

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

KIMBERLY CLARK CORPORATION,
Petitioner,

v.

THE PROCTOR & GAMBLE COMPANY,
Patent Owner.

Case No: PGR2026-00078
U.S. Patent No. 12,516,475
Issue Date: January 6, 2026

**PETITION FOR POST GRANT REVIEW
OF U.S. PATENT 12,516,475**

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LISTING OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 12,516,475 B2 to Young et al. (the “475 patent”)
1002	File History of U.S. Patent No. 12,516,475 B2 to Young et al.
1003	Declaration of Dr. Steven Keller
1004	<i>Curriculum Vitae</i> of Dr. Steven Keller
1005	U.S. Patent No. 12,534,855 B2 to Young et al.
1006	Khan, M.U., A. Rehman, M.A. Khan, A.R. Khan, S. Ali and Z. Ahmad. 2024. <i>Utilization of non-wood fibers as raw materials for pulp and paper production in Pakistan: A review</i> . Pakistan Journal of Forestry, 74(2): 53-62.
1007	Söderberg & Lucisano, <i>Aq-vanes: a new technology for stratified forming</i> , ATIP. Association Technique de L'Industrie Papetiere 58(6):17-19 (2004).
1008	de Assis, T., Reisinger, L. W., Pal, L., Pawlak, J., Jameel, H., and Gonzalez, R. W. (2018). <i>Understanding the effect of machine technology and cellulosic fibers on tissue properties – A Review</i> , BioRes. 13(2), 4593-4629.
1009	Han, J.S. (1998) <i>Properties of Nonwood Fibers</i> . In: Proceedings of the Korean Society of Wood Science and Technology Annual Meeting, The Korean Society of Science and Technology, Seoul, 3-12.
1010	<i>The TSA – Tissue Softness Analyzer</i> , TissueMAG, May 2017, 194-197.
1011	Wang, Y., De Assis, T., Zambrano, F., Pal, L., Venditti, R., Dasmohapatra, S., Pawlak, J., and Gonzalez, R. (2019). <i>Relationship between human perception of softness and instrument measurements</i> , BioRes. 14(1), 780-795.

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1012	Dhamodaran, T.K., Gnanaharan, R., Pillai, K.S., <i>Bamboos: Distribution, Utilization, Storage and Economics, in BAMBOO FOR PULP AND PAPER: A STATE OF THE ART REVIEW WITH ANNOTATED BIBLIOGRAPHY</i> , Kerala Forest Research Institute (March 2003)
1013	de Assis, T., Pawlak, J., Pal, L., Jameel, H., Venditti, R., Reisinger, L. W., Kavalew, D., and Gonzalez, R. W. (2019). <i>Comparison of wood and non-wood market pulps for tissue paper application</i> , <i>BioRes.</i> 14(3), 6781-6810
1014	Pawlak, J. J., Frazier, R., Vera, R. E., Wang, Y., and Gonzalez, R. (2022). <i>Review: The softness of hygiene tissue</i> , <i>BioResources</i> 17(2), 3509-3550.
1015	Pydimalla, Madhuri & Kamma, Rithusha & Mamidala, Akanksh. (2022). <i>A Review on Morphological, Chemical and Structural Properties of Wood and Non-wood Fiber Species</i> . <i>La Pensée.</i> 51. 229-239.
1016	Ashley Jordan, Shelley Vinyard & Jennifer Skene, <i>The Issue with Tissue Eighth Edition: Nature, Health, and Human Rights in Crisis</i> , Nat. Res. Def. Council (Sept. 2026)
1017	Andrew Moore, <i>New Tariffs Could Make Toilet Paper More Expensive, Less Soft</i> , NC State University College of Natural Resources News (Aug. 28, 2026), https://cnr.ncsu.edu/news/2026/08/toilet-paper-trade-war/
1018	<i>Forests & Biodiversity</i> , Kimberly Clark (June 2025), https://www.kimberly-clark.com/en-us/sustainability/forests-and-biodiversity
1019	<i>Kimberly-Clark Unveils Proprietary Alternative Natural Fiber Innovation Program to Advance Its “Better Care for a Better World” Commitment</i> , Kimberly Clark (Aug. 3, 2026), https://www.investor.kimberly-clark.com/news-releases/news-release-details/kimberly-clark-unveils-proprietary-alternative-natural-fiber

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1020	<i>Everything You Need to Know about Bamboo Toilet Paper</i> , agood company (May 24, 2023), https://www.agood.com/blogs/stories/bamboo-toilet-paper
1021	Natasha Khan, <i>The Paper in Your Paper Towel Is a Candidate for a Radical Overhaul</i> , Wall Street Journal (Aug. 3, 2026), https://www.wsj.com/business/the-paper-in-your-paper-towel-is-a-candidate-for-a-radical-overhaul
1022	Gonzalez, RW., Urdaneta, F.E., Vera, R.E., & Franco, J. H., <i>Alternative Fibers for Hygiene Consumer Goods</i> , Tecnicelpa Int'l Conf. Forest Biobased Materials (Oct. 13, 2023)

I. Introduction

Petitioner Kimberly Clark Corporation (“Kimberly Clark”) requests post grant review of claims 1, 3, 4, 9, 10-14, 15, 17, 18, 23, and 24-28 of U.S. Patent No. 12,516,475 (“’475 Patent”).

The challenged claims are unpatentable because they lack adequate written description and are not enabled under 35 U.S.C. § 112(a). The claims purport to cover tissue products that (i) include at least one multi-layer ply where all layers include abaca¹ fibers and (ii) meet specified “softness” criteria. But the specification only provides a passing wish for the claimed product; it provides no working examples, no clear guidance on how to design an abaca-based tissue that will meet the claimed requirements, and never explains to other artisans how to go about creating the claimed tissues. Put differently, the inventors simply claimed what they hoped abaca might do and left it to others to figure out whether and how such a tissue might actually be created. As a result, the inventors neither had possession of the invention they claimed, nor did they enable others to practice and use the invention without undue experimentation.

Each challenged independent claim requires a tissue product that includes a multi-layer ply comprising non-wood fibers “selected from the group consisting of

¹ Abaca, or *musa texilis* is a species of plant. It is a relative of the banana.

bamboo, abaca, and mixtures thereof’ at levels from about 5% to about 100% by weight per layer, and further requires that the product exhibit either a TS7 value of less than about 14 dB V² rms (claims 1 and 15) or a TS750 value of less than about 45 dB V² rms (claims 9 and 23).² These TS7 and TS750 parameters are quantitative measures of acoustic softness that are widely used in the paper-making industry. And those measures, combined with the specific claimed structure and fiber content, define the scope of what the inventors purport to have invented.

The specification’s disclosure of abaca-containing multi-layered plies is fatally deficient in at least two independent respects.

First, the claimed inventions lack written description because the specification provides no example—actual or prophetic—or description of an abaca-containing sanitary tissue product with both (i) the required multi-layer structure and (ii) a TS7 of less than 14 dB V² rms or a TS750 of less than 45 dB V² rms.³ The specification’s Papermaking Examples describe some process conditions for making abaca-containing substrates, but do not identify the acoustic softness information of the substrates made using any particular Papermaking Example.⁴ Similarly, the

² EX1001, claims 1, 9, 15, 23.

³ EX1003, ¶¶ 136-46.

⁴ EX1001, 57:53-59:7 (Papermaking Examples 3-14).

specification's data tables show some abaca-containing samples, but *none* show a product with a multi-layer ply with abaca in every layer, as the claims require, let alone demonstrate the required TS7 or TS750 performance of such a product.⁵ And instances where acoustic softness is reported for abaca-containing products that are not multi-layer, the reported values are unpredictable and vary widely—even for products that contain the same amount of abaca. By contrast, the specification provides extensive TS7 and TS750 data for bamboo-containing products with a multi-layer ply, confirming that the inventors achieved the claimed multi-layer product and acoustic properties with a variety of bamboo compositions, but never demonstrated the same for abaca. The disclosed species thus “abide in a corner of the genus”—the bamboo corner—while the abaca corner remains wholly unsupported.⁶

The lack of examples is compounded by the specification's acknowledgment that making tissue products with abaca is challenging: abaca “comprises

⁵ EX1001, Figs. 18A-2 (samples 28-33 do not have abaca in all layers), 18B-1 (samples 34-39 do not have abaca in all layers), 19 (samples 49 and 56-64 are single layer).

⁶ *AbbVie Deutschland GmbH & Co., KG v. Janssen Biotech, Inc.*, 759 F.3d 1285, 1299-300 (Fed. Cir. 2014)

characteristics that can make it challenging (especially at higher incorporation levels) for incorporating into sanitary tissue products of the present invention as it is better known for being used to produce thin, strong, and porous paper capable of withstanding hard use.”⁷ Despite this admitted difficulty, the specification provides no blaze marks directing a person of ordinary skill in the art to any combination of fiber content, process conditions, or product architecture that would yield an abaca-containing tissue meeting the claims’ requirements.

Second, the specification fails to enable a POSITA to make an abaca-containing tissue product meeting the claimed functional limitations without undue experimentation. “If a patent claims an entire class of processes, machines, manufactures, or compositions of matter, the patent’s specification must enable a person skilled in the art to make and use the entire class.”⁸ Here, the claims encompass a vast genus of abaca-containing products spanning all content levels (5% to 100%), all tissue product formats, and all conceivable process conditions—each required to achieve a multi-layer product with a precise acoustic softness threshold. But the specification provides zero working examples of abaca products achieving those requirements, zero guidance on which process parameters might

⁷ EX1001, 26:43-47.

⁸ *Amgen Inc. v. Sanofi*, 598 U.S. 594, 610 (2023).

affect acoustic softness, zero basis for predicting whether any given abaca composition will satisfy the claims, and no explanation for how to overcome abaca’s “challenging” nature.⁹ The only path available to a POSITA is trial-and-error experimentation across a multi-dimensional design space with a minimal starting point, no direction, and no assurance of success. That is the hallmark[] of undue experimentation—and indeed, of the type of “research assignment[]” the Supreme Court held cannot satisfy the enablement requirement.¹⁰

The evidence demonstrates that claims 1, 3, 4, 9, 10-14, 15, 17, 18, 23, and 24-28 of the ’475 Patent are unpatentable. The Board should institute post grant review.

II. Compliance with PGR Requirements

a) Certification of Standing

Petitioner certifies that this Petition is filed within 9 months of the ’475 Patent’s issuance. Petitioner also certifies it is not barred or estopped from requesting this PGR. Petitioner and its privies have not filed a civil action challenging the validity of any claim of the ’475 Patent.

⁹ EX1003, ¶¶ 178-91.

¹⁰ *Amgen*, 598 U.S. at 614.

The '475 Patent is eligible for post-grant review because none of its claims are entitled to an effective filing date prior to March 16, 2013.

b) Mandatory Notices

i. Real Party in Interest

Kimberly Clark Corporation is the real party-in-interest for this Petition.

ii. Related Proceedings

There are no proceedings related to this Petition.

iii. Counsel and Service Information

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Petitioner consents to service via e-mail at the email addresses listed above.

