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Paper No. ____
Date: July 8, 2014

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CORNING INCORPORATED
Petitioner

v.

DSM IP ASSETS B.V.
Patent Owner

Case IPR2013-00045
U.S. Patent No. 6,339,666

Before FRED E. McKELVEY, GRACE KARAFFA OBERMANN, JENNIFER S. BISK, SCOTT E. KAMHOLZ, and ZHENYU YANG, *Administrative Patent Judges.*

CORNING INCORPORATED'S NOTICE OF APPEAL

Pursuant to 35 U.S.C §§ 141-142 and 37 C.F.R. §§ 90.2-90.3, notice is hereby given that Petitioner Corning Incorporated ("Corning") hereby appeals to the United States Court of Appeals for the Federal Circuit from the Patent Trial and Appeal Board's ("Board") Final Written Decision entered May 9, 2014 (Paper 92) ("Final Written Decision"), and from all underlying findings, orders, decisions, rulings and opinions relating to the Final Written Decision. A copy of the Final Written Decision is attached hereto.

In accordance with 37 C.F.R. § 90.2(a)(3)(ii), Corning further indicates that the issues on appeal include, but are not limited to: the Board's decision in the Final Written Decision that Corning did not establish by a preponderance of the evidence that claims 1-20 of U.S. Patent No. 6,339,666 ("'666 Patent") should be cancelled as unpatentable for the following reasons: (1) claims 10-20 based on anticipation by WO 95/15928 to Szum (Ex. 1002) ("Szum") under 35 U.S.C. § 102; (2) claims 10-20 based on obviousness over Szum under 35 U.S.C. § 103; (3) claims 1-9 based on obviousness over Szum and U.S. Patent No. 5,352,712 to Shustack (Ex. 1003) ("Shustack") under 35 U.S.C. § 103; (4) claims 1, 2, 8, 10, 11, 16, 17, and 19 based on anticipation by Shustack under 35 U.S.C. § 102; (5) claims 1, 2, 8, 10, 11, 16, 17, and 19 based on obviousness over Shustack under 35 U.S.C. § 103; and (6) claims 3, 12, 18, and 20 based on obviousness over Shustack and U.S. Patent No. 4,900,126 to Jackson et al. (Ex. 1005) under 35 U.S.C. § 103, and

the findings and conclusions supporting those rulings. Those findings and conclusions include, but are not limited to: (1) the Board's construction under the broadest reasonable interpretation standard of the claim language (required in all claims) of "sufficient adhesion to said glass fiber to prevent delamination in the presence of moisture and during handling"; (2) the Board's reliance on testimony that did not apply the broadest reasonable interpretation of that claim language; (3) the application of the Board's claim construction to the facts and art; (4) the Board's failure to properly consider evidence of record; and (5) the Board's findings that conflict with the evidence of record and/or are not supported by substantial evidence.

Corning also challenges the Board's refusal to accept patent owner's concession that claims 1 and 10 were not patentable.

Corning reserves the right to challenge any finding or determination supporting or relating to the issues listed above, and to challenge any other issues decided adversely to Corning in the Board's Final Written Decision or in any other order, decision, ruling, or opinion underlying the Final Written Decision.

Simultaneous with this submission, three (3) copies of this Notice of Appeal are being filed with the Clerk of the United States Court of Appeals for the Federal Circuit, together with the requisite docketing fee in the amount of $500. In addition, a copy of this Notice of Appeal is being filed with the Patent Trial and Appeal Board and served upon counsel of record for DSM IP Assets B.V.

Respectfully submitted,

Date: July 8, 2014

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UNITED STATES PATENT AND TRADEMARK OFFICE

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ATTACHMENT TO
CORNING INCORPORATED'S NOTICE OF APPEAL

FINAL WRITTEN DECISION

Trials@uspto.gov
571-272-7822

Paper 92
Entered: May 9, 2014

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CORNING INCORPORATED
Petitioner

v.

DSM IP ASSETS B.V.
Patent Owner

Case IPR2013-00045
Patent 6,339,666 B2

Before FRED E. McKELVEY, GRACE KARAFFA OBERMANN, JENNIFER S. BISK, SCOTT E. KAMHOLZ, and ZHENYU YANG, *Administrative Patent Judges*.

