fuel vapor adsorbed on the adsorbent volumes 202, 201 before entering an internal combustion engine through the purge outlet 106.

Id. at 4:29–40.

The embodiment of Figure 2 includes additional subsequent adsorbent volumes 203 and 204, and the embodiment of Figure 3 adds empty volume 205 between subsequent adsorbent volumes 203 and 204. *Id.* at 4:41–57.

Figures 4–6 of the ’553 patent, reproduced below, depict a second group of canister system embodiments.



Figures 4–6 are evaporative emission control canister systems that include more than one canister, “wherein an initial adsorbent volume and at least one subsequent adsorbent volume are located in separate canisters that are connected to permit sequential contact by fuel vapor.” *Id.* at 4:14–20. Figure 4 depicts main canister 101 having similar elements as shown in Figure 2, along with supplemental canister 300 including conduit 107 connected to main canister 101, subsequent adsorbent volume 301, and vent port 105. *Id.* at 4:61–5:3. Main canister 101 and supplemental canister 300 operate similarly to the embodiments of Figures 1–3: when the engine is off,

fuel vapor enters main canister 101 through inlet 104, diffuses through the adsorbent volumes 201–204, and then enters adsorbent volume 301 before releasing to the atmosphere at vent port 105. *Id.* at 5:4–14. Once the engine is turned on, ambient air is drawn into the canister system through vent port 105, the purge air flows through the adsorbent volumes in supplemental canister 300 and main canister 101 to desorb the fuel vapor adsorbed on the adsorbent volumes, before entering the internal combustion engine through purge outlet 106. *Id.* at 5:14–23. The embodiment of Figure 5 includes additional subsequent adsorbent volume 302, and the embodiment of Figure 6 adds empty volume 304 between subsequent adsorbent volumes 302 and 303. *Id.* at 5:24–38.

The '553 patent describes adsorbent volumes in terms of three adsorptive characteristics: "incremental adsorption capacity," "butane working capacity (BWC)," and "g-total BWC." *See* Ex. 1001, 6:10–22. These properties are described as "nominal," which include adsorbent component volumes but excludes conduits, gaps, or other non-adsorbent volumes, and "effective," which includes all volumes of the system both adsorbent and non-adsorbent. *Id.* at 6:37–42; 10:26–34. Nominal incremental adsorption capacity of an adsorbent component is a function of the difference between the gram mass of adsorbed butane at 50 vol. % butane concentration and 5 vol. % butane concentration, multiplied by the "nominal volume apparent density" (defined as the mass of adsorbent material divided by the nominal volume of adsorbent material). *Id.* at 6:56–64; 9:6–25. Nominal volume BWC is determined by placing the adsorbent component in a test system that loads the adsorbent material with butane and then purges it with air, and measuring the difference in mass of the

adsorbent component before and after the purge. *Id.* at 9:26–10:24. The g-total BWC is defined as the total gram amount of butane purged during the test. *Id.* at 10:24–25. The "effective" property of each characteristic (i.e., effective incremental adsorption capacity, effective butane working capacity (BWC), and effective g-total BWC) is a function of each respective nominal property that takes into account the total effective volume of the system. *Id.* at 10:25–62.

The '553 patent provides an exemplary embodiment of an evaporative emission control canister system with specified adsorbent material properties, comprising:

> an initial adsorbent volume having an effective incremental adsorption capacity at 25° C. of greater than 35 grams n-butane/L between vapor concentration of 5 vol % and 50 vol % n-butane; and at least one subsequent adsorbent volume having an effective incremental adsorption capacity at 25° C. of less than 35 grams n-butane/L between vapor concentration of 5 vol% and 50 vol% n-butane, an effective butane working capacity (BWC) of less than 3 g/dL, and a g-total BWC of between 2 grams and 6 grams. . . .
>
> The evaporative emission control canister system has a two-day diurnal breathing loss (DBL) emissions of no more than 20 mg at no more than about 210 liters of purge applied after the 40 g/hr butane loading step.

Ex. 1001, 3:56–67; 4:5–9.

The '553 patent provides further examples of evaporative emission control canister systems, and lists specific characteristics for each example. *Id.* at 13:60–20:12; *see also* col. 19–col. 24, Tables 1–5.