III. Grounds

The grounds advanced in this Petition are:

- (a) Claims 1, 3, 4, 9, 10-14, 15, 17, 18, 23, and 24-28 are unpatentable under 35 U.S.C. § 112 as lacking written description.
- (b) Claims 1, 3, 4, 9, 10-14, 15, 17, 18, 23, and 24-28 are unpatentable under 35 U.S.C. § 112 as not being enabled.

Petitioner's grounds are supported by the evidence submitted with this Petition, including testimony from Dr. Steven Keller (EX1003).

IV. Background on the '475 Patent

a) Field of the Patent

The '475 Patent is related to sanitary tissue products, including bath tissue, napkins, facial tissue, and paper towels, comprising a multi-layer structure containing non-wood fibers in all of the layers that exhibits specified acoustic softness properties.¹¹

b) Overview of Papermaking

The manufacture of tissue products as described in the '475 Patent is a multi-stage process in which each step introduces variables that influence the properties of the final product. The process begins with fiber selection and preparation: raw fibers—whether wood (e.g., eucalyptus, pine) or non-wood (e.g., bamboo, abaca)—can be repulped from dried bales or sheets into aqueous slurries, and may then be refined to varying degrees depending on the desired strength and bonding characteristics.¹² Chemical additives such as permanent wet-strength resins (e.g.,

¹¹ EX1001, Abstract.

¹² EX1003, ¶¶ 38-48; *see also* EX1001, 55:44-56:.

Kymene™), dry-strength agents (e.g., carboxy methyl cellulose), and defoamers may be introduced at this stage.¹³

Individual tissue plies are then formed in a “wet-laid” papermaking process, of which there multiple variations, such as creped through-air drying (“CTAD”), uncreped through-air drying (“UCTAD”), fabric crepe, NTT, and ATMOS, each of which produces plies with materially different characteristics.¹⁴ The papermaking process begins with depositing the aqueous fiber slurry from a headbox—which may be single- or multi-chambered—at precisely controlled ratios onto a forming wire to produce an embryonic web.¹⁵ The relative speeds of the headbox jet and the forming wire (the “jet-to-wire ratio”) affect fiber orientation, tensile ratio, and formation—and, as the specification acknowledges, the relationships between these variables are “different for non-wood fibers than they are for wood fibers.”¹⁶ The embryonic web is then transferred to a papermaking belt, where the web can be deflected, rearranged, and/or further de-watered.¹⁷ After further processing and drying, the web

¹³ EX1003, ¶ 45; *see also* EX1001, 53:64-54: 27.

¹⁴ EX1003, ¶¶ 49, 60; *see also* EX1001, 10:10-11:16; 16:39-48.

¹⁵ EX1003, ¶¶ 50-53; *see also* EX1001, 12:45-13:20; 55:18-56:39.

¹⁶ EX1003, ¶ 54; *see also* EX1001, 14:55-15:54.

¹⁷ EX1003, ¶¶ 56-58; *see also* EX1001, 12:63-13:20.

can be wound into parent rolls and subjected to converting operations—including embossing, ply-bonding with adhesive, application of surface softeners, calendering, and winding onto consumer-sized rolls—each of which independently influences the finished product’s softness, strength, bulk, and surface texture.¹⁸

The specification repeatedly acknowledges that incorporating non-wood fibers into this process is not straightforward. Non-wood fibers differ from conventional wood fibers in both chemical composition and morphology—including length, width, coarseness, cell wall thickness, and degree of fibrillation—and these differences propagate through every stage of the process.¹⁹ The specification notes, for example, that non-wood fibers such as bamboo “drain[] poorly” due to their morphology, making them “particularly unsuited for through-air-drying machines due to high energy costs,” and that their attributes causes them to be “much less susceptible to molding into a structured fabric, resulting in less desirable properties.”²⁰ These effects are compounded when once-dried (as opposed to never-dried) non-wood fibers are used, because drying and reslushing causes “[s]ignificant

¹⁸ EX1003, ¶ 61; *see also* EX1001, 13:43-14:12.

¹⁹ EX1001, 8:59-64; 17:3-11; *see also* EX1003, ¶¶ 63, 66-68.

²⁰ EX1001, 50:56-51:23.

changes in the papermaking properties of fibers” as the cell walls become “progressively more rigid and less conformable.”²¹

c) Overview of Acoustic Softness

The '475 Patent claims tissue products defined, in part, by quantitative acoustic softness thresholds expressed as TS7 and TS750 values. These values are measured using an EMTEC Tissue Softness Analyzer (“Emtec TSA”), manufactured by Emtec Electronic GmbH of Leipzig, Germany.²² The instrument operates by rotating a set of vertical blades on the surface of a tissue sample at a defined and calibrated rotational speed with a contact force of 100 mN; the contact between the blades and the sample creates vibrations, which generate sound that is recorded by a microphone within the instrument.²³ The recorded sound file is analyzed by the TSA software, which outputs two values: TS7, which “correlates with the real material softness,” and TS750, which “correlates with the felt smoothness/roughness of the material.”²⁴ Both values are reported in units of dB V² rms.²⁵

²¹ EX1001, 17:45-18:24.

²² EX1001, 82:54-83:3.

²³ EX1001, 82:54-83:3.

²⁴ EX1001, 82:54-83:3.

²⁵ EX1001, 83:42-45.

A critical feature of the softness test, as described in the specification, is that the measured TS7 and TS750 values are surface-specific—they depend on which side of the tissue product contacts the instrument’s rotating blades. The specification prescribes testing on both the “top surface (outer facing surface of a rolled product)” and the “bottom surface (inner facing surface of a rolled product),” with four replicate measurements taken on each surface.²⁶ The four top-surface values and four bottom-surface values are separately averaged, and an overall average of all eight measurements is also computed.²⁷ This testing protocol reveals that the two surfaces of a tissue product can yield materially different TS7 and TS750 values—a potential consequence of the asymmetric density structure created during papermaking or the fiber composition of each surface.²⁸ In TAD processes, for instance, the fabric-side-out (“FSO”) and wire-side-out (“WSO”) surfaces have different structures, producing different surface textures that generate different acoustic responses.²⁹ A

²⁶ EX1001, 83:29-38.

²⁷ EX1001, 83:39-51.

²⁸ EX1003, ¶¶ 77-78.

²⁹ EX1001, 23:19-36 (describing FSO and WSO surfaces and noting that “[w]hen pillows face outwardly, TS7 values decrease”); Drawing Sheets 45-48 (identifying samples as FSO or WSO); *see also* EX1003, ¶¶ 79-80.

POSITA would understand that the measured TS7 and TS750 values are thus not intrinsic material properties of the papermaking fibers themselves; rather, they are composite outcomes of the specific fibers and amounts used, the ply structure, the ply orientation, and the converting operations used to produce the product.³⁰

d) Background of Sustainable Tissue Products

The majority of commercial tissue products today contain wood fibers that come from trees grown in natural forests. These fibers have a combination of properties that papermakers have learned (over decades of study) to assemble into a product that, among other things, stays intact when you use it, absorbs liquids, and disintegrates when submerged in water so as not to clog plumbing. But every year millions of trees are cut down from natural forests to make tissue products for the U.S. market. Studies estimate that tens of millions of trees are cut down annually in Canada's boreal forests alone to feed this market.³¹ This rate of harvest risks degrading natural forests, a loss of biodiversity, and creates a dependency on foreign imports.³² As a result, companies are looking for sustainable alternatives.³³

³⁰ EX1003, ¶ 82.

³¹ EX1016, 8.

³² See EX1017.

³³ EX1016, 5, 11-12.

More specifically, companies (including Petitioner) are spending enormous amounts of money to find and develop a suitable replacement for these trees.³⁴ First, alternative fibers must be identified and tested to determine whether they are viable to make into tissue products in the first place. Petitioner has tested over seventy fibers as part of their work in this area.³⁵ Once suitable fibers are identified, a company must find (or build) an appropriate supply chain for that fiber. For example, while bamboo is a relatively common alternative fiber for tissue products, the specific species of bamboo that is typically used for this purpose grows primarily in natural forests in China.³⁶

The selection and sourcing of fiber is only the first hurdle. As discussed in the accompanying declaration of Dr. Keller, formulating a tissue product from an alternative fiber requires navigating hundreds of interrelated fiber, furnish, and process variables, where a change to any one can affect the others, and the finished product's properties, in ways that cannot be predicted in advance. Those effects can

³⁴ See EX1018, 1-2.

³⁵ EX1019, 1.

³⁶ EX1020, 3.

be evaluated only through costly and time-consuming experimentation. Petitioner itself has spent nearly two decades and over \$250 million on such efforts.³⁷

Put simply, the industry is actively working to solve a major technical, economic, and environmental sustainability problem that that would free United States manufacturers from dependency on natural forests and foreign suppliers, and the research needed to solve those problems is both time and resource intensive.

e) Problem Allegedly Addressed by the '475 Patent

The patent identifies softness as a critical consumer attribute that “many sustainable sanitary tissue products” fail to achieve, acknowledging that “[t]he art does not disclose how to achieve soft fibrous structures comprising bamboo, abaca, or other sustainable non-wood fibers” and that “incorporation of non-woods into sanitary tissue products is a real challenge, even for experienced papermakers.”³⁸ The patent claims to have solved this problem by achieving particular softness thresholds, quantified as TS7 values of less than about 14 dB V² rms and TS750 values of less than about 45 dB V² rms, in products with a multi-layer ply wherein

³⁷ EX1021, 3; EX1019, 1.

³⁸ EX1001, 1:25-31.

each layer must include between about 5% to about 100% by weight of bamboo, abaca, or mixtures of the two.³⁹

f) Person of Ordinary Skill in the Art

A person of ordinary skill in the art relevant to the '475 Patent would have at least at least a Bachelor of Science degree in paper science and engineering, materials science, chemistry, chemical engineering, or an equivalent degree, plus at least two years of academic or industry experience in papermaking, fiber characterization, or related fields involving alternative or non-wood fibers. Additional relevant experience could substitute for formal education, and vice versa.⁴⁰

g) Prosecution History

The '475 Patent issued from Application No. 18/131,383, filed April 6, 2023 (the "'383 Application"), and claims priority to five provisional applications filed between April 8, 2022 and March 31, 2023.⁴¹

³⁹ EX1001, claims 1, 9, 15, 23; 2:18-29.

⁴⁰ EX1003, ¶ 26.

⁴¹ EX1001, at (21), (22), (60).

The '383 Application originally contained twenty-one claims organized into two groups—claims 1-14 (Group I) and claims 15-21 (Group II).⁴² On January 30, 2025, the Examiner issued a restriction requirement, and Applicant elected Group I (claims 1-14) without traverse.⁴³ Group II (claims 15-21) were withdrawn from consideration.⁴⁴

Three office actions issued during prosecution, none of which raised any rejection under 35 U.S.C. § 112(a) for lack of written description or enablement.