OBERMANN, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

A. Background

Petitioner, Corning Incorporated ("Corning"), filed a petition on November 15, 2012, for *inter partes* review of claims 1-20 ("the challenged claims") of U.S. Patent No. 6,339,666 B2 (Ex. 1001 ("the '666 Patent")) pursuant to 35 U.S.C. §§ 311-319. Paper 2 ("Pet."). Patent Owner, DSM IP Assets B.V. ("DSM"), filed a preliminary response on February 21, 2013. Paper 10 ("Prelim. Resp."). On May 13, 2013, the Board instituted trial on six grounds of unpatentability. Paper 11 ("Dec."). Those grounds are set forth in the following table:

Claims challenged	**Basis**	**Reference(s)**[1]
10-20	§ 102	Szum
10-20	§ 103	Szum
1-9	§ 103	Szum and Shustack
1, 2, 8, 10, 11, 16, 17, and 19	§ 102	Shustack
1, 2, 8, 10, 11, 16, 17, and 19	§ 103	Shustack
3, 12, 18, and 20	§ 103	Shustack and Jackson

After institution of trial, DSM filed a patent owner response. Paper 43 ("PO Resp."). DSM also filed a motion to amend claims by submitting proposed new claims 21 and 22 to be substituted for original claims 1 and 10, respectively. Paper 44 ("Mot. to Amend"). Corning filed a reply to the patent owner response (Paper 61 ("Reply")) and also an opposition to DSM's motion to amend (Paper 60). DSM then filed a reply in support of its motion to amend. Paper 72.

[1] The references are: WO 95/15928 (Ex. 1002) ("Szum"); U.S. Patent No. 5,352,712 (Ex. 1003) ("Shustack"); and U.S. Patent No. 4,900,126 (Ex. 1005) ("Jackson").

Both parties filed and fully briefed motions to exclude evidence. Paper 78 ("Pet. Mot. to Exclude"); Paper 75 ("PO Mot. to Exclude"). Oral hearing was held February 11, 2013. Paper 89 ("Transcript").

The Board has jurisdiction under 35 U.S.C. § 6(c). This final written decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73.

Corning fails to show by a preponderance of evidence that any of the challenged claims 1-20 are unpatentable. DSM's motion to amend is denied, without prejudice. DSM's motion to exclude evidence is denied. Corning's motion to exclude evidence is dismissed as moot.

B. Related Proceedings

Corning and DSM are involved simultaneously in nine other *inter partes* reviews based on patents claiming similar subject matter: IPR2013-00043; IPR2013-00044; IPR2013-00046; IPR2013-00047; IPR2013-00048; IPR2013-00049; IPR2013-00050; IPR2013-00052; IPR2013-00053.

C. The '666 Patent (Ex. 1001)

The '666 patent generally relates to radiation-curable coating compositions for optical glass fibers commonly used in data transmission. Ex. 1001, 1:22-23. In particular, the patent describes optical glass fibers coated with two radiation-cured coatings. *Id.* at 1:30-31. An inner primary coating contacts the glass surface of the fiber. *Id.* at 1:32-34. An outer primary coating overlays the inner coating. *Id.* For identification purposes, the outer primary coating includes colorant or, alternatively, a third colored layer, called an ink coating, which is applied to the outer primary coating. *Id.* at 1:57-62.

Figure 1, depicting such an optical glass fiber, is reproduced below:

FIG. 1

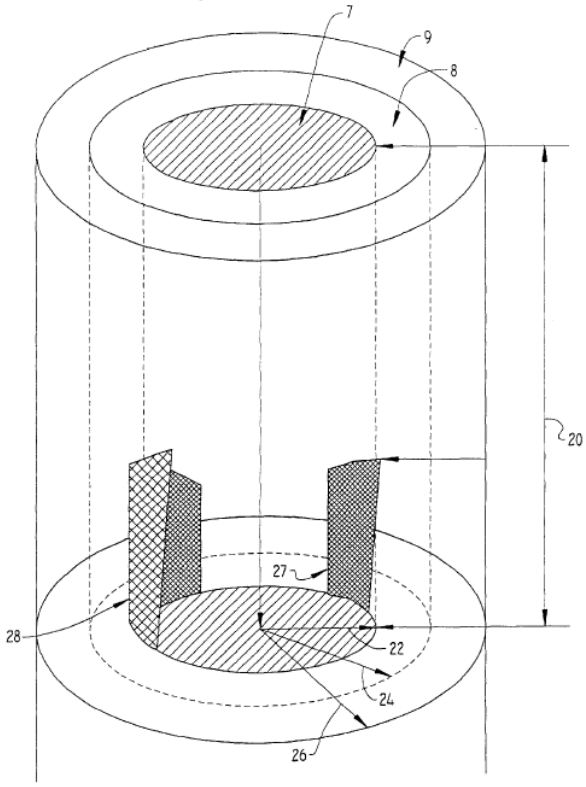

Figure 1 is a longitudinal cross-sectional view of coated optical glass fiber 7 coated with inner primary coating 8 and commercially available outer primary coating 9. *Id.* at 8:11-12; 10:10-12.

To create a cable or ribbon assembly, used in the construction of multi-channel transmission cables, a plurality of coated optical fibers are bonded together in a matrix material. *Id.* at 1:44-50. In order to connect the fibers of multiple ribbons, the surface of a glass fiber must be accessible. *Id.* at 1:57–2:10. That is often accomplished by a process known as "ribbon stripping"— removing the coatings and the matrix material, preferably as a cohesive unit. *Id.* The invention of the '666 patent is directed to a ribbon assembly having improved ribbon stripping capabilities. *Id.* at 1:25-27.