C. The Challenged Claims

Petitioner challenges claims 1–10, 14–28, 32–38, 51, 52, 55–57, 59, 64–72, and 76–82 of the '553 patent. Pet. 1. Claims 2–10 and 14–20

depend from claim 1; claims 22–28 and 32–38 depend from claim 21; claim 52 depends from claim 51; claims 56, 57, and 59 depend from claim 55; and claims 65–72 and 76–82 depend from claim 64.

Claim 1, reproduced below, is illustrative of the subject matter of the challenged claims:

> 1. An evaporative emission control canister system, including one or more canisters and comprising:
>
> a fuel-side adsorbent volume having an effective incremental adsorption capacity at 25° C. of greater than 35 grams n-butane/L between vapor concentration of 5 vol % and 50 vol % n-butane; and
>
> at least one subsequent adsorbent volume having an effective incremental adsorption capacity at 25° C. of less than 35 grams n-butane/L between vapor concentration of 5 vol % and 50 vol % n-butane, an effective butane working capacity (BWC) of less than 3 g/dL, and a g-total BWC of ≤6 grams,
>
> wherein the fuel-side adsorbent volume having an effective incremental adsorption capacity at 25° C. of greater than 35 grams n-butane/L between vapor concentration of 5 vol % and 50 vol % n-butane, and the at least one subsequent adsorbent volume are located within a single canister, or in separate canisters that are connected to permit sequential contact by fuel vapor, and wherein the canister system has a two-day diurnal breathing loss (DBL) of no more than 20 mg at no more than 100 BV of purge applied after a 40 g/hr butane loading step.

Ex. 1001, 23:18–40.

D. Asserted Grounds of Unpatentability

Petitioner asserts the following grounds of unpatentability:

Claims Challenged	**35 U.S.C.**	**Reference(s)/Basis**
1, 2, 4–10, 14–28, 32–38, 51, 55–57, and 65	§ 112(a)	Enablement
1–10, 14–28, 32–38, 51, 52, 55–57, 59, and 65	§ 112(a)	Enablement

Claims Challenged	35 U.S.C.	Reference(s)/Basis
1–10, 14–28, 32–38, 51, 52, 55–57, 59, and 65	§ 112(a)	Written Description
64, 66–72, and 76–82	§ 112(a)	Enablement
64, 66–72, and 76–82	§ 112(a)	Written Description

Pet. 2–3. Petitioner relies on the Declaration of James M. Lyons (Ex. 1003).

II. ANALYSIS

A. Level of Ordinary Skill in the Art

Factors pertinent to a determination of the level of ordinary skill in the art include "(1) educational level of the inventor; (2) type of problems encountered in the art; (3) prior art solutions to those problems; (4) rapidity with which innovations are made; (5) sophistication of the technology; and (6) educational level of workers active in the field." *Envtl. Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 696–697 (Fed. Cir. 1983) (citing *Orthopedic Equip. Co. v. All Orthopedic Appliances, Inc.*, 707 F.2d 1376, 1381–82 (Fed. Cir. 1983)). Not all such factors may be present in every case, and one or more of these or other factors may predominate in a particular case. *Id.*

Petitioner argues a person of ordinary skill in the art at the time of the invention "would possess at least a B.S. in chemistry or chemical or mechanical engineering and would have at least one year of experience working on control of automotive evaporative emissions" and "would also understand the chemistry and physics associated with the phenomena of fuel vapor adsorption, desorption, and diffusion." Pet. 16–17 (citing Ex. 1003 ¶ 17). Patent Owner does not dispute the level of ordinary skill in the art. For purposes of this decision, we adopt Petitioner's definition of the level of ordinary skill in the art because it is consistent with the '553 patent and the asserted prior art.

B. Post-Grant Review Eligibility of the '553 Patent

The post-grant review provisions set forth in section 6(d) of the Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (September 16, 2011) ("AIA"), apply only to patents subject to the first-inventor-to-file provisions of the AIA. *See* AIA § 6(f)(2)(A) (The provisions of Section 6(d) "shall apply only to patents described in section 3(n)(1)"). Patents subject to the first-inventor-to-file provisions are those that issue from applications "that contain[] or contained at any time . . . a claim to a claimed invention that has an effective filing date as defined in section 100(i) of title 35, United States Code, that is on or after" March 16, 2013. AIA § 3(n)(1). Additionally, "[a] petition for a post-grant review may only be filed not later than the date that is 9 months after the date of the grant of the patent or of the issuance of a reissue patent (as the case may be)." 35 U.S.C. § 321(c).