In a Non-Final Office Action dated April 16, 2025, the Examiner rejected claims 1-14 under § 112(b) as indefinite—noting that the then-pending claims did not recite a specific amount or type of non-wood fibers, making it “unclear if the compressibility claimed would be obtained for any amount and type of non-wood fibers used” and observing that “[i]t seems from the specification that to obtain said property a specific amount and type of non-wood fibers, bamboo and abaca, have to be used.”⁴⁵ The Examiner simultaneously rejected claims 1-14 under § 103 as obvious over Shannon (US 2013/0071678) as evidenced by Seger (US

⁴² EX1002, pp. 166-67, 2274.

⁴³ EX1002, pp. 2272-77, 3503.

⁴⁴ EX1002, pp. 4357-64.

⁴⁵ EX1002, p. 4360.

2021/0017710), and in view of Rekoske (US 9,657,443).⁴⁶ The Examiner reasoned that, although Shannon did not measure TS7 and TS750, “those properties must be inherent to the tissues of the primary reference, since they contain the same type of non-wood fibers, e.g., bamboo, and are made using the same process, e.g., TAD process, as disclosed in the current application.”⁴⁷

In response, Applicant amended independent claims 1, 5, and 9 to recite a “multi-ply sanitary tissue product” that is “at least about 5% to about 100% by weight” of bamboo, abaca, and mixtures thereof, and having a “consumer-facing surface comprising... non-wood fibers.”⁴⁸ Applicant argued that Shannon “teaches away from a multi-ply sanitary tissue product comprising a consumer-facing surface comprising non-wood fibers.”⁴⁹ Applicant cited Shannon ¶¶ [0010] and [0051] as teaching that non-wood fibers should be placed in the non-consumer-facing surface.⁵⁰

⁴⁶ EX1002, p. 4361.

⁴⁷ EX1002, pp. 4361-62.

⁴⁸ EX1002, pp. 4513-14.

⁴⁹ EX1002, p. 4517.

⁵⁰ EX1002, p. 4517.

In a Final Office Action dated July 23, 2025, the Examiner raised a § 103 rejection over Kleinwaechter (US 2019/0366676) in view of Rouse (WO 2018/156109), observing that both references teach the TAD process for making tissue and that Rouse teaches non-wood fiber amounts of “at least 5% which includes the claimed range, since at least 5% includes ranges up to 100%.”⁵¹ In response, Applicant filed a Request for Continued Examination on August 14, 2025, amending the claims to require a multi-layered fibrous structure ply where all of the layers comprise at least about 5% by weight non-wood fibers.⁵²

Following an interview with Applicant’s attorney on August 20, 2025, the Examiner proposed an Examiner’s Amendment “in order to put the application in condition for allowance.”⁵³ The Examiner proposed adding a limitation “implicitly and/or explicitly stating that a multi-layer web of a multi-ply tissue were part of the outer surface of the product, i.e., the tissue, so to overcome a possible obvious rejection over Shannon.”⁵⁴ An Examiner’s Amendment was entered on August 21, 2025, adding claims 22-35 (which issued as claims 15-28) and finalizing the claim

⁵¹ EX1002, pp. 4530-33.

⁵² EX1002, pp. 4626-33.

⁵³ EX1002, p. 4654.

⁵⁴ EX1002, p. 4654.

set.⁵⁵ Claims 1-14 and 22-35 were allowed, and the Notice of Allowance issued on September 2, 2025.⁵⁶

In the Reasons for Allowance, the Examiner stated that “the prior art does not teach nor fairly suggest a two/multi-ply tissue including at least one multi-layer ply in the exterior of the tissue, said ply comprising non-wood fibers in all the layers and having the claimed properties,” and noted that “Shannon... teaches away from using the non-wood fibers in the external/outer surface of the web and Rouse... teaches away from the use of non-wood fibers in the middle layer of multi-layer web/ply.”⁵⁷

h) The Challenged Claims

This Petition challenges claims 1, 3, 4, 9, 10, 11, 12, 13, 14, 15, 17, 18, 23, 24, 25, 26, 27, and 28 of the '475 Patent, which are the eighteen claims that recite “abaca” as a fiber component, either directly or through dependency on an independent claim that does. Ten additional claims in the patent (claims 2, 5, 6, 7, 8, 16, 19, 20, 21, and 22) are limited exclusively to bamboo fibers and are not challenged in this Petition.⁵⁸

⁵⁵ EX1002, pp. 4644-53.

⁵⁶ EX1002, pp.4640, 4644-53.

⁵⁷ EX1002, p. 4652.

⁵⁸ EX1001, claims 1-28.

The Challenged Claims are organized around four independent claims, each of which recites a tissue product comprising non-wood fibers “selected from the group consisting of bamboo, abaca, and mixtures thereof” at levels from “at least about 5% to about 100% by weight,” and further requires the product to satisfy a specified acoustic softness threshold:

- Claim 1 recites a two-ply sanitary tissue product in which all layers of at least one multi-layered fibrous structure ply comprise at least about 5% to about 100% by weight non-wood fibers, and in which the product exhibits a TS7 of less than about 14 dB V² rms.⁵⁹
- Claim 9 recites a two-ply sanitary tissue product with the same fiber composition and layer requirements as claim 1, but requires the product to exhibit a TS750 of less than about 45 dB V² rms.⁶⁰
- Claim 15 recites a multi-ply sanitary tissue product with the same fiber composition and layer requirements as claim 1, and additionally requires that at least one multi-layered fibrous structure ply forms an

⁵⁹ EX1001, claim 1.

⁶⁰ EX1001, claim 9.

exterior ply of the product. The product must exhibit a TS7 of less than about 14 dB V² rms.⁶¹

- Claim 23 recites a multi-ply sanitary tissue product with the same composition, layer, and exterior-ply requirement as claim 15, but requires the product to exhibit a TS750 of less than about 45 dB V² rms.⁶²

Every independent claim thus shares three features that are central to the § 112(a) grounds advanced in this Petition: (1) a ply comprising a plurality of layers, where (2) each of the plurality of layers has a fiber composition that encompasses abaca, either alone or in blends with bamboo, at any incorporation level from about 5% to about 100%; and (3) a quantitative acoustic softness threshold (TS7 < ~14 or TS750 < ~45) that the claimed product must achieve.

The fourteen dependent claims add limitations that narrow product format, fiber content, or acoustic performance, but none cures the foundational deficiency of the independent claims. These dependent claims fall into four groups:

⁶¹ EX1001, claim 15.

⁶² EX1001, claim 23.

- The first group, consisting of claims 3, 11, 17, and 25, limits the product to a toilet tissue format.⁶³
- The second group, consisting of claims 4, 12, 18, and 26, requires the product to comprise “greater than about 30% to about 100% by weight” non-wood fibers.⁶⁴ These claims thus increase the minimum non-wood content beyond 5%, requiring higher levels of abaca incorporation.
- The third group, consisting of claims 10 and 24, requires the product to comprise a “structured fibrous structure.”⁶⁵
- The fourth group, consisting of claims 13, 14, 27, and 28, narrows the acoustic softness threshold. Claims 13 and 27 require a TS750 of less than 40 dB V² rms, while claims 14 and 28 require a TS750 of from about 25 to about 35 dB V² rms.⁶⁶

⁶³ EX1001, claims 3, 11, 17, 25.

⁶⁴ EX1001, claims 4, 12, 18, 26.

⁶⁵ EX1001, claims 10, 24.

⁶⁶ EX1001, claims 13, 14, 27, 28.

V. All Challenged Claims Are Unpatentable Under § 112

a) All Challenged Claims Lack Written Description

The Challenged Claims are unpatentable for failure to satisfy the written description requirement of 35 U.S.C. § 112(a). Each of these claims recites a tissue product that includes a multi-layer ply comprising non-wood fibers “selected from the group consisting of bamboo, abaca, and mixtures thereof” in each layer that must achieve specific acoustic softness thresholds—either a TS7 value of less than about 14 dB V² rms or a TS750 value of less than about 45 dB V² rms.⁶⁷ While the specification of the ’475 Patent provides extensive data demonstrating that certain *bamboo*-containing products may achieve these properties, the specification is devoid of any comparable support for *abaca*-containing products. The specification thus fails to demonstrate that the inventors possessed the claimed invention insofar as it encompasses abaca.⁶⁸

To fulfill the written description requirement, the application must “reasonably convey[] to those skilled in the art that the inventor had possession of

⁶⁷ EX1001, claims 1, 9, 15, 23.

⁶⁸ EX1003, ¶¶ 126-27.

the claimed subject matter as of the filing date.”⁶⁹ Where, as here, the claims define a genus of products, the written description must “show that one has truly invented the genus”, “[o]therwise, one has only a research plan, leaving it to others to explore the unknown contours of the claimed genus.”⁷⁰ A genus may be adequately disclosed by “either a representative number of species falling within the scope of the genus or structural features common to the members of the genus so that one of skill in the art can visualize or recognize the members of the genus.”⁷¹ Critically, “if the disclosed species only abide in a corner of the genus, one has not described the genus sufficiently to show that the inventor invented, or had possession of, the genus.”⁷²

The '475 Patent's specification fails under each of these standards. Its disclosed species (bamboo-containing tissue products with demonstrated TS7 and TS750 values) occupy only one “corner” of the claimed genus. The abaca corner is

⁶⁹ *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc).

⁷⁰ *AbbVie*, 759 F.3d at 1300.

⁷¹ *Ariad*, 598 F.3d at 1350 (citation omitted).

⁷² *AbbVie*, 759 F.3d at 1299-300.

entirely empty: no representative claimed abaca species,⁷³ no structural features linking abaca to the claimed acoustic properties, no structural features linking the performance of abaca to that of bamboo, and no data of any kind demonstrating that a product with a multi-layered ply with abaca in all layers was possible or that it could achieve the claimed softness thresholds—much less that it will do so across the entire composition spectrum of between 5% and 100% by weight of abaca. The specification amounts to nothing more than a general hope for abaca, impermissibly “leaving it to others to explore the unknown contours” of whether one can build a multi-layer abaca product with the claimed acoustic performance.⁷⁴

The Federal Circuit’s decision in *Brita LP v. ITC* is directly on point.⁷⁵ There, the court affirmed a finding of lack of written description where a patent claimed any “filter media” meeting a functional performance threshold (the “FRAP” factor) but disclosed only carbon-block filters as meeting that threshold, even though the specification listed other filter media types and declared the performance criteria “independent of the exact embodiment of the filter.” Here, as in *Brita*, the

⁷³ While the specification includes a handful of “samples” which include abaca, none fall within the claim scope. *See infra* at Section V.a.i.

⁷⁴ *AbbVie*, 759 F.3d at 1300; EX1003, ¶¶ 168-69.