As described in the Background of the Invention, the prior art discloses ribbon assemblies composed of multiple optical glass fibers with

both an inner and outer coating and an optional outer ink layer. *Id.* at 1:44-52. The two compositions used as the inner and outer coatings often are modified to provide desired properties—providing bare optical glass fibers, which, when stripped, are substantially free of residue. *Id.* at 2:37-4:33. For example, the inner primary coating may be modified to reduce adhesion between the coating and the optical glass fiber. *Id.* at 2:42-44. A reduction in adhesion facilitates easy removal of the coating during stripping, but also increases the possibility of undesirable delamination in the presence of moisture. *Id.* at 2:44-53. "Delamination of the inner primary coating from the optical glass fiber can lead to degraded strength of the optical glass fiber as well as signal transmission attenuation disadvantages." *Id.* at 2:54-57.

We focus our analysis on a dispositive issue concerning a property, required by each challenged claim, of providing "sufficient adhesion to [a] glass fiber to prevent delamination in the presence of moisture and during handling." *Id.* at claims 1, 10.

D. Illustrative Claims

Claims 1 and 10 are the only independent claims and are reproduced below (emphases added):

> 1. A composition for coating an optical fiber, said composition comprising propoxylated nonyl phenol acrylate and an oligomer having at least one functional group capable of polymerizing under the influence of radiation, said composition after radiation cure having the combination of properties of:
>
> (a) a fiber pull-out friction of less than 40 g/mm at 90° C.;
> (b) a crack propagation of greater than 1.0 mm at 90° C.;
> (c) a glass transition temperature of below 10° C.; and
> (d) *sufficient adhesion to said glass fiber to prevent delamination in the presence of moisture and during handling*.

> 10. A composition for coating an optical fiber, said composition comprising an oligomer having an aliphatic diisocyanate residue and at least one functional group capable of polymerizing under the influence of radiation, said composition after radiation cure having the combination of properties of:
>
> (a) a fiber pull-out friction of less than 40 g/mm at 90° C.;
> (b) a crack propagation of greater than 1.0 mm at 90° C.;
> (c) a glass transition temperature of below -20° C. of less; and
> (d) *sufficient adhesion to said glass fiber to prevent delamination in the presence of moisture and during handling*.

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 100(b); Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012). Claim terms are given their ordinary and customary meaning, as understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

If an inventor acts as his or her own lexicographer, the definition must be set forth in the specification with reasonable clarity, deliberateness, and precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). The construction that stays true to the claim language and most naturally aligns with the inventor's description is likely the correct interpretation. *Renishaw PLC v. Marposs Società per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998).

Each challenged claim requires a curable coating composition that, after radiation cure, exhibits "sufficient adhesion to [a] glass fiber to prevent delamination in the presence of moisture and during handling." Ex. 1001,

claims 1, 10. We refer to that property in our analysis as "the claimed adhesion property."

The parties disagree about the meaning of the term "in the presence of moisture," which appears in the limitation relating to the claimed adhesion property. Corning argues that the term is broad enough to embrace exposure to 95% relative humidity as disclosed in the '666 patent for a wet adhesion test. Pet. 15; *see* Ex. 1001, 28:57–29:7 (disclosing conditions of wet adhesion test). DSM counters that "in the presence of moisture" means exposure to liquid water—that is, 100% relative humidity—as would be present, for example, in the water soak delamination test that is described in the '666 patent. PO Resp. 24-25 (citing Ex. 2032 ¶¶ 46-53). That delamination test involves soaking a cured coating sample in a hot water bath for up to 24 hours. *See* Ex. 1001, 27:32-47; Table 3 (describing conditions of the water soak delamination test). DSM produces evidence that, under conditions of 95% relative humidity, "by definition, there will be no moisture condensation on the surface of the coating because moisture condenses at 100% relative humidity." Ex. 2032 ¶ 48 (declaration of DSM's witness, Dr. Carl R. Taylor).

The evidence supports a conclusion that the broadest reasonable interpretation of the term "moisture" is liquid water—that is, a condition of 100% relative humidity. The written description uses the term "moisture" in a context that suggests liquid water. *See, e.g.*, Ex. 1001, 29:5-7 (applying a "wax/water slurry" to surface of sample film in order "to retain moisture"); 35:24-26 (applying heat to remove "moisture" from samples, suggesting removal of liquid water). Moreover, where the written description discusses water in vapor form, the inventors use the word "humidity" or "atmospheric

moisture," but not "moisture" alone. *See, e.g.*, *id.* at 21:54 (referring to "atmospheric moisture"); 28:55, 67; 29:5 (referring to "humidity"). The '666 patent further discloses that a "ribbon assembly can be buried under ground or water for long distance connections, such as between cities," which is consistent with the proposition that an optical fiber coating must endure long periods of immersion in liquid water without delaminating. Ex. 1001, 67:20-22. In light of the context in which the term "moisture" appears in the specification, we conclude that the inventors used that term in its ordinary sense to refer to liquid water.