The effective filing date of an application for a patent on an invention is "the filing date of the earliest application for which the . . . application is entitled, as to such invention, to a right of priority under section 119, 365(a), 365(b), 386(a), or 386(b) or to the benefit of an earlier filing date under section 120, 121, 365(c), or 386(c)." 35 U.S.C. § 100(i)(1)(B). In the event that the application is not entitled to any earlier filing date or right of priority, the effective filing date is "the actual filing date of. . . the application for the patent containing a claim to the invention." 35 U.S.C. § 100(i)(1)(A).

The '553 patent issued on June 18, 2019 from U.S. Application No. 15/676,734 ("the '734 application," filed Aug. 14, 2017), which is a continuation of U.S. Application No. 14/434,690 ("the '690 application,"

filed Apr. 9, 2015), which claims the benefit of U.S. National Entry of International Application No. PCT/US2013/064407 ("the '407 PCT application," filed Oct. 10, 2013), which claims the benefit of U.S. Provisional Application No. 61/712,244 ("the '244 provisional," filed Oct. 10, 2012). Ex. 1001, codes (21), (22), (45), (60), (63), 1:7–18. Although the '553 patent claims priority to the '244 provisional, Petitioner argues at least claim 1 of the '553 patent lacks enablement and written description support in the '244 provisional. Pet. 17–29. Thus, Petitioner contends that the '553 patent is eligible for post-grant review because the claims are not entitled to an effective filing date earlier than the October 10, 2013 filing date of the '407 PCT application. *Id.* at 17–18.

Because Petitioner fails to show it is more likely than not that the challenged claims are unpatentable based on the merits of the challenges presented, we determine that we need not address the issue of PGR eligibility for the '553 patent. For purposes of this decision, we assume that the '553 patent is PGR-eligible.

C. Alleged Lack of Enablement

Petitioner argues that all of the challenged claims 1–10, 14–28, 32–38, 51, 52, 55–57, 59, 64–72, and 76–82 lack enablement under 35 U.S.C. § 112(a), in ground 1 (Pet. 29–54), ground 2 (*id.* at 54–71), and ground 4 (*id.* at 87–90) (collectively, "the enablement grounds"). Each of the enablement grounds challenges a different set of claims, based on commonalities within that set: (1) ground 1 is directed to the claim limitations "a subsequent adsorbent volume having . . . an effective butane working capacity (BWC) of less than 3 g/dL, and a g-total BWC of ≤6 grams"; (2) ground 2 is directed to the number of adsorbent volumes in the claimed canister systems;

and (3) ground 4 is directed to claims that depend from claim 65, or from which claim 65 depends. We address each of these grounds below.

1. Legal Standard

To be enabling under § 112(a), "the specification of a patent must teach those skilled in the art how to make and use the full scope of the claimed invention without 'undue experimentation.'" *In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993). The key word is "undue," not experimentation. *In re Wands*, 858 F.2d 731,737 (Fed. Cir. 1988). In determining whether undue experimentation would have been required to make and use an invention, the following factors are considered:

> (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims.

Wands, 858 F.2d at 737.

2. Ground 1: claims 1, 2, 4–10, 14–28, 32–38, 51, 55–57, and 65 ("the ground 1 claims")

Petitioner's Contentions

Petitioner argues that the '553 patent "identifies a 'window of adsorptive properties' (i.e. g-total BWC between 2g – 6g and effective BWC less than 3g/dL) for a vent-side adsorbent volume necessary for a LEV-III compliant system" (Pet. 30, citing Ex. 1001, 19:19–23), and that Patent Owner chose to broadly claim canister systems with a subsequent adsorbent volume having properties outside of this window. *Id.* Petitioner argues that a person of ordinary skill in the art could not have made a LEV-III compliant canister system having a subsequent adsorbent volume with g-total BWC outside the range of 2g–6g, or effective BWC outside the range

of less than 3g/dL, without undue experimentation, and thus the ground 1 claims are not enabled. *Id.* at 30–31.