⁷⁵ *Brita LP v. Int’l Trade Comm’n*, 156 F.4th 1326 (Fed. Cir. 2025).

specification describes a genus of products encompassing two fundamentally different fiber types (bamboo and abaca), but purports to demonstrate possession only for one (bamboo). The specification thus fails to demonstrate that the inventors possessed the claimed invention insofar as it encompasses abaca.

i. The Claims Define a Broad Genus of Abaca-Containing Products the Specification Does Not Support

Each independent challenged claim—claims 1, 9, 15, and 23—defines a genus of tissue products by specifying three sets of parameters: (i) fiber composition (“non-wood fibers selected from the group consisting of bamboo, abaca, and mixtures thereof” at levels from “at least about 5%” to “about 100% by weight”); (ii) structural requirements (two-ply or multi-ply configurations with at least one multi-layer ply with the non-wood fiber content in all layers); and (iii) functional acoustic softness thresholds ($TS7 < 14 \text{ dB V}^2 \text{ rms}$ or $TS750 < 45 \text{ dB V}^2 \text{ rms}$).⁷⁶ By listing “abaca” as an alternative to “bamboo” in the fiber composition Markush group, the claims treat these fibers as interchangeable options for achieving the claimed properties. But the specification’s support for each fiber is vastly asymmetric.

For bamboo, the specification contains multiple examples of tissue products with a multi-layered ply with bamboo in each layer and with measured TS7 and

⁷⁶ EX1001, claims 1, 9, 15, 23.

TS750 values that satisfy the claimed thresholds.⁷⁷ Figures 18A-1 to 22A, for example, contain information regarding numerous multi-layer bamboo-containing bath tissue samples with reported acoustic softness properties.⁷⁸ A POSITA reviewing the specification would therefore understand that the inventors possessed numerous examples of multi-layer *bamboo* products that meet the claimed acoustic performance thresholds.⁷⁹

For abaca, the specification provides no such examples falling within the claim scope. The genus of abaca-containing products encompassed by the claims is broad—spanning abaca content levels from 5% to 100% where the remainder could be any other type of fiber, every conceivable combination of process parameters (refining levels, fiber inclusion levels, structuring approaches, drying methods,

⁷⁷ EX1001, Drawing Sheets 44-50 (reporting TS7 and TS750 data for bamboo-containing bath tissue samples); EX1003, ¶ 91 (identifying the bamboo samples and their reported acoustic properties).

⁷⁸ EX1001, Drawing Sheets 44-72.

⁷⁹ Petitioners do not take a position on whether or not there are sufficient examples within the “bamboo” genus to provide adequate written description for that portion of the claim. Instead, they are simply pointing out that there *are* bamboo examples in the specification, but no similar examples when it comes to abaca.

chemical treatments), multiple ply configurations, and a multitude of converting operations and product formats. Yet the specification does not identify or describe even a single abaca-containing product that both (i) has the claimed multi-layer ply with abaca in every layer and (ii) achieves $TS7 < 14 \text{ dB V}^2 \text{ rms}$ or $TS750 < 45 \text{ dB V}^2 \text{ rms}$.⁸⁰ Specifically, Samples 28-39 are described as multi-layer products that contain abaca, but none include abaca in every layer—as the claims expressly require.⁸¹ Instead, the Fabric Layer of Samples 28-33 is devoid of abaca and made entirely of Eucalyptus:

Substrate	Type	Sample ID	Fractionation	# Unique Layers	Non-wood	Fabric Layer			Center Layer			Wire Layer			% of total Sheet			
						EUC	NSK /SW	Non-wood	EUC	NSK /SW	Non-wood	EUC	NSK /SW	Non-wood	EUC	Softwood	Non-wood	FSOI/ WSO
Bath tissue	Inventive	24	No fractionation	1	Bamboo										0%	0%	100%	WSO
Bath tissue	Inventive	25		1	Bamboo										0%	0%	100%	WSO
Bath tissue	Inventive	26		1	Bamboo										0%	0%	100%	WSO
Bath tissue	Inventive	27		1	Bamboo										0%	0%	100%	WSO
Bath tissue	Inventive	28		2	Abaca	100%	0%	0%	67%	33%	0%	67%	33%	0%	55%	37%	8.0%	FSO
Bath tissue	Inventive	29		2	Abaca	100%	0%	0%	33%	50%	17%	33%	50%	17%	55%	22.5%	22.5%	FSO
Bath tissue	Inventive	30		2	Abaca	100%	0%	0%	25%	38%	38%	25%	38%	38%	55%	22.5%	22.5%	FSO
Bath tissue	Inventive	31		2	Abaca	100%	0%	0%	25%	0%	75%	25%	0%	75%	55%	0%	45%	FSO
Bath tissue	Inventive	32		2	Abaca	100%	0%	0%	25%	0%	75%	25%	0%	75%	55%	0%	45%	FSO
Bath tissue	Inventive	33		2	Abaca	100%	0%	0%	25%	0%	75%	25%	0%	75%	55%	0%	45%	FSO

Figure 18A-2 (Annotated)

⁸⁰ EX1003, ¶¶ 99, 109.

⁸¹ EX1001, Figs. 18A & 18B (Samples 28-33 do not have any non-wood in the fabric layer; Samples 34-39 do not have any non-wood in the wire layer).

Similarly, the Wire Layer of Samples 34-39 are 100% Eucalyptus:

Substrate	Type	Sample ID	Fractionation	# Unique Layers	Non-wood	Fabric Layer			Center Layer			Wire Layer			% of total Sheet			
						EUC	NSK /SW	Non-wood	EUC	NSK /SW	Non-wood	EUC	NSK /SW	Non-wood	EUC	Softwood	Non-wood	FSO/ WSO
Bath tissue	Inventive	34		2	Abaca	23%	65%	12%	23%	65%	12%	100%	0%	0%	50%	42.5%	7.5%	WSO
Bath tissue	Inventive	35		2	Abaca	23%	54%	23%	23%	54%	23%	100%	0%	0%	50%	35%	15%	WSO
Bath tissue	Inventive	36		2	Abaca	23%	38%	38%	23%	38%	38%	100%	0%	0%	50%	25%	25%	WSO
Bath tissue	Inventive	37		2	Abaca	23%	38%	8%	23%	38%	8%	100%	0%	0%	50%	25%	25%	WSO
Bath tissue	Inventive	38		2	Abaca	23%	0%	77%	23%	0%	77%	100%	0%	0%	50%	0%	50%	WSO
Bath tissue	Inventive	39		2	Abaca	23%	0%	77%	23%	0%	77%	100%	0%	0%	50%	0%	50%	WSO
Bath tissue	Inventive	40		2	Unbleached Bamboo	67%	33%	0%	67%	33%	0%	0%	0%	100%	43%	21%	36%	WSO

Figure 18B-1 (Cropped and Annotated)

Thus, regardless of the TS7 or TS750 scores of these samples, those examples cannot show possession of the claimed invention. Relatedly, Samples 49 and 56-64 are only a *single layer* towel product.⁸² Thus, these samples lack the required multi-layer ply structure. This deficiency renders the genus claims invalid for lack of written description: the claims “merely draw[] a fence around the outer limits of a purported genus” without demonstrating possession of what falls within.⁸³

⁸² EX1001, Fig. 19.

⁸³ *Ariad*, 598 F.3d at 1350-54; *Boehringer Ingelheim Animal Health USA Inc. v. Kan. State Univ. Research Found.*, No. PGR2020-00076, Paper 42, 35 (PTAB Jan. 31, 2022) (homology limitation “serves to merely draw a fence around the outer limits of a purported genus” (citation omitted)).

ii. The Specification Contains Minimal Description of Abaca-Containing Products

The written description deficiency is not subtle. It is absolute. The specification of the '475 Patent provides no description or examples of a multi-layer product having abaca in every layer. And the specification contains **zero** TS7 information and **zero** TS750 information for any multi-layer abaca-containing product with abaca in every layer.⁸⁴ This complete absence of a working example for abaca is fatal to the written description of the abaca embodiments.

The specification's abaca-related disclosure falls into five categories, none of which demonstrates possession of the claimed abaca product:

First, the specification provides a generic description of abaca as fibrous material derived from *Musa textilis*, noting its coarseness (>16 mg/100m), fiber length (>2.5mm), and general suitability as a "softwood replacement" for providing strength properties.⁸⁵ This description merely identifies abaca by only two exceedingly large ranges of physical characteristics but provides nothing about whether abaca-containing tissue products can be formed in the required multi-layer structure and achieve specific acoustic softness values.⁸⁶

⁸⁴ EX1003, ¶¶ 99-100, 136-46.

⁸⁵ EX1001, 26:31-27:7.

⁸⁶ EX1003, ¶ 140.

Second, the specification includes Papermaking Examples 3-14, which describe process conditions for making single-layer abaca-containing substrates at various ratios (e.g., 65% abaca/35% eucalyptus; 60/40; 55/45; 50/40/10 with softwood; 20/40/40 with softwood) using through-air-drying, wet-strength resins, and various structuring belts.⁸⁷ Critically, however, the specification does not tie these examples to any TS7 or TS750 measurement.⁸⁸ They describe inputs and process steps, not the functional output required by the claims.⁸⁹

Relatedly, Papermaking Examples 1-2 describe processing conditions for making products that contain *any* “non-wood (e.g., bamboo, abaca, etc.) pulp” (i.e. not specific to abaca) in undisclosed ratios. But all “non-wood[s]” is a vast genus comprised of a wide range of disparate fibers.⁹⁰ Including a passing mention of

⁸⁷ EX1001, 57:53-59:7 (Examples 3-14).

⁸⁸ The descriptions of the Paper Making Examples themselves do not provide TS scores for any of the resulting tissue. Nor do the descriptions tie the Paper Making Examples to any of the Samples identified in the drawings. The specification therefore provides no way to assess the acoustic softness of any substrate made using any of the Paper Making Examples. *See* EX1003, ¶¶ 111-15, 141-42.

⁸⁹ EX1003, ¶ 141.

⁹⁰ EX1001, 24:14-19.

abaca, without any specific teachings, examples, or characteristics, does not demonstrate possession of the claimed invention.⁹¹

Third, the data tables in Figures 18-22 identify certain abaca-containing samples (Samples 28-33, 49 and 56-64), but none include a multi-layer ply with abaca in every layer. Instead, samples 28-33 are described as each having three layers, but the “Fabric Layer” is composed of 100% Eucalyptus.⁹² Similarly, the “Wire Layer” of samples 34-39 is composed of 100% Eucalyptus.⁹³ And samples 49 and 56-64 are described as having a single layer.⁹⁴

Fourth, the specification contains a general statement that “[i]t has surprisingly been found that, despite the often non-desirable... characteristics of non-wood fibers, it is still possible to achieve high levels of wet strength and dry softness in a non-wood (e.g., abaca) containing substrate.”⁹⁵ But this statement, which references “dry softness” in subjective terms, does not establish that any abaca

⁹¹ EX1003, ¶ 142. Note also that Papermaking Example 1 also does not describe a *multi-layer* product.

⁹² EX1001, Fig. 18A-2.

⁹³ EX1001, Fig. 18B-1.