The '666 patent, thus, is directed to a coating composition that, after radiation cure, has sufficient adhesion to glass to prevent delamination in the presence of liquid water. We decline to resolve what temperature, or length of time, of exposure to liquid water the coating must endure, without delaminating, in order to satisfy the claimed adhesion property. Resolving those conditions is not necessary to our analysis, which focuses on whether Corning's wet adhesion test, conducted under conditions of 95% relative humidity, is probative of the extent to which a cured coating delaminates from glass when exposed to liquid water.

B. Basis of Decision to Institute

We instituted trial based on the limited information advanced in the petition and preliminary response. In the petition, Corning relied on wet adhesion test data to show that certain prior art coatings inherently exhibit the claimed adhesion property. Pet. 16, 18-19, 26. In the preliminary response, DSM did not challenge specifically Corning's view that such data are sufficient to establish the claimed adhesion property in a cured coating. *See, e.g.*, Prelim. Resp. 8-12. Based on the record developed at the

preliminary stage of the proceeding, therefore, the Board instituted trial. *See, e.g.*, Dec. 10 (citing Prelim. Resp. 8-12) ("DSM does not dispute, specifically, any of [Corning's] assertions" regarding whether the properties required by the claims are inherently met in the prior art).

Additional information developed during the trial, however, casts doubt on the adequacy of wet adhesion test data to support a finding that the prior art coatings in fact exhibit the claimed adhesion property. Informed by the totality of evidence developed during the trial phase, and for the reasons set forth below, we conclude that Corning fails to show by a preponderance of evidence that Szum or Shustack inherently describes or suggests a coating composition that satisfies the claimed adhesion property.

C. Szum: Anticipation and Obviousness of Claims 10-20

Corning argues that claims 10-20 are anticipated by, or would have been obvious over, Szum. Corning admits that Szum does not disclose expressly a coating composition having the claimed adhesion property. The crux of Corning's argument is that Szum inherently discloses a coating composition having that property, as evidenced by a wet adhesion test carried out under conditions of 95% relative humidity on a coating prepared according to Szum's Example 5 ("the Szum coating"). Pet. 18-19.

DSM responds that the wet adhesion test does not evaluate for delamination, which is caused by exposure to liquid water, and that a different test—the water soak delamination test—is the only method disclosed in the '666 patent for assessing delamination. *See* PO Resp. 16 (citing Ex. 2032 ¶¶ 46-53 (opinion of DSM's witness, Dr. Taylor)). DSM also comes forward with its own test results, which allegedly show that the

Szum coating, in fact, delaminates when subjected to the conditions of the water soak delamination test disclosed in the ’666 patent. PO Resp. 29-30.

A dispositive question thus arises: Does Corning show by a preponderance of evidence that the Szum coating exhibits sufficient adhesion to prevent delamination from glass in the presence of liquid water? For the reasons set forth below, we answer that question in the negative. We first address the conditions set forth in the ’666 patent for the wet adhesion test and the water soak delamination test. We then consider whether the wet adhesion test, which Corning performed on the Szum coating, is probative of the claimed adhesion property. Finally, we explain why an evaluation of DSM’s water soak delamination test data is not necessary to our analysis.

i. The Wet Adhesion Test

The ’666 patent describes a wet adhesion test for evaluating a cured coating sample on a glass substrate. Ex. 1001, 28:60-65. The wet adhesion test is conducted “at a temperature of 23±2° C. and a relative humidity of 50±5% for a time period of 7 days.” *Id.* at 28:66–29:1. A portion of the sample film is then “further conditioned at a temperature of 23±2° C. and a relative humidity of 95% for a time period of 24 hours.” *Id.* at 29:2-5. During that step, “[a] layer of polyethylene wax/water slurry [is] applied to the surface of the further conditioned film to retain moisture.” *Id.* at 29:5-7.

The written description makes plain that the wet adhesion test assesses a cured coating that is conditioned at 95% relative humidity. *Id.* at 28:66–29:1. Corning acknowledges that fact. *See, e.g.*, Pet. 15 (citing Ex. 1006 ¶ 82) (“The term ‘wet adhesion’ is described in the ’666 patent at col. 28, lines 53-58 as adhesion at 95% relative humidity.”). Corning raises no argument that application of a layer of “wax/water slurry” to the surface

of the coating represents an exposure to 100% relative humidity. Ex. 1001, 29:5-7; *see* Reply 3 (The wet adhesion test described in the ’666 patent relates to conditioning “at 95% relative humidity—not liquid water immersion.” (citing Ex. 1001, 29:5-7)).