As to the g-total BWC limitation, Petitioner argues that the '553 patent teaches away from LEV-III compliant canister systems with a vent-side adsorbent having a g-total BWC < 2g and thus claims 1, 21, 55, and 65 are not enabled. *Id.* at 43–46. For independent claim 51 and its dependents, which do not recite a limitation for g-total BWC, Petitioner argues that the '553 patent does not enable systems with a vent-side adsorbent having g-total BWC < 2g or g-total BWC > 6g. *Id.* at 46–48. As to the effective BWC limitation, Petitioner argues that claims 21 and 55 and their respective dependents are not enabled because they fail to recite an upper limit on effective BWC. *Id.* at 50.

Petitioner's arguments concerning the ground 1 claims rely on the following passage from the '553 specification:

> TABLE 4 and TABLE 5 summarized the conditions of the canister systems of EXAMPLES 1-13, and their measured 2-day DBL emissions. The canister systems of EXAMPLES 7, 8, 10 and 11 provided the 2-day DBL emissions of less than 20 mg, as required under the California Bleed Emissions Test Procedure (BETP). The requirement not to exceed 20 mg for BETP under low purge was met by satisfying a window of adsorptive properties by a vent-side volume, where the window was an effective BWC of less than 3 g/dL and a g-total BWC of between 2g and 6g.

Ex. 1001, 19:14–23. Petitioner argues that this statement about the '553 patent's examples shows that all canister systems meeting the DBL emissions requirement must have a vent-side volume having both an effective BWC of less than 3 g/dL and a g-total BWC of between 2g and 6g. (Pet. 31–32), and thus the '553 patent "explicitly limits the low-purge LEV-

III-compliant systems to those within the 'window of adsorptive properties.'" *Id.* at 34. Petitioner further argues that this statement teaches away from LEV-III compliant systems with effective BWC or g-total BWC outside the window of adsorptive properties, and would have discouraged a person of ordinary skill in the art from experimenting to achieve the claimed system. *Id.* at 38–39, 42. Specifically, Petitioner argues that Example 13, having g-total BWC of 1.6g and 2-day DBL emissions of 35 mg, "demonstrates that the inventors were unable to meet the emissions performance limitation of those claims with volumes having g-total BWC lower than 2g." *Id.* at 40–41. Similarly, Petitioner argues that Example 9, having effective BWC of 3.1g/dL and 2-day DBL emissions of 51 mg, demonstrates that "the inventors tried and failed to make" a canister system having an effective BWC above 3g. *Id.* at 51.

Petitioner sets forth a *Wands* factor analysis for canister systems having subsequent adsorbent volume with (1) g-total BWC outside the range of 2g–6g (*id.* at 44–46) and (2) effective BWC greater than 3g/dL (*id.* at 52–53).

Patent Owner's Contentions

Patent Owner argues that the '553 specification would have guided a person of ordinary skill in the art to experiment with canister systems outside the "window of adsorptive properties," and that Petitioner's non-enablement contention fails to consider the knowledge of a person of ordinary skill. Prelim. Resp. 43–44. Patent Owner disputes Petitioner's interpretation of the '553 specification and argues that the summary of Tables 4 and 5 (Ex. 1001, 19:14–23) is not a statement of requirements for all canister systems under all testing conditions, and therefore does not limit

the canister systems that would achieve the 2-day DBL threshold to only those within the "window of adsorptive properties." *Id.* at 45. Patent Owner further argues that the '553 specification does not teach away from a g-total BWC or effective BWC outside the "window of adsorptive properties" and, to the contrary, the design of experiments (including Examples 9 and 13) would have encouraged experimentation with multiple parameters of a canister system. *Id.* at 46–57.

Discussion

We agree with Patent Owner that Petitioner has not sufficiently shown that the ground 1 claims lack enablement. Petitioner's argument is based on an interpretation of the '553 specification that improperly focuses on the inventors' state of mind, while failing to consider adequately the knowledge of a person of ordinary skill in the art. Petitioner's assertions as to the inventors' state of mind are not supported in the record, and moreover, an enablement determination must be based on the relative skill of those in the art. *Wands,* 858 F.2d at 737. Petitioner's argument that the '553 specification teaches away from canister systems with parameters outside the "window of adsorptive properties" and discourages experimentation is not persuasive because Petitioner does not identify any explicit teaching in the specification that a g-total BWC or effective BWC outside the window would fail to achieve the 2-day DBL threshold. Further, Petitioner's analysis of the '553 specification's examples is not persuasive because it unduly attributes DBL emissions levels to the g-total BWC and effective BWC parameters, without adequately considering the evidence of record that demonstrates the knowledge a person of ordinary skill would apply to adjusting other parameters of a canister system, such as purge volume, in

order to reduce DBL emissions. *E.g.* Pet. 40 ("failure [of Example 13] is solely attributable to the fact that it had a low g-total BWC of 1.6g, outside of the 'window of adsorptive properties.'"); *see* Ex. 1001, 2:13–16 (teaching that "[o]ne approach [to reducing DBL emissions] is to significantly increase the volume of purge gas").