⁹⁴ EX1001, Fig. 19.

⁹⁵ EX1001, 48:58-64.

product achieves the *specific, quantified* TS7 or TS750 thresholds required by the claims. A vague assertion of “dry softness” is not a demonstration of $TS7 < 14 \text{ dB V}^2 \text{ rms}$ in a product with the claimed configuration.⁹⁶

Fifth, the specification’s various generalized statements about “non-wood fibers” do not demonstrate written description of an abaca-containing invention because there are an inordinate number of “non-wood” fibers, and each has varying characteristics and properties that impact the overall finished product.⁹⁷

The Federal Circuit has consistently held that a specification must do more than gesture toward a claimed result—it must demonstrate the inventor’s actual possession of the claimed invention. In *Idenix*, the court invalidated genus claims where the patent provided “lists or examples of supposedly effective” compounds without “explain[ing] what makes them effective, or why” finding this “deprive[s]” a skilled artisan “of any meaningful guidance.”⁹⁸ Here, the specification does not provide a list of abaca products that achieve the claimed properties, nor does it provide an explanation as to why they might do so. If the disclosure of lists and

⁹⁶ EX1003, ¶ 144.

⁹⁷ EX1003, ¶ 145.

⁹⁸ *Idenix Pharms. LLC v. Gilead Scis. Inc.*, 941 F.3d 1149, 1163-64 (Fed. Cir. 2019).

formulas without functional verification was insufficient in *Idenix*, the absence of any example (actual or prophetic) that meets the claimed requirements is insufficient here.

iii. The Specification Acknowledges Abaca Is “Challenging” But Provides No Blaze Marks

The specification itself confirms that the inventors recognized the difficulty of incorporating abaca into tissue products—yet provides no guidance for overcoming that difficulty to achieve the claimed product. The specification expressly states:

Abaca comprises characteristics that can make it challenging (especially at higher incorporation levels) for incorporating into sanitary tissue products of the present invention as it is better known for being used to produce thin, strong, and porous paper capable of withstanding hard use.⁹⁹

This admission undermines any contention of adequate written description. The specification acknowledges that abaca is (i) “challenging” to incorporate into the claimed products, (ii) that the difficulty escalates with increasing incorporation levels, and (iii) that abaca is traditionally associated with strong, stiff papers—the antithesis of the claimed soft tissue products.¹⁰⁰ Despite acknowledging these

⁹⁹ EX1001, 26:43-47.

¹⁰⁰ EX1003, ¶¶ 149-53.

challenges, the specification provides no “blaze marks” directing a POSITA toward how those challenges might be overcome to achieve $TS7 < 14$ or $TS750 < 45$.¹⁰¹

Adding to these admissions, the specification elsewhere doubles down on the difficulty of using non-wood fibers generally:

Whether one is substituting short or long wood fibers with non-wood fibers, there are not direct non-wood substitutions available for several reasons, such as morphology differences between wood and non-wood fibers. For instance, even when fiber length is matched by the non-wood replacing the wood fiber, said non-wood fiber likely has important differences such as fiber width, stiffness, etc. For some of these reasons, generally speaking, knuckles and pillows comprising non-wood fibers will be different (e.g., less dense) than knuckles and pillows consisting of non-wood fibers. These are some of the reasons that incorporation of non-wood fibers into established sanitary tissue products is not straightforward and creates unexpected outcomes. This is especially true as one tries to achieve parity (when using non-wood fibers) for multiple key parameters of sanitary tissue products.¹⁰²

But the specification provides no guidance on how these difficulties can be overcome when attempting to incorporate abaca into tissue products.

¹⁰¹ EX1003, ¶¶ 148, 154.

¹⁰² EX1001, 8:49-64.

Finally, another patent assigned to Patent Owner, listing the same inventors as the '475 Patent and filed on the same day as the '475 Patent, highlights the uniqueness of each non-wood fiber:

Particularly, fiber morphology characteristics such as length, cell wall thickness, width, kink, curl, fibrillation, and other characteristics ***can vary significantly from non-wood to non-wood***, as well as compared to wood pulps. It is, therefore, a current problem to develop sanitary tissue products having desired characteristics when utilizing non-wood fibers that have much different (versus wood pulps) morphologies that often compromise sanitary tissue product performance.¹⁰³

Taking all these together, Patent Owner admits that fiber morphology characteristics differ between wood and non-wood and even amongst non-woods and that there are specific challenges unique to abaca. A disclosure that fails to “provide sufficient blaze marks to direct a [POSITA] to the specific subset” of a genus with the claimed function does not satisfy § 112(a).¹⁰⁴ The specification here does worse than fail to provide blaze marks: It affirmatively warns the POSITA that the path is obstructed, then leaves the POSITA without a map. The specification identifies no *single* combination of abaca content level, refining parameters, non-abaca fiber content, structuring approach, or converting operation that enables an

¹⁰³ EX1005 (USPN 12,534,855), 1:52-62 (emphasis added).

¹⁰⁴ *Idenix*, 941 F.3d at 1164.

abaca product with the claimed composition and structure to achieve the claimed acoustic thresholds, let alone enough detail to show that the inventors were in possession of the entire genus.¹⁰⁵

This absence of guidance is particularly significant in light of what the specification *does* disclose about abaca’s physical properties. Abaca fibers have a coarseness exceeding 16 mg/100 m—substantially coarser than typical tissue-grade fibers.¹⁰⁶ Fiber coarseness is a critical determinant of sheet surface properties, and coarser fibers tend to produce harsher, stiffer surfaces that would be expected to exhibit *higher* (worse) TS7 and TS750 values, not lower ones.¹⁰⁷ The specification’s own description of abaca as a fiber “better known for being used to produce thin, strong, and porous paper capable of withstanding hard use” reinforces that abaca is associated with strength and durability—properties fundamentally in tension with acoustic softness.¹⁰⁸ A POSITA confronting this disclosure would have no basis for

¹⁰⁵ EX1003, ¶ 150.

¹⁰⁶ EX1001, 26:38-47.

¹⁰⁷ EX1003, ¶ 151.

¹⁰⁸ EX1001, 26:43-47.

concluding that the inventors actually possessed an abaca-containing tissue product meeting the claimed acoustic thresholds.¹⁰⁹

iv. The Specification’s Bamboo Examples Are Not Representative of the Abaca Genus

Patent Owner may contend that the specification’s bamboo-containing examples somehow provide written description support for the abaca embodiments of the claims. This argument fails. The bamboo examples are not “representative” of the abaca genus because bamboo and abaca are different fibers with materially different properties that affect acoustic performance in tissue products.¹¹⁰

Bamboo fibers are generally finer, more flexible, and more similar to hardwood kraft fibers in their papermaking behavior.¹¹¹ Abaca fibers, by contrast, are significantly coarser (>16 mg/100 m), longer (>2.5 mm), and stiffer—characteristics that make them function more like softwood kraft fibers, which are typically used for *strength*, not *softness*.¹¹² The specification itself confirms this distinction by describing abaca as a “more suitable softwood replacement” based on

¹⁰⁹ EX1003, ¶ 154.

¹¹⁰ EX1003, ¶¶ 155-58.

¹¹¹ EX1003, ¶ 156.

¹¹² EX1001, 26:38-42; EX1003, ¶¶ 95-97, 156.

its “length, width, and coarseness”¹¹³—properties that are the *opposite* of those associated with soft tissue.

And, as previously mentioned, Patent Owner has acknowledged that fiber morphology of non-wood fibers varies significantly from fiber to fiber.¹¹⁴ “The morphological differences between wood and non-wood pulps cause even experienced papermakers significant problems delivering fibrous structures having desired properties.”¹¹⁵

These differences have direct consequences for acoustic properties. TS7 and TS750 measure the vibrations produced when a blade contacts the tissue surface, essentially measuring how “noisy” or “stiff” the surface feels.¹¹⁶ A surface composed of coarse, stiff fibers (like abaca) would be expected to produce different vibrational characteristics than one composed of fine, flexible fibers (like bamboo).¹¹⁷ There is no basis in the specification or in the knowledge of a POSITA

¹¹³ EX1001, 27:4-7.

¹¹⁴ EX1005 (USPN 12,534,855), 1:52-62.

¹¹⁵ EX1005 (USPN 12,534,855), 1:63-65.

¹¹⁶ EX1003, ¶¶ 74-75.

¹¹⁷ EX1003, ¶ 157.

for concluding that acoustic results achieved with bamboo would necessarily or predictably be replicated with abaca.¹¹⁸

The Federal Circuit’s analysis in *AbbVie* is instructive. There, the court affirmed that over 300 antibody examples were insufficient to provide written description for a genus because “the described species are all of the similar type and do not qualitatively represent other types” within the claimed genus.¹¹⁹ The court explained that merely providing many examples “of the similar type” does not satisfy the written description when the claimed genus encompasses structurally distinct alternatives.¹²⁰ So too here: the specification’s numerous bamboo examples do not represent the structurally and functionally distinct abaca alternative that the claims also encompass. Bamboo data cannot stand in for abaca data any more than one type of antibody could stand in for a structurally unrelated type in *AbbVie*.

Similarly, in *Boehringer*, the Board found that a percentage-identity limitation “serves to merely draw a fence around the outer limits of a purported genus [which] is not an adequate substitute for describing a variety of materials constituting the

¹¹⁸ EX1003, ¶ 157.

¹¹⁹ *AbbVie*, 759 F.3d at 1300-01.

¹²⁰ *Id.*

genus.”¹²¹ Here, the claims draw a fence encompassing all products using fibers from a group “consisting of bamboo, abaca, and mixtures thereof”, but the specification populates only the bamboo portion of that fenced-in territory. The abaca territory remains unexplored and undescribed.

v. The Dependent Claims Lack Written Description

Each dependent claim incorporates the limitations of its respective independent claim—including the requirement that the product comprise non-wood fibers “selected from the group consisting of bamboo, abaca, and mixtures thereof” in every layer and that the product meets specific acoustic thresholds. Because the specification fails to provide written description support for the abaca embodiments of the independent claims, each dependent claim necessarily fails for the same reason.¹²² Moreover, none of the dependent claim limitations cures the foundational deficiency.

a. Claims 3, 11, 17, and 25 (Toilet Tissue)

Claims 3 (dependent on claim 1), 11 (dependent on claim 9), 17 (dependent on claim 15), and 25 (dependent on claim 23) each add the limitation that the tissue

¹²¹ *Boehringer*, Paper 42 at 35-36.