After conditioning the sample at 95% relative humidity, sample that appears “uniform and free of defects” is “peeled back from the glass.” Ex. 1001, 29:13-17. The wet adhesion test is performed on the peeled-back sample using a device that includes “a horizontal support and a pulley.” *Id.* at 29:8-12. With the glass secured to the horizontal support, a wire is “attached to the peeled-back end of the sample, run along the specimen and then run through the pulley in a direction perpendicular to the specimen.” *Id.* at 29:17-21. A wet adhesion value is determined by clamping the free end of the wire “in the upper jaw of the testing instrument,” which is activated “until the average force value, in grams force/inch,” becomes “relatively constant.” *Id.* at 29:21-24. The ’666 patent discloses that “[t]he preferred value for wet adhesion is at least about 5 g/in.” *Id.* at 29:24-25.

On this record, we find that the wet adhesion test assesses the mechanical force required to peel a cured coating away from a glass substrate, after conditioning the coating at 95% relative humidity.

ii. The Water Soak Delamination Test

The ’666 patent also discloses a water soak delamination test in which “coated microscope slides [are] soaked in [] water.” *Id.* at 27:32, 43. The samples are soaked in a beaker of deionized water that is placed in a 60° C. hot water bath. *Id.* at 27:43-45. The samples are “observed for delamination periodically. The time when the first signs of delamination” appear is recorded. *Id.* at 27:45-47.

Table 2 in the ’666 patent specification describes a “hot water soak” in which samples are “aged for 4 hours at 60° C.,” the water bath is “shut-off for about 70 hours,” and then the temperature is “brought back to 60° C. for an additional 48 hours.” *Id.* at 28:18-19, 23-25. The degree of delamination observed after the hot water soak is reported in Table 2 as “none” or “delam. [a]fter 1 hour at 60° C.” *Id.* at 28:15-29. Table 3 similarly reports results for a delamination test that is described as a “60° C. Water Soak.” *Id.* at 29:53. Delamination results are reported in terms such as “No Delamination After 24 Hours,” “Slight Delamination After 15 Minutes,” and “No Delamination After 8 Hours; Slight Delamination After 24 Hours.” *Id.* at 29:53-59.

On this record, we find that the water soak delamination test assesses the ability of a cured coating to withstand the hydrodynamic forces that cause delamination of a cured coating from a glass substrate in the presence of liquid water.

iii. Corning Fails to Establish that the Szum Coating Inherently Exhibits the Claimed Adhesion Property

The ’666 patent discloses that the wet adhesion test evaluates the force required to peel a coating away from a glass substrate, after the coating has been conditioned at 95% relative humidity. Ex. 1001, 29:8-25. The ’666 patent identifies a different test—a water soak delamination test—for evaluating the extent of delamination that occurs when a cured coating is exposed to liquid water. *Id.* at 28:32-47. In DSM’s view, Corning fails to establish sufficiently that the wet adhesion test, or “[p]eel test,” can “be used to reliably determine what the results of a delamination test would be.” PO Resp. 25. We agree.

Corning prepared the Szum coating and subjected it to substantially the same wet adhesion test that is described in the written description of the ’666 patent. *Compare* Ex. 1007 ¶¶ 41-44 (Declaration of Ms. Inna I. Kouzmina) (describing the wet adhesion test procedure performed on the Szum coating) *with* Ex. 1001, 28:57–29:25 (describing a wet adhesion test procedure performed on an inventive example). The ’666 patent instructs, however, that coating samples are subjected to a water soak test and “examined for delamination” prior to conducting the wet adhesion test. Ex. 1001, 28:53-54. Specifically, the wet adhesion test is performed “[i]n addition” to the water soak delamination test. *Id.* at 28:52-56. It is the delamination test that ascertains “[t]he time when the first signs of delamination” appear in a coating sample that is immersed in water. *Id.* at 27:32-47.

Although the ’666 patent describes a sequence of testing that includes both a delamination test and a wet adhesion test, Corning comes forward with no evidence that the Szum coating was subjected to a delamination test. *Id.*; *see* Ex. 1007 ¶¶ 41-43 (Corning’s test procedures). Corning’s own witness, Dr. Michael Winningham, was unaware of any delamination test performed by Corning on the Szum coating. PO Resp. 25 (citing Ex. 2029, 469:17–471:17). Corning relies on a wet adhesion value for the Szum coating that is expressed as a grams-per-inch mechanical force required to peel the coating away from a glass substrate after conditioning at 95% relative humidity. Ex. 1007 ¶¶ 41-44.

On this record, we find that Corning relies on test results obtained for the Szum coating after exposure to conditions of 95% relative humidity, but not to liquid water. As explained in our claim construction analysis,

exposure to 95% relative humidity is not "in the presence of moisture" (i.e., liquid water) as specified in the challenged claims. Corning argues that the Szum coating exhibits a wet adhesion value "of 44 g/in when conditioned at 95% relative humidity," but does not explain how that result is probative of adhesion in the presence of liquid water—that is, 100% relative humidity. Pet. 18 (citing Ex. 1006 ¶ 88); *see* Ex. 2032 ¶ 48 (moisture condenses at 100% relative humidity). On that basis, we determine that Corning fails to show by a preponderance of evidence that the Szum coating meets the claimed adhesion property.