3. Ground 2: claims 1–10, 14–28, 32–38, 51, 52, 55–57, 59, and 65 ("the ground 2 claims")

Petitioner argues that the '553 patent discloses only one configuration of adsorbent volumes— "a canister system consisting of **four** total volumes: one high-capacity fuel-side adsorbent volume and three low-capacity subsequent adsorbent volumes"— that is capable of meeting the 2-day DBL requirement recited in the ground 2 claims. Pet. 55. Petitioner argues that claims 1, 21, 51, 55 and their respective dependents that recite canister systems with two total volumes, and claims 6–10 and 24–28 that recite canister systems with three total volumes, are not enabled because the '553 specification does not disclose an example of a two-volume or three-volume canister system meeting the 2-day DBL requirement, and a person of ordinary skill in the art would not be able to make a compliant two- or three-volume canister system without undue experimentation. *Id.*

Petitioner's arguments concerning the ground 2 claims rely on Examples 7, 8, 10, and 11 of the '553 specification, which all use the same configuration of a canister system consisting of four total volumes. Pet. 56–58. Petitioner argues that the results in Tables 2 and 3 of the '553 patent show that only Examples 7, 8, 10, and 11 meet the 2-day DBL requirement, and therefore none of the other examples, with less than four total volumes, would be able to meet the DBL requirement recited in the claims. *Id.*

Petitioner further argues the '553 specification does not disclose a two-volume or three-volume canister system that meets the DBL requirement. *Id.* at 59–61, 64. Petitioner sets forth a *Wands* factor analysis and asserts "[t]he inventors' failure to create a two-volume or three-volume canister system meeting the low-purge LEV-III requirement . . . is strong evidence that undue experimentation would be required to achieve the full scope of the claims." *Id.* at 63.

Patent Owner disputes Petitioner's assertion that only canister systems consisting of four total volumes would be able to meet the DBL requirement. Prelim. Resp. 58. Patent Owner relies on Clontz SAE,[1] which Petitioner asserts as a prior art reference in the '37 PGR, as evidence that the '553 inventors[2] achieved 2-day DBL emissions below 20 mg, at 100BV of purge, in a canister system with two adsorbent volumes. *Id.* at 59–60 (citing '37 PGR Petition 60). Patent Owner further argues that Petitioner fails to consider the impact of other parameters of the canister systems in the '553 examples, such as purge volume (*id.* at 17, 61), and that a person of ordinary skill in the art would have understood that increasing the purge volume in canister systems having less than four total volumes (e.g. Examples 2–6, 9, and 13) would have reduced their 2-day DBL emissions below 20 mg. *Id.* Patent Owner further argues that enablement does not require that a

[1] "Effects of Low-Purge Vehicle Applications and Ethanol-Containing Fuels on Evaporative Emissions Canister Performance," by Clontz et al., July 2007 International Fuels and Lubricants Meeting, Society of Automotive Engineers of Japan (JSAE) ('37 PGR, Ex. 1010).

[2] Two named inventors of the '553 patent are co-authors of Clontz SAE.

specification include a working example for every value of a parameter when the patent claim encompasses a range of that parameter. *Id.* at 64.

We agree with Patent Owner that Petitioner has not sufficiently shown that the ground 2 claims lack enablement. Petitioner's reliance on Clontz SAE in the '37 PGR as evidence that a person of ordinary skill in the art would have been able to use a canister system having two adsorbent volumes to achieve 2-day DBL emissions less than 20 mg at 100 BV of purge (*see* PGR2020-00037, Paper 3, 59–61, 71, 75) is counter to Petitioner's assertion here that undue experimentation would be required to achieve the 2-day DBL requirement in a canister system having less than four volumes. In other words, if Clontz SAE shows that a person of ordinary skill in the art would have been successful with a two-volume system meeting the DBL emissions limit, then it would not require undue experimentation for that person to achieve the DBL emissions limit with a two-volume system. Petitioner cannot have it both ways. Further, as with Petitioner's enablement analysis of the ground 1 claims discussed above, Petitioner's analysis of the '553 specification's examples is not persuasive because it unduly attributes DBL emissions levels to the number of adsorbent volumes, without adequately considering the knowledge a person of ordinary skill would apply to adjusting other parameters of a canister system, such as purge volume, in order to reduce DBL emissions.