¹²² EX1003, ¶ 159.

product is “a toilet tissue product.”¹²³ This limitation narrows the product format but does not supply the missing written description for abaca. The specification does not disclose a single multi-layer *toilet tissue* product with abaca in every level that achieves $TS7 < 14$ or $TS750 < 45$.¹²⁴ Narrowing to toilet tissue thus does not cure the absence of described abaca species within the claimed genus.

b. Claims 4, 12, 18, and 26 (Greater Than 30% Non-Wood Fibers)

Claims 4 (dependent on claim 1), 12 (dependent on claim 9), 18 (dependent on claim 15), and 26 (dependent on claim 23) require that the product comprise “greater than about 30% by weight non-wood fibers.”¹²⁵ This limitation exacerbates the written description problem. The specification expressly warns that abaca is “challenging (especially at higher incorporation levels)” to incorporate into tissue products.¹²⁶ If the specification cannot demonstrate possession of *any* multi-layer abaca-containing product (with abaca in every layer) meeting the acoustic thresholds, it cannot demonstrate possession of products with *elevated* abaca content exceeding 30%. The very limitation that claims 4, 12, 18, and 26 add is the condition

¹²³ EX1001, claims 3, 11, 17, 25.

¹²⁴ EX1003, ¶¶ 160-61.

¹²⁵ EX1001, claims 4, 12, 18, 26.

¹²⁶ EX1001, 26:43-47.

the specification specifically identifies as making abaca incorporation more difficult.¹²⁷

c. Claims 10 and 24 (Structured Fibrous Structure)

Claims 10 (dependent on claim 9) and 24 (dependent on claim 23) require that the product comprise “a structured fibrous structure.”¹²⁸ While the specification describes structured tissue-making processes generally, and certain of the abaca Papermaking Examples (Examples 3-14) employ structuring belts, none of these examples reports TS750 data for the resulting product.¹²⁹ The addition of a structured fibrous structure limitation does not establish that an abaca-containing structured product achieves $TS750 < 45 \text{ dB V}^2 \text{ rms}$. Absent such a demonstration, the specification fails to describe the claimed combination of abaca, structured fibrous structure, and $TS750 < 45$.¹³⁰

¹²⁷ EX1003, ¶¶ 162-63.

¹²⁸ EX1001, claims 10, 24.

¹²⁹ EX1001, 57:53-59:7.

¹³⁰ EX1003, ¶¶ 164-65.

d. Claims 13, 14, 27, and 28 (Narrower TS750 Ranges)

Claims 13 and 27 require TS750 of “less than 40 dB V² rms”; claims 14 and 28 require TS750 of “from about 25 to about 35 dB V² rms.”¹³¹ These claims narrow the required acoustic performance to even more demanding sub-ranges of the TS750 threshold in the independent claims. If the specification cannot demonstrate possession of an abaca product meeting the broader threshold (TS750 < 45), it necessarily cannot demonstrate possession of abaca products meeting these narrower, more demanding thresholds.¹³² The increasingly stringent acoustic requirements make the written description deficiency more pronounced because there is progressively less reason to believe (and no disclosed basis for concluding) that abaca products can achieve these tighter acoustic targets.

* * *

In sum, the specification of the '475 Patent fails to convey to a POSITA that, as of the filing date, the inventors were in possession of the full scope of the claimed genus insofar as it encompasses products (i) with a multi-layer ply with abaca in every layer (ii) that achieve the recited TS7 and TS750 values. The disclosure provides only a generic identification of abaca as a possible fiber choice, an express

¹³¹ EX1001, claims 13, 14, 27, 28.

¹³² EX1003, ¶¶ 166-67.

admission that abaca is “challenging” to incorporate, and process examples that do not meet the claim requirements. This falls far short of the written description required by § 112(a), and the Challenged Claims are unpatentable on this ground.¹³³

b) All Challenged Claims Are Not Enabled

Independent of the written description deficiency, the Challenged Claims are also unpatentable because the specification fails to enable their full scope. “If a patent claims an entire class of... compositions of matter, the patent’s specification must enable a person skilled in the art to make and use the entire class,” i.e., “the *full scope* of the invention.”¹³⁴ “The more one claims, the more one must enable.”¹³⁵ And “[i]t is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement.”¹³⁶

Here, the claims encompass a wide range of abaca-containing products, yet the specification provides no working examples and no meaningful guidance for achieving the claimed TS7 and TS750 thresholds in a multi-layer abaca product, as

¹³³ EX1003, ¶¶ 168-69.

¹³⁴ *Amgen*, 598 U.S. at 610 (emphasis added).

¹³⁵ *Id.*

¹³⁶ *Idenix*, 941 F.3d at 1159 (citation omitted).

claimed. A POSITA could not practice the full scope of the claims, particularly their abaca embodiments, without undue experimentation.¹³⁷ “Claims are not enabled when, at the effective filing date of the patent, one of ordinary skill in the art could not practice their full scope without undue experimentation.”¹³⁸

The Federal Circuit has set forth seven factors for assessing the adequacy of disclosure for enablement:

- (1) the scope of the claimed invention;
- (2) whether the patent discloses specific working examples of the claimed invention;
- (3) the amount of guidance presented in the patent;
- (4) the nature and predictability of the field;
- (5) the quantity of experimentation necessary;
- (6) how routine any necessary experimentation is in the relevant field; and
- (7) the level of ordinary skill.¹³⁹

¹³⁷ EX1003, ¶¶ 170-71, 196-99.

¹³⁸ *Wyeth & Cordis Corp. v. Abbott Lab’ys*, 720 F.3d 1380, 1383-84 (Fed. Cir. 2013).

¹³⁹ *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988); *see also Idenix*, 941 F.3d at 1156 (citing same).

When applied here, each factor confirms that the experimentation required to practice the abaca embodiments of the claims is undue. Where, as here, the scope of the claims is large, there are “few working examples disclosed in the patent, and [the only] guidance... to practice the full scope of the invention [is] to use trial and error to narrow down the potential candidates to those satisfying the claims’ functional limitations—the asserted claims are not enabled.”¹⁴⁰

i. The Scope of the Claims Is Extremely Broad

The claims encompass abaca-containing tissue products spanning an extraordinary range of variables. With respect to fiber composition alone, the claims cover products containing anywhere from “at least about 5%” to “about 100%” non-wood fibers—meaning abaca content could range from a minor component at 5% to the entirety of the furnish at 100%.¹⁴¹ At each content level, the abaca may be combined with any other fiber, or combination of fibers, in any ratio.¹⁴²

Beyond fiber composition, the claims impose no limitations on the manufacturing process used to achieve the claimed product. The claims thus

¹⁴⁰ *Baxalta Inc. v. Genentech, Inc.*, 579 F. Supp. 3d 595, 615-16 (D. Del. 2022), *aff’d*, 81 F.4th 1362 (Fed. Cir. 2023).

¹⁴¹ EX1001, claims 1, 9, 15, 23.

¹⁴² EX1001, claims 1, 9, 15, 23; EX1003, ¶¶ 173-74.

encompass products made by any papermaking process (conventional wet-pressing, through-air-drying, hybrid processes), with any chemical treatment (wet-strength resins, debonders, softening agents, lotions), any structuring approach (structuring belts or fabrics of any pattern), any converting operation (embossing patterns, ply-bonding methods, calendering conditions), and any combination thereof.¹⁴³ The product may be two-ply (claims 1, 9) or multi-ply (claims 15, 23), in any tissue format.

Each of these variables could potentially affect the final product's structure and acoustic properties in generally unpredictable ways.¹⁴⁴ The scope of experimentation required to determine which combinations of abaca content, process parameters, and product configurations can achieve the claimed product with a $TS7 < 14$ or $TS750 < 45$ is immense. This is not a case where a narrow claim can be practiced by making routine adjustments to a disclosed embodiment; it is a case where the entire design space for abaca products must be explored from scratch because the specification provides no starting point.¹⁴⁵

¹⁴³ EX1003, ¶¶ 175-76.

¹⁴⁴ EX1003, ¶¶ 177, 192.

¹⁴⁵ EX1003, ¶ 177.

ii. The Specification Contains No Working Examples Using Abaca

The specification does not disclose a single working example of the claimed invention using abaca—that is, a tissue product with a multi-layer ply with abaca in every layer that achieves $TS7 < 14 \text{ dB V}^2 \text{ rms}$ or $TS750 < 45 \text{ dB V}^2 \text{ rms}$.¹⁴⁶ This factor weighs heavily against enablement.

None of the Papermaking Examples could be considered “working examples” of the claimed invention. A working example must demonstrate that the claimed invention actually works—here, that a product with a multi-layer ply with abaca in every layer achieves the claimed acoustic properties.¹⁴⁷ Examples 3-14 describe only the process for making *single*-layer abaca-containing substrates: furnish compositions, refining conditions, wet-strength resin addition, structuring belt selection, and through-air-drying parameters.¹⁴⁸ And they do not report the claimed functional properties of the resulting substrates. Without TS7 or TS750 data tied to the specific Paper Making Examples, a POSITA cannot determine whether these examples produce products meeting the claims, or how far from the claimed

¹⁴⁶ EX1003, ¶ 179.

¹⁴⁷ See *Amgen*, 598 U.S. at 612-14 (distinguishing between disclosure of a methodology and demonstration of working results).

¹⁴⁸ EX1001, 57:53-59:7.

thresholds the resulting products fall. For all the POSITA knows from this specification, Examples 3-14 may produce products with TS7 values of 20, 30, or 50 dB V² rms—far exceeding the claimed threshold of 14.¹⁴⁹

The data tables in Figures 18-22 are equally unavailing. None of the abaca-containing samples shown in these tables (Samples 28-33, 49, 56-64) are products with a multi-layer ply with abaca in every layer.¹⁵⁰

The Supreme Court’s reasoning in *Amgen* directly applies here. In *Amgen*, the Court found that a patent claiming a genus of antibodies was not enabled where the only methodology disclosed for identifying members of the genus was something akin to a trial and error process.¹⁵¹ There, “Amgen’s specification enable[d] 26 exemplary antibodies”, but the claims covered a “‘vast’ number of additional antibodies.”¹⁵² The Supreme Court found this insufficient to enable the full scope of the claims: “It requires scientists to make substitutions to the... antibodies known to work and then test the resulting antibodies to see if they do too—an uncertain

¹⁴⁹ EX1003, ¶ 180.

¹⁵⁰ EX1001, Figs. 18-22; EX1003, ¶ 181.

¹⁵¹ *Amgen*, 598 U.S. at 613-16.

¹⁵² *Id.* at 612-13.

prospect given the state of the art.”¹⁵³ The same logic applies here: even if the specification’s abaca Examples 3-14 produced some multi-layer abaca substrates (they do not), absent any acoustic characterization, a POSITA must individually make and test each possible abaca product configuration to determine whether it satisfies the claims. That is precisely the “trial-and-error” methodology *Amgen* held insufficient.

Brita is also instructive on this point. There, the Commission found that the patent in question “provides no teaching on how any filter other than carbon block can achieve the required FRAP factor.”¹⁵⁴ The Federal Circuit agreed that this evidence supported the Commission’s finding of no enablement. Similarly here, the ’475 Patent’s specification provides no teaching on how any non-wood fiber other than bamboo can achieve the required acoustic performance in a product with a multi-layer ply with the non-wood in every layer. This lack of working examples supports a finding of no enablement.

iii. The Specification Provides Inadequate Guidance

The specification provides no credible guidance enabling a POSITA to select process parameters or product configurations that will yield a product with a multi-

¹⁵³ *Id.* at 614.