A second independent basis supports our determination. Corning comes forward with evidence insufficient to support an inference that the results of a 95% relative humidity wet adhesion test correspond to an ability to withstand the hydrodynamic forces that effect delamination. Corning argues that Dr. Winningham "has confirmed that a coating composition with an adhesion to glass of either 23 g/in or 44 g/in, as in Szum, would have sufficient adhesion to the glass fiber to prevent delamination in the presence of moisture and during handling." Pet. 18-19 (citing Ex. 1006 ¶ 88).[2] Dr. Winningham's opinion on that point is unsupported and, therefore, unpersuasive. *See* Ex. 1006 ¶ 88 (reciting opinion without objective proof).

In that regard, Dr. Winningham repeats, verbatim, attorney argument set forth in the petition, but identifies no objective evidence explaining how a wet adhesion value, which indicates a mechanical force required to peel a coating away from a glass substrate, correlates to an ability to withstand the

[2] In addition to the experimental test results tending to establish a wet adhesion value of 44 g/in for the Szum coating, Corning points to the reference itself for a teaching that the Szum coating exhibits "an adhesion to glass at 95% relative humidity of 23 g/in." Pet. 18 (citing Ex. 1002, 25:12).

hydrodynamic forces that effect delamination. *Id.* Dr. Winningham's bare opinion is entitled to little weight in the absence of objective evidentiary support. *See Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 294 (Fed. Cir. 1985) (finding lack of factual support for expert opinion "may render the testimony of little probative value in a validity determination").

During cross-examination, Dr. Winningham testified about the differences between a water soak delamination test and a wet adhesion test, which he refers to in his testimony as "a peel test":

> Q. If one was concerned about the ability of a coating to delaminate from a substrate when exposed to water, would performing a peel test not give sufficient information to satisfy the interested person?
>
> A. I think those tests measure — are looking at different things or measuring different things, so I'm not sure if — I can't say categorically that a peel test is going to tell you what's going to happen in a water delamination test. Different tests.

Ex. 2029, 460:12-21.

Dr. Winningham also testified that the water soak delamination test evaluates the "hydrodynamic forces" that work to delaminate a coating from a glass substrate, whereas "a peel test" evaluates the "mechanical forces" exerted, where "one is applying a — mechanical force to a film and pulling the film off a substrate." Ex. 2029, 459:3-18. That testimony of Corning's witness is consistent with the explanation of the relevant hydrodynamic forces that is provided by DSM's witness, Dr. Taylor. Ex. 2032 ¶¶ 52-53.

At the oral hearing, Corning's counsel directed our attention to test results reported in Table 3 of the '666 patent and, for the first time, argued that those results establish "a clear correlation between the films that passed

the hot water soak test . . . and films that have a certain wet adhesion." Transcript 10:15-17. That argument, and Corning's reliance on Table 3, is not set forth in the petition or the reply. *See* Pet. 18-19; Reply 2-5. We deem Corning to have waived that argument raised by counsel for the first time at the oral hearing. *Cf. Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1320-21 n.3 (Fed. Cir. 2005) (arguments not raised in an opening brief are deemed waived).

That argument also is unpersuasive because it is unsupported by convincing, objective evidence that explains a relationship between the wet adhesion values and the water soak delamination results reported in Table 3. In that regard, Corning asks us to infer a relationship between wet adhesion values (reported as a grams-per-inch mechanical force) and water soak delamination results (reported as an observation, for example, of slight delamination after 15 minutes) from Table 3. *See* Transcript 10:15-17; Ex. 1001, 29:50-59 (Table 3). That is a leap we will not undertake in the absence of persuasive evidence, such as a technical article or expert testimony, explaining some relationship between those disparate test results. Pet. 18-19; Reply 2-5 (identifying no such evidence).

Because the issue is not discussed in the briefs, moreover, we have no evidence as to how the wet adhesion value obtained for the Szum coating, which never endured a hot water soak, is comparable to the wet adhesion values reported in Table 3, which appear to relate to coating samples that endured both a hot water soak and the wet adhesion test. *See* Ex. 1001, 28:53-57 (wet adhesion test is performed "[i]n addition" to water soak delamination test); *see also id.* at 29:13-15 (after conditioning, "samples that appeared to be uniform and free of defects" were selected for the wet

adhesion test, implying that samples that delaminated were excluded from such testing).