4. Ground 4: claims 64, 66–72, and 76–82 ("the ground 4 claims")

Petitioner argues that the ground 4 claims are not enabled because of their relationship to dependent claim 65, which Petitioner argues is not enabled in grounds 1 and 2, *supra*. Pet. 89–90. Petitioner argues that

because claim 65 is invalid for lack of enablement, by definition the full scope of its parent claim 64 is also not enabled. *Id.* (citing *ABS Global, Inc. v. Inguran, LLC*, 914 F.3d 1054, 1072–73 (7th Cir. 2019)). Petitioner argues that the other ground 4 claims that depend from claim 64 lack enablement for the same reason. *Id.* at 90.

Patent Owner responds that Petitioner has not shown it is more likely than not to prevail on any ground 4 challenged claim for the same reasons as Patent Owner argued against the grounds 1 and 2 claims. Prelim. Resp. 78.

Having determined that Petitioner has not shown it is more likely than not that claim 65 is unpatentable under grounds 1 and 2, we determine that Petitioner also has not shown that the ground 4 claims are unpatentable, for the same reasons as discussed above.

D. Alleged Lack of Written Description Support

Petitioner argues that all of the challenged claims 1–10, 14–28, 32–38, 51, 52, 55–57, 59, 64–72, and 76–82 lack written description support under 35 U.S.C. § 112(a), in ground 3 (Pet. 71–87) and ground 5 (*id.* at 90–95) (collectively, "the written description grounds"). We address each of these grounds below.

1. Legal Standard

The written description inquiry under 35 U.S.C. § 112(a) is a question of fact, is context-specific, and must be determined on a case-by-case basis. *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc). To satisfy the written description requirement, the disclosure must reasonably convey to skilled artisans that the inventor had possession at that time of the later claimed subject matter. *Id.* The exact level of detail

required in the disclosure depends upon "the nature and scope of the claims and on the complexity and predictability of the relevant technology." *Id.*

2. Ground 3: claims 1–10, 14–28, 32–38, 51, 52, 55–57, 59, and 65 ("the ground 3 claims")

Petitioner argues the ground 3 claims lack written description support under 35 U.S.C. § 112(a). Pet. 71–87. As with the enablement grounds (grounds 1, 2, and 4), Petitioner groups the ground 3 claims based on configurations of the parameters of LEV-III compliant canister systems within the scope of those claims: (1) two-volume or three-volume canister systems having a subsequent adsorbent volume with a g-total BWC ≤ 6g. (*id*. at 73–77); (2) two-volume or three-volume canister systems having a subsequent adsorbent volume with a g-total BWC less than 2g and an effective BWC greater than 3 g/dL (*id.* at 77–79); (3) two-volume or three-volume canister systems having a subsequent adsorbent volume with an effective BWC greater than 3 g/dL (*id*. at 79–80); (4) two-volume canister systems having a subsequent adsorbent volume within the "window of adsorptive properties" (*id*. at 80–81); (5) various configurations described in dependent claims (*id.* at 81–87). Exhibit A to the Petition provides a summary of these groups. For the reasons explained below, we find that Petitioner has not sufficiently shown that any of the ground 3 claims lacks written description support.

Petitioner's contentions regarding lack of written description of the ground 3 claims largely track the arguments and evidence Petitioner asserts in grounds 1 and 2. For example, Petitioner argues "the inventors could only meet the low-purge LEV-III requirement with a four volume canister system including a subsequent adsorbent volume having a 'window of adsorptive

properties.'" Pet. 75. Petitioner further argues only Examples 7, 8, 10, and 11 of the '553 specification "met the LEV-III requirement at low purge, and none of those examples had a fourth and final vent-side adsorptive volume with a g-total BWC outside of the 'window of adsorptive properties'" *Id.* at 75–76.