¹⁵⁴ *Brita*, 156 F.4th at 1337.

layer ply with abaca in every layer meeting the claimed acoustic thresholds.¹⁵⁵ The guidance deficiency takes multiple forms.

First, the specification provides no correlation between the claimed abaca-containing products and acoustic softness. A POSITA reading the specification may learn that certain process conditions may be used to make *single*-layer abaca substrates (Papermaking Examples 3-14), but would have no information about how those conditions translated to acoustic softness, if at all, let alone the acoustic softness of *multi*-layer products.¹⁵⁶ Without this information a POSITA cannot use those Examples as a starting point for optimization, or even determine whether optimization is feasible.¹⁵⁷

In fact, in some instances the specification increases the uncertainty of the effect of abaca on acoustic softness. Samples 56 and 61 are each described as single layer paper towels that contain 35% Eucalyptus and 65% abaca.¹⁵⁸

¹⁵⁵ EX1003, ¶ 182.

¹⁵⁶ EX1003, ¶ 184.

¹⁵⁷ EX1003, ¶ 184.

¹⁵⁸ EX1001, Fig. 19. Of course, these samples lack the *multi*-layer structure required by the claim.

Substrate	Type	Sample ID	# Unique Layers	Non-wood	% of total Sheet			FSO/ WSO
					Euc	Softwood	Non-wood	
Towel	Inventive	9	1	Bamboo	37%	53%	10%	FSO
Towel	Inventive	10	1	Bamboo	42%	48%	10%	FSO
Towel	Inventive	11	1	Bamboo	34%	46%	20%	FSO
Towel	Inventive	12	1	Bamboo	44%	36%	20%	FSO
Towel	Inventive	13	1	Bamboo	31%	40%	30%	FSO
Towel	Inventive	14	1	Bamboo	46%	24%	30%	FSO
Towel	Inventive	45	1	Bagasse	40%	25%	35%	WSO
Towel	Inventive	46	1	Flax	40%	25%	35%	WSO
Towel	Inventive	47	1	Hemp	40%	25%	35%	WSO
Towel	Inventive	48	1	Unbleached Bamboo	40%	25%	35%	WSO
Towel	Inventive	49	1	Abaca	40%	25%	35%	WSO
Towel	Inventive	56	1	Abaca	35%	0%	65%	FSO
Towel	Inventive	57	1	Abaca	34%	36%	30%	FSO
Towel	Inventive	58	1	Abaca	36%	33%	31%	FSO
Towel	Inventive	59	1	Abaca	36%	33%	31%	FSO
Towel	Inventive	60	1	Abaca	36%	33%	31%	FSO
Towel	Inventive	61	1	Abaca	35%	0%	65%	FSO
Towel	Inventive	62	1	Abaca	40%	0%	60%	FSO
Towel	Inventive	63	1	Abaca	45%	0%	55%	FSO
Towel	Inventive	64	1	Abaca	35%	0%	65%	FSO

Figure 19 (Cropped and Annotated)

Despite these exact same properties, the specification reports that Sample 56 achieved a TS7 score of 16.6 while Sample 61 achieved a TS7 score of 12.50.¹⁵⁹

¹⁵⁹ EX1001, Fig. 22E.

Sample ID	Stack Compressibility	Resilient Bulk	Stack Compressibility x Resilient Bulk	TS7 Avg	TS750 Avg	Plate Stiffness	Slip Stick CoF Avg	Kinetic CoF Avg	Bulk (cc/g)
9	70.6	100.4	7086	18.3	43.6	12.5	964	0.99	20.5
10	71.6	100.8	7218	17.8	43.0	13.8	812	0.94	20.8
11	76.9	108.6	8354	19.3	41.5	15.9	810	0.94	22.8
12	75.4	107.9	8140	19.9	45.0	15.2	766	0.91	22.3
13	69.8	97.6	6812	20.2	43.3	13.5	827	0.94	21.9
14	71.6	105.0	7514	20.3	49.7	15.2	808	0.90	22.4
45									15.2
46									14.4
47									14.7
48									14.8
49									13.4
56	73.4	96.7	7098	16.6	49.3	11.3	1329	1.311	19.8
57	72.3	99.9	7223	18.1	49.8	11.2	1034	1.129	20.3
58	68.8	97.1	6680	17.9	43.95	10.2	1227	1.181	20.4
59	66.6	99	6593	20.52	52.89	13.2	872	1.06	19.9
60	67.3	96.9	6521	19.53	50.82	13.6	1117	1.059	20.0
61	80.2	92.4	7415	12.50	47.46	14.0	932	1.247	19.7
62	80.6	91.5	7375	11.94	45.20	13.5	990	1.240	19.7
63	74.1	91.7	6792	12.66	50.83	13.2	910	1.140	19.7
64	79.9	92.5	7388	12.97	44.31	13.1	892	1.154	20.4

Figure 22E (Cropped and Annotated)

In other words, the exact same *amount* of abaca yielded products that achieved different acoustic softness scores: one that falls within the claimed level and one that does not. But the specification provides no guidance for a POSITA that would

demonstrate why one abaca-containing (single-layer) product achieved the desired result while the other did not.¹⁶⁰

Second, the specification provides no structure-function relationship between abaca fiber properties and acoustic performance. The specification discusses abaca in the context of *strength* properties.¹⁶¹ The specification's discussion of abaca is entirely oriented toward mechanical performance metrics (tensile strength, wet strength, basis weight) rather than acoustic softness metrics (TS7, TS750).¹⁶² A POSITA would thus find no guidance in the specification as to how abaca's particular fiber morphology (high coarseness, long length) interacts with other fibers and processing variables to produce specific acoustic outcomes.^{163, 164}

¹⁶⁰ EX1003, ¶¶ 185-87.

¹⁶¹ EX1001, 49:64-50:42.

¹⁶² EX1003, ¶ 188.

¹⁶³ EX1003, ¶ 188.

¹⁶⁴ The specification includes the inventors' hypothesis on why certain fibers processed in certain ways might result in desirable softness. EX1001, 50:17-42. Even *if* these hypotheses were correct, they are unhelpful. The hypotheses do not account for all of the process parameters needed to furnish the claimed product, and the claims are not limited to the process parameters recited. EX1003, ¶ 188.

Third, the specification affirmatively warns that abaca is “challenging” to incorporate, especially at higher levels, without providing any solution to that challenge.¹⁶⁵ For example, the ’475 Patent warns that “regarding using abaca for its strength characteristics ... it is desirable to keep it from collapsing into a tightly bonded, rough, thin network with little variation in pore size.”¹⁶⁶ The ’475 Patent suggests overcoming this by combining abaca with a “sustainable hardwood (e.g., eucalyptus)” or forming the tissue product with “patterns comprising higher degrees of pillow modulation” and by “increasing molding conditions such as structuring belt pattern, belt overburden, crepe and/or wire to press draw.”¹⁶⁷ While the ’475 Patent claims that these proposed modifications can result in “surface texture with surface softness,” there is no specific guidance regarding what fiber composition is needed or what processing steps must be employed to result in a multi-layered tissue product comprising abaca in every layer exhibiting a TS7 of less than about 14 dB V² rms and/or a TS750 less than about 45 dB V² rms.¹⁶⁸ This is the opposite of guidance; it is an identification of difficulty without a specific, disclosed pathway to

¹⁶⁵ EX1001, 26:43-47.

¹⁶⁶ EX1001, 50:5-9.

¹⁶⁷ EX1001, 50:3-16.

¹⁶⁸ EX1001, 50:9-14.

resolution. Indeed, the specification fails to even identify the full extent of characteristics of abaca that make it “challenging,” let alone how the challenges can be overcome.¹⁶⁹ A specification that says, in effect, “this is hard, but we never solved it” cannot enable a POSITA to practice the invention.¹⁷⁰ Here, as in *Brita*, the specification leaves it to the POSITA to determine whether—and how—abaca products can achieve the claimed configuration and TS7 and TS750 thresholds. This is precisely the type of burden that the enablement requirement prohibits.¹⁷¹

Fourth, the specification provides no direction regarding which abaca content levels (if any) are compatible with achieving the claimed acoustic properties. The

¹⁶⁹ Elsewhere, the specification recognizes that a product with *no* non-wood fibers in the Yankee contacting layer would be “easier to run, as the non-wood fibers have less interaction with the complex chemical and physical interactions with the glue coating and creping process.” EX1001, 44:50-65. Of course, the claims here require non-wood in *all* layers. But the specification does not explain how to overcome the challenges arising from abaca interacting with the glue coating and creping process in such a product.

¹⁷⁰ EX1003, ¶ 189; *cf. Amgen*, 598 U.S. at 614 (specification providing only a “research assignment[]” does not enable).

¹⁷¹ *Brita*, 156 F.4th at 1336-37.

claims span from 5% to 100% abaca fiber, but the specification does not indicate whether acoustic targets are achievable at 5% abaca, 30% abaca, 65% abaca, or 100% abaca—or whether they are achievable at any level.¹⁷² A POSITA would face the entire 5-100% range as an undifferentiated design space with no signposts.¹⁷³ And to make matters worse for the claims, to enable the *full scope* of the claim, the specification must enable a POSITA to make a softness-compliant paper at *every* level. Put differently, because it purports to *claim* a 100% abaca product with the required acoustic softness, the patent must enable someone to build such a product—a challenge the specification does not even begin to address.

iv. The Relevant Field Is Unpredictable

Using non-wood fibers to make sanitary tissue products is itself an unpredictable and developing field.¹⁷⁴ And achieving specific acoustic softness values in tissue products is not predictable from fiber selection alone.¹⁷⁵ TS7 and

¹⁷² EX1003, ¶ 190.

¹⁷³ EX1003, ¶ 190.

¹⁷⁴ EX1022, 1, 6 (discussing the challenges of utilizing alternative fibers in sanitary tissue making).

¹⁷⁵ EX1008, 22 (discussing that a myriad number of different factors affect the properties of hygiene tissue paper).

TS750 are complex, multi-factorial properties that depend on the integrated effect of numerous interacting variables: fiber morphology (length, width, coarseness, kink, curl), sheet architecture (density, void volume, surface texture, fiber orientation), process conditions (forming consistency, refining energy, pressing pressure, structuring geometry, drying temperature and throughput), chemical treatments (wet-strength resins, debonders, softeners, lotions), and converting operations (embossing depth and pattern, ply-bonding adhesive type and pattern, calendering pressure).¹⁷⁶ Changes to any one variable can alter acoustic properties in ways that are difficult to predict without empirical testing.¹⁷⁷

The unpredictability is particularly acute when substituting a fiber type that is materially different from the demonstrated fiber type. Abaca's fiber morphology and chemical composition¹⁷⁸—are substantially different from those of bamboo. These differences affect every downstream aspect of the papermaking process: sheet formation, fiber-to-fiber bonding, sheet consolidation, surface smoothness, and compressibility.¹⁷⁹ Each of these parameters, in turn, influences how the final

¹⁷⁶ EX1003, ¶ 192.