In sum, two independent reasons support our determination that the wet adhesion test results advanced by Corning fail to show adequately that the Szum coating has "sufficient adhesion . . . to prevent delamination in the presence of moisture" within the meaning of the challenged claims. First, the wet adhesion test assesses a property of the coating after conditioning at 95% relative humidity, which is not "in the presence of moisture." Second, Corning identifies no persuasive evidence from which we reasonably can discern that the wet adhesion test evaluates for "delamination."

iv. DSM's Delamination Test Results are Not Necessary to our Analysis

DSM presents evidence that the Szum coating exhibits insufficient adhesion to prevent delamination in the presence of liquid water. Specifically, DSM contends that it formulated a coating according to Szum's Example 5 and subjected it to the water soak delamination test described in the '666 patent. PO Resp. 29-30 (citing Ex. 2032 ¶¶ 66-69). DSM reports that the Szum coating "experienced delaminations, visible to the unaided eye," and that those "delaminations appeared as water-filled voids or 'blisters' between the inner primary coating and the glass." *Id.* Corning counters that those results are unreliable because DSM failed to follow the correct procedure for preparing the Szum coating. Reply 5. In particular, Corning argues that DSM used the wrong photoinitiator in its formulation, which negatively affected the ability of the Szum coating to withstand delamination. *Id.* (citing Ex. 1063 ¶¶ 95-105).

Corning bears the burden of showing by a preponderance of evidence that the Szum coating inherently discloses the claimed adhesion property. We need not resolve whether DSM properly formulated the Szum coating or whether DSM's test results accurately reflect the ability of that coating to withstand delamination in the presence of moisture. Our decision rests on Corning's failure to show sufficiently that its wet adhesion test results, which relate to the mechanical force sufficient to peel a coating away from a glass substrate after conditioning at 95% relative humidity, are probative of whether the Szum coating has "sufficient adhesion . . . to prevent delamination in the presence of moisture" (i.e., liquid water).

Based on the record developed at trial, Corning fails to show by a preponderance of evidence that the Szum coating inherently discloses the claimed adhesion property. Because each of claims 10-20 includes a limitation directed to that property, each claim withstands Corning's challenge based on anticipation by, or obviousness over, the Szum coating.

D. Grounds of Unpatentability Based on Shustack

We next turn to the other grounds of unpatentability raised at trial: (1) claims 1-9 based on obviousness over Szum and Shustack; (2) claims 1, 2, 8, 10, 11, 16, 17, and 19 based on anticipation by Shustack; (3) claims 1, 2, 8, 10, 11, 16, 17, and 19 based on obviousness over Shustack; and (4) claims 3, 12, 18, and 20 based on obviousness over Shustack and Jackson. *See* Dec. 22.

The first of those grounds is based on Corning's view that the wet adhesion test results establish that the Szum coating inherently exhibits the claimed adhesion property. Pet. 30-31, 33. For the reasons discussed above, Corning fails to establish that fact by a preponderance of evidence.

The other grounds are based on a substantially similar argument that a coating made according to Example 1 of Shustack ("the Shustack coating") exhibits the claimed adhesion property. Corning argues that it prepared the Shustack coating, subjected it to the 95% relative humidity wet adhesion test disclosed in the '666 patent, and determined that it exhibits "adhesion to glass at 95% relative humidity of 77 g/in." Pet. 39 (citing Ex. 1007 ¶¶ 30, 35, 40, 44; Ex. 1006 ¶ 121); *see* Ex. 1007 ¶¶ 41-44.

For reasons set forth above, the wet adhesion test results do not show sufficiently whether, or to what extent, a cured coating delaminates from glass in the presence of liquid water. On this record, Corning fails to show by a preponderance of evidence that the Shustack coating inherently discloses the claimed adhesion property. Because each challenged claim includes a limitation directed to that property, we are not persuaded that Corning carries its burden of demonstrating the unpatentability of any claim based on any ground advanced at trial.

E. DSM's Motion to Amend

"A motion to amend may cancel a challenged claim or propose a reasonable number of substitute claims." 37 C.F.R. § 42.121(a)(3). DSM moves to substitute claim 21 for original claim 1 and substitute claim 22 for original claim 10. Mot. to Amend 1-2. The overall framework of our amendment process is geared towards deciding motions to amend where the claims sought to be replaced are under a continuing threat of cancellation by virtue of the patentability challenge upon which trial is instituted. *See* 35 U.S.C. § 316(d) (tethering amendments to "challenged" patent claims and contemplating amendments that "materially advance" settlement of an ongoing dispute); *see also* 37 C.F.R. § 42.121(a)(2)(i) (an amendment may

be denied where it "does not respond to a ground of unpatentability involved in the trial"). Absent some showing of special circumstances, we are not convinced that our charter of deciding cases quickly and efficiently favors dedicating our limited resources to evaluating the patentability of DSM's proposed substitute claims, after we have resolved the main controversy in DSM's favor.

Having determined that none of DSM's original claims are proven unpatentable, we deny without prejudice the motion to amend. *See* Office Patent Trial Practice Guide, 77 Fed. Reg. at 48,767 (indicating that a motion to amend may be denied, without prejudice, if it is determined that patent owner's original claims are not unpatentable). At the hearing, counsel stated that DSM is "conceding [c]laims 1 and 10." Transcript, 19:4-10. To the extent counsel's statement represents a request to cancel claims 1 and 10, we observe that a patent owner may disclaim a patent claim at any time during the life of a patent. 35 U.S.C. § 253; 37 C.F.R. § 1.321. Alternatively, a patentee may seek reissue if it believes that an error has occurred. 35 U.S.C. § 251. Our decision denying the motion to amend is without prejudice to the filing of a disclaimer or, if appropriate, seeking reissue.