Patent Owner responds that Petitioner's arguments against the ground 3 claims are deficient for many of the same reasons as Petitioner's arguments against the grounds 1 and 2 claims. Prelim. Resp. 66–78. For example, Patent Owner argues that Petitioner's contentions based on Examples 7, 8, 10, and 11 fail to consider purge volume, and therefore, Petitioner has not shown that the only canister systems meeting the DBL emissions requirement that were within the inventors' possession consisted of four total volumes. *Id.* at 71. Patent Owner further argues that Clontz SAE shows the inventors had possession of a two volume canister system that met the DBL emissions requirement. *Id.* Patent Owner further argues that *Ariad* does not require a specification to disclose an example for every species encompassed by a claim, but rather only a representative number of species. *Id.* at 67, 74 (citing *Ariad*, 598 F. 3d at 1350). Patent Owner asserts it is undisputed that Examples 7, 8, 10, and 11, which Petitioner characterizes as "successful," are representative species of independent claims 1, 21, 51, and 55 as well as dependent claims 2–4, 6, 8, 14–20, 22–23, 26, 32–38, 52, 56–57, and 59. *Id.* at 68.

Based on this record, we are not persuaded that Petitioner has shown it more likely than not would prevail on its written description challenge to the ground 3 claims, for principally the same reasons as we discussed above for the grounds 1 and 2 claims, and the reasons argued by Patent Owner. In

particular, Petitioner's written description challenge is not persuasive because it conflicts with its allegation in the '37 PGR Petition that Clontz SAE achieved 2-day DBL emissions below 20 mg at 100BV of purge. *See* PGR2020-00037, Paper 3, 59–61, 71, 75. Petitioner asserts in the '37 PGR Petition that Clontz SAE (authored by co-inventors of the '553 patent) achieved DBL emissions limits at low purge, and Clontz SAE was a two-volume system. Petitioner cannot simultaneously argue here that a person of ordinary skill in the art, who is assumed to have knowledge of the Clontz SAE reference authored by the same inventors, would understand that the inventors did not have possession of such a system. Also, Petitioner's arguments concerning the '553 specification's examples fail to consider the knowledge a person of ordinary skill would apply to adjusting other parameters of a canister system, such as purge volume, in order to reduce DBL emissions.

3. Ground 5: claims 64, 66–72, and 76–82 ("the ground 5 claims")

Petitioner argues the ground 5 claims lack written description support under 35 U.S.C. § 112(a). Pet. 90–96.

Claim 64 is identical to claim 1, except that it does not recite the limitation of 2-day DBL emissions < 20 mg at no more than 100 BV of purge. Ex. 1001, 30:5–24. Petitioner argues that the specification does not support a canister system having claims 64's configuration because it does not disclose any two-volume embodiments where one volume has effective BWC less than 3g/dL or g-total BWC less than 6g. Pet. 92. Petitioner argues that dependent claims 66–72 and 76–82 recite several properties for the canister system that do not relate to IAC or BWC, nor do they require

more adsorbent volumes than claim 64; thus, claims 76-82 do nothing to cure the deficiencies of claim 64 and are invalid for the same reasons as claim 64. *Id.* at 93–96.

Patent Owner responds by arguing that, as discussed in ground 3, the written description requirement does not require disclosure of every possible species, but only a representative number of species within the claim genus. Prelim. Resp. 79. Patent Owner asserts it cannot be disputed that Examples 7, 8, 10, 11, and 13 are species of claim 64, and Petitioner's failure to explain why they are not representative of the genus renders its showing of lack of written description defective. *Id.* Patent Owner also argues that Petitioner is unlikely to prevail on its written description challenge as to each of the dependent ground 5 claims. *Id.* at 80–81.

We are not persuaded that Petitioner has shown it more likely than not would prevail on its written description challenge as to the ground 5 claims, for the reasons argued by Patent Owner, and as we discuss for the ground 3 claims above.

III. CONCLUSION

For the above reasons, we determine that the information presented does not establish it is more likely than not that Petitioner would prevail in showing that claims 1–10, 14–28, 32–38, 51, 52, 55–57, 59, 64–72, and 76–82 of the '553 patent are unpatentable on the grounds asserted in the Petition.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is *denied*; and

FURTHER ORDERED that no post-grant review is instituted.

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