¹⁷⁷ EX1003, ¶ 192.

¹⁷⁸ EX1001, 26:38-42; Figs. 23 and 25; EX1003, ¶ 193.

¹⁷⁹ EX1003, ¶ 193.

product interacts with the Emtec TSA measurement blade and what acoustic signal is produced.¹⁸⁰

A POSITA could not predict, based on the specification's bamboo data, whether or how abaca products would perform acoustically. Abaca's high coarseness means that individual fibers have thicker cell walls making them stiffer than bamboo and creating a different surface topography when formed into a sheet.¹⁸¹ Without empirical data confirming that abaca products *can* achieve the claimed values, and under what conditions, a POSITA would face fundamental uncertainty about whether the claimed invention is even achievable with abaca.¹⁸²

The specification's own "challenging" admission reinforces this unpredictability. If the inventors viewed abaca incorporation as challenging, a POSITA reading the specification cannot reasonably be expected to *predict* how to overcome those challenges to achieve precise acoustic targets.¹⁸³

¹⁸⁰ EX1003, ¶ 193.

¹⁸¹ EX1003, ¶ 194.

¹⁸² EX1003, ¶ 194.

¹⁸³ EX1001, 26:43-47; EX1003, ¶ 195.

v. The Quantity of Experimentation Required Is Undue

Given the absence of working examples, the lack of guidance, and the unpredictability of the acoustic outcomes with abaca fibers, the experimentation required to practice the full scope of the claims is undue by any measure.¹⁸⁴

To practice the abaca embodiments, a POSITA would need to systematically explore a vast, multi-dimensional design space. At minimum, the POSITA would need to: (i) select which fibers to use with abaca and the relative amounts of each (ii) select an abaca source and preparation method (including refining level); (iii) select papermaking process conditions (forming, pressing vs. TAD vs. hybrid drying, rush transfer, creping conditions); (iv) select chemical additives and application levels; (v) select a structuring approach (belt pattern, fabric type); (vi) select from a myriad of converting processes (surface treatment, embossing, calendering, plying); (vii) chose a product format (bath tissue, napkins, facial tissue, paper towels); and (viii) measure TS7 and/or TS750 on the finished product.¹⁸⁵ If the measured values do not meet the claimed thresholds, the POSITA would need to adjust one or more variables and repeat without any guidance from the specification as to which direction to move.

¹⁸⁴ EX1003, ¶ 196.

¹⁸⁵ EX1003, ¶ 197.

This is not routine optimization of a known-good starting point. It is open-ended exploration to determine whether a goal is achievable at all.¹⁸⁶ The specification does not provide a single data point showing that *any* combination of variables produces an acceptable result with abaca. A POSITA would therefore have no basis for knowing whether they are approaching the target or moving away from it at any given iteration. This type of undirected, empirical search through an enormous design space is precisely what the Supreme Court in *Amgen* found insufficient to constitute enablement.¹⁸⁷

The magnitude of the required experimentation is substantial in practical terms. Each iteration requires fabricating a complete tissue product—from pulp preparation through converting—and then performing acoustic testing on the finished product. Fabrication at pilot or commercial scale is time-consuming and resource-intensive.¹⁸⁸ A POSITA could not reasonably be expected to undertake the hundreds or thousands of iterations that might be necessary to map the abaca design space with no starting direction from the patent.¹⁸⁹

¹⁸⁶ EX1003, ¶ 198.

¹⁸⁷ *Amgen*, 598 U.S. at 613-14; EX1003, ¶¶ 197-98.

¹⁸⁸ EX1003, ¶¶ 62, 199.

¹⁸⁹ EX1003, ¶ 199.

vi. The Required Experimentation Is Not Routine

While papermaking is itself a well-established field, the experimentation needed here transcends routine optimization. Routine experimentation presupposes a known-working starting point and a defined objective achievable through predictable adjustments.¹⁹⁰ Here, neither condition is met.

First, there is no known-working starting point for abaca. The specification provides no abaca-containing tissue product demonstrated to meet the claimed thresholds—or even demonstrated to *approach* them.¹⁹¹ A POSITA therefore has no anchor from which to begin optimization. Attempting to achieve $TS7 < 14$ with abaca is not like adjusting a bamboo product with $TS7$ of 14.5 to bring it below 14, rather it is like starting with a product of entirely unknown acoustic performance and attempting to reach a specific, quantified target.¹⁹²

Second, the experimentation involves solving a novel materials-science challenge, not applying known solutions. The specification itself characterizes abaca incorporation as “challenging,” particularly at higher levels.¹⁹³ Overcoming

¹⁹⁰ EX1003, ¶ 200.

¹⁹¹ EX1003, ¶ 201.

¹⁹² EX1003, ¶ 202.

¹⁹³ EX1001, 26:43-47.

this challenge to achieve specific acoustic outcomes with abaca is not routine—it is an unsolved problem that the inventors themselves evidently did not solve, as evidenced by the absence of any successful abaca result in the specification.¹⁹⁴

Third, the relevant outcome (TS7 or TS750) is a complex function of the entire production process, not a parameter that can be dialed in through single-variable optimization.¹⁹⁵ Because TS7 and TS750 depend on the integrated effect of dozens of interacting variables from fiber properties through sheet architecture to converting conditions, the experimentation cannot be reduced to a simple, sequential optimization of individual parameters. Multi-variable, high-dimensional optimization without a predictive model or empirical starting point is not “routine” by any standard.¹⁹⁶

vii. The Level of Skill Cannot Overcome the Specification’s Deficiencies

A POSITA in this field would possess knowledge and experience in papermaking, fiber science, and product characterization.¹⁹⁷ This expertise, however, cannot compensate for the fundamental information the specification fails

¹⁹⁴ EX1003, ¶ 203.

¹⁹⁵ EX1003, ¶ 204.

¹⁹⁶ EX1003, ¶ 204.

¹⁹⁷ EX1003, ¶ 205.

to provide. “[I]t is the specification, not the knowledge of one skilled in the art, that must supply the novel aspects of an invention in order to constitute adequate enablement.”¹⁹⁸

The “novel aspect” here—the specific, claimed innovation—is achieving defined acoustic softness thresholds ($TS_7 < 14$; $TS_{750} < 45$) in products with a multi-layer ply comprising abaca fibers in every layer. A POSITA’s general knowledge of papermaking does not supply this specific information because: (i) the relationship between abaca fiber properties and acoustic outcomes is not established in the general art¹⁹⁹; (ii) the conditions under which abaca products might achieve these specific thresholds are not disclosed²⁰⁰; and (iii) the specification itself acknowledges difficulty in incorporating abaca, suggesting this is not routine knowledge.²⁰¹ If achieving the claimed properties with abaca were within the general knowledge of skilled artisans, the specification’s “challenging” admission

¹⁹⁸ *Idenix*, 941 F.3d at 1159 (citation omitted).

¹⁹⁹ EX1003, ¶ 206.

²⁰⁰ EX1003, ¶ 206.

²⁰¹ EX1001, 26:43-47.

would make no sense; the inventors would not characterize as “challenging” something that a POSITA could readily accomplish.²⁰²

viii. The Dependent Claims Are Not Enabled

Each dependent claim incorporates the unenabled limitations of its respective independent claim and thus is independently not enabled.²⁰³ The additional limitations of the dependent claims do not cure—and in several instances exacerbate—the enablement deficiency.

Claims 3, 11, 17, and 25 (toilet tissue): Limiting the product to toilet tissue format does not provide the missing guidance for achieving the claimed acoustic properties with abaca.²⁰⁴

Claims 4, 12, 18, and 26 (>30% non-wood fibers): Requiring elevated non-wood fiber content increases the abaca burden and directly implicates the specification’s warning about abaca being “challenging (especially at higher

²⁰² EX1003, ¶ 206.

²⁰³ EX1003, ¶ 207.

²⁰⁴ EX1003, ¶ 208.

incorporation levels).”²⁰⁵ The undue experimentation required to practice the independent claims is compounded, not alleviated, by this limitation.²⁰⁶

Claims 10 and 24 (structured fibrous structure): While structuring processes are known in the art, there is no disclosed correlation between specific structuring approaches and achievement of $TS_{750} < 45$ when using abaca fibers. The specification’s abaca Papermaking Examples (3-14) use structuring belts but do not report whether structuring helps, hurts, or is irrelevant to acoustic performance with abaca.²⁰⁷

Claims 13, 14, 27, and 28 (narrower TS_{750} ranges): These claims narrow the acoustic requirement to $TS_{750} < 40$ dB V^2 rms (claims 13, 27) or 25-35 dB V^2 rms (claims 14, 28). If the specification does not enable the broader $TS_{750} < 45$ threshold with abaca, it *a fortiori* cannot enable these more stringent sub-ranges.²⁰⁸ Tighter acoustic targets require *more* precise control of process variables, *more* specific guidance, and *more* demonstration of feasibility—none of which the

²⁰⁵ EX1001, 26:43-47.

²⁰⁶ EX1003, ¶ 209.

²⁰⁷ EX1003, ¶ 210.

²⁰⁸ EX1003, ¶ 211.

specification provides for abaca.²⁰⁹ The undue experimentation burden increases as the targeted acoustic range narrows.

* * *

In sum, the specification of the '475 Patent fails to enable the full scope of the Challenged Claims insofar as they encompass abaca-containing products. The specification provides no working examples demonstrating that *any* product with a multi-layer ply with abaca in every layer achieves the claimed acoustic thresholds, no meaningful guidance for a POSITA to determine how to achieve those thresholds with abaca, and no basis for predicting whether the claimed results are even attainable with this fiber. At the same time, the specification expressly acknowledges that incorporating abaca into tissue products is “challenging.” Under *Amgen*, *Idenix*, and the *Wands* factors, this is a textbook case of claims that exceed their enabling disclosure. The Challenged Claims are unpatentable for lack of enablement under 35 U.S.C. § 112(a).²¹⁰

VI. Conclusion

For the foregoing reasons, Petitioner respectfully requests institution of PGR and cancellation of claims 1, 3, 4, 9, 10-14, 15, 17, 18, 23, and 24-28.

²⁰⁹ EX1003, ¶ 211.

²¹⁰ EX1003, ¶¶ 212-13.

Respectfully submitted,

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Dated: October 5, 2026

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CERTIFICATE OF COMPLIANCE

The undersigned certifies that the foregoing PETITION FOR POST GRANT REVIEW complies with the type volume limitation in 37 C.F.R. § 42.24(a). According to the utilized word-processing system's word count, the petition—excluding the caption, table of contents, table of exhibits, mandatory notices, certificate of word count, and certificate of service—contains 11,856 words.

Dated: October 5, 2026

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CERTIFICATE OF SERVICE

The undersigned hereby confirms that the foregoing Petition for Post Grant Review and associated documents and exhibits were caused to be served on October 5, 2026 via overnight courier upon the following counsel of record for Patent Owner:

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