F. Motions to Exclude Evidence

DSM moves to exclude Dr. Winningham's testimony as unreliable, based on argument that he failed to review data underlying his opinions and, further, failed to apply the correct legal standard for obviousness. PO Mot. to Exclude 1-6. Because DSM's argument goes to the weight that should be accorded the testimony, and not its admissibility, we decline to exclude that evidence. DSM also moves to exclude certain test results and testimony relating to fiber pull-out and dL/L testing, as well as certain exhibits

submitted with Corning's reply. *Id.* at 7-14. We rely on none of that evidence to reach our final decision. We decline to exclude evidence that does not bear upon our decision.

On this record, DSM's motion to exclude evidence is denied.

Corning also moves to exclude evidence. Pet. Mot. to Exclude 1-11. Specifically, Corning seeks to exclude testimony relating to the water soak delamination tests that DSM performed on prior art coatings, as well as opinions relating to DSM's fiber pull-out friction tests. *Id.* We rely on none of that evidence to reach our final decision. Here again, we decline to exclude evidence that does not underlie our decision.

On this record, Corning's motion to exclude evidence is dismissed as moot.

III. CONCLUSION

Corning has not shown by a preponderance of evidence that the subject matter of claims 10-20 of the '666 patent is anticipated by, or would have been obvious over, the teachings of Szum.

Corning has not shown by a preponderance of evidence that the subject matter of claims 1-9 would have been obvious over the combined teachings of Szum and Shustack.

Corning has not shown by a preponderance of evidence that the subject matter of claims 1, 2, 8, 10, 11, 16, 17, and 19 of the '666 patent is anticipated by, or would have been obvious over, the teachings of Shustack.

Corning has not shown by a preponderance of evidence that the subject matter of claims 3, 12, 18, and 20 would have been obvious over the combined teachings of Shustack and Jackson.

DSM's motion to amend claims is *denied*.

The parties' motions to exclude evidence are *denied*.

This is a final decision. Parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

IV. ORDER

It is

ORDERED that Corning's request to cancel claims 1-20 is *denied*;

FURTHER ORDERED that DSM's motion to amend claims is *denied*, without prejudice;

FURTHER ORDERED that DSM's motion to exclude evidence is *denied*; and

FURTHER ORDERED that Corning's motion to exclude evidence is *dismissed as moot*.

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CERTIFICATE OF FILING

Pursuant to 37 C.F.R. § 90.2(a)(1) and 37 C.F.R. § 104.2, this is to certify that on this 8th day of July, 2014, I caused to be filed the original of the foregoing **CORNING INCORPORATED'S NOTICE OF APPEAL (with attached Final Written Decision)** with the Director of the United States Patent and Trademark Office by hand-delivery at the following address:

Director of the United States Patent and Trademark Office
c/o Office of the General Counsel
United States Patent and Trademark Office
10B20, Madison Building East
600 Dulany Street
Alexandria, VA 22314

In addition, pursuant to 37 C.F.R. § 90.2(a)(1) and 37 C.F.R. § 42.6(b), this is to further certify that on this 8th day of July, 2014, I caused to be electronically filed a true and correct copy of the foregoing **CORNING INCORPORATED'S NOTICE OF APPEAL (with attached Final Written Decision)** through the Board's PRPS System.

In addition, pursuant to 37 C.F.R. § 90.2(a)(2) and Federal Circuit Rule 15(a)(1), this is to further certify that on this 8th day of July, 2014, I caused to be filed three (3) true and correct copies of the foregoing **CORNING INCORPORATED'S NOTICE OF APPEAL (with attached Final Written Decision)** with the Clerk of the Court for the United States Court of Appeals for the Federal Circuit by hand-delivery at the following address:

Clerk of Court
United States Court of Appeals for the Federal Circuit
717 Madison Place, NW, Room 401
Washington, DC 20439

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 90.2(a)(3)(ii) and 37 C.F.R. § 42.6(e), this is to certify that on this 8th day of July, 2014, I caused to be served a true and correct copy of the foregoing **CORNING INCORPORATED'S NOTICE OF APPEAL (with attached Final Written Decision)** by e-mail on the following (as agreed in the Service Information section in DSM IP Assets B.V.'s Notice Pursuant to 37 C.F.R § 42.8):

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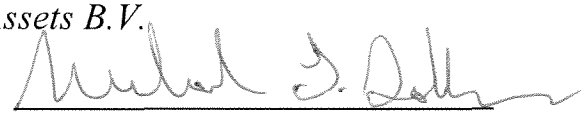

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