

United States Court of Appeals
for the Federal Circuit

E.I. DU PONT DE NEMOURS & COMPANY,
Plaintiff-Appellee

v.

UNIFRAX I LLC,
Defendant-Appellant

2017-2575

Appeal from the United States District Court for the District of Delaware in No. 1:14-cv-01250-RGA, Judge Richard G. Andrews.

Decided: April 17, 2019

CHRISTOPHER LANDGRAFF, Bartlit Beck LLP, Chicago, IL, argued for plaintiff-appellee. Also represented by SHARON DESH, MARK LESLIE LEVINE.

JACOB M. HOLDREITH, Robins Kaplan LLP, Minneapolis, MN, argued for defendant-appellant. Also represented by BRENDA L. JOLY, DAVID ALLEN PRANGE.

Before O'MALLEY, REYNA, and HUGHES, *Circuit Judges*.

Opinion for the court filed by *Circuit Judge* REYNA.

Dissenting opinion filed by *Circuit Judge* O'MALLEY.

REYNA, *Circuit Judge*.

This appeal arises from a patent infringement suit filed in the U.S. District Court for the District of Delaware. Defendant-Appellant Unifrax I LLC appeals from the district court's claim construction and denial of its motions for judgment of non-infringement and invalidity as a matter of law after a jury found that Unifrax I LLC's flame barrier product infringed the asserted patent and that Unifrax I LLC failed to prove the asserted patent was invalid. Because the district court correctly construed "100% by weight" and substantial evidence supports the jury's verdict, we affirm.

BACKGROUND

I. The Asserted Patent

U.S. Patent No. 8,607,926 ("the '926 patent"), entitled "Composite Flame Barrier Laminate for a Thermal and Acoustic Insulation Blanket," issued on December 17, 2013. The '926 patent claims composite laminates that are incorporated into thermal-acoustic blankets installed on the interior of the fuselage in aircraft to shield passengers from flames and reduce noise. The laminates claimed in the '926 patent have three layers of materials: (1) a polymeric film layer; (2) an inorganic refractory layer; and (3) an adhesive layer between the film and refractory layer. '926 patent col. 1 ll. 48–51; col. 9, ll. 6–17 (claim 1); Fig. 1. The '926 patent lists Drs. Llewellyn Bentley ("Ley") Richardson, III, and Darisuz Wlodzimierz Kawka of E.I. du Pont de Nemours & Company ("DuPont") as inventors.

The application that led to the '926 patent was filed on December 14, 2011, as a continuation-in-part of the application that led to U.S. Patent No. 8,292,027 ("the '027 patent"). The parent '027 patent claims a polymeric film layer

and an inorganic refractory layer but not an adhesive layer. The '027 patent also names Dr. Richardson as an inventor but does not name Dr. Kawka.

The primary dispute in this case concerns the “inorganic refractory layer,” which generally consists of “vermiculite platelets” that come from the natural mineral vermiculite. Claim 1 of the '926 patent—the only independent claim at issue—recites the following:

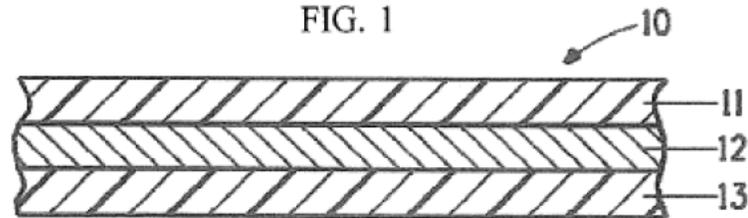
1. A multilayer laminate for use as a flame barrier layer for an aircraft comprising in order (i) a polymeric film layer capable of withstanding a temperature of at least 200 C for at least 10 min[;]

(ii) an adhesive layer having an areal weight of from 2 to 40 gsm capable of activation at a temperature of from 75 to 200 degrees C[;] and

(iii) an inorganic refractory layer;

wherein the inorganic refractory layer of (iii) comprises platelets in an amount of *100% by weight* with a dry areal weight of 15 to 50 gsm and a residual moisture content of no greater than 10 percent by weight.

Id. col. 9 ll. 6–17 (emphasis added). The three layers comprising the claimed multilayer laminate are depicted in the '926 patent in Figure 1:



Id., Fig. 1. “Fig. 1 shows a section through a burnthrough resistant composite laminate 10 comprising a polymeric film layer 11, an adhesive layer 12 and an inorganic refractory layer 13.” *Id.* col. 1 ll. 48–50. The inorganic refractory layer is made by pouring a “dispersion” including vermiculite platelets suspended in water onto a flat surface and then drying. Adding “dispersants” (e.g., tetrasodium pyrophosphate) to the dispersion can change the viscosity of the solution and improve how evenly the dispersion spreads and the quality of the coating when the dispersion dries. The parties dispute what constitutes a dispersant in several instances, but there is no dispute that tetrasodium pyrophosphate, a sodium phosphate salt, is an example of a dispersant. Appellee Br. 11.

II. Procedural History

DuPont sued Unifrax I LLC (“Unifrax”) for patent infringement on October 1, 2014, in the District of Delaware. DuPont alleged that Unifrax infringed claims 1, 2, and 5 of the ’926 patent by making and selling a flame barrier product called FyreWrap® Combi-Film 3G11 (“Combi-Film 3G11”). The case proceeded to a jury trial in May 2017. The district court charged the jury with an invention date instruction because DuPont argued the inventors conceived of the invention of the ’926 patent and reduced it to practice before the public use date of one of Unifrax’s asserted prior art references.

The jury found that the Combi-Film 3G11 product infringes the '926 patent and that the asserted claims were not invalid. Unifrax moved for judgment of non-infringement and invalidity as a matter of law. The court denied Unifrax's motions, finding that legally sufficient evidence supported the jury's verdicts of infringement and no anticipation or obviousness. J.A. 41–43.

A central issue in this appeal is the court's construction of the term in claim 1, "100% by weight." During claim construction proceedings, DuPont proposed that "100% by weight" means "[t]here is no carrier material such as resin, adhesive, cloth or paper in addition to the inorganic platelets. There may be some residual dispersant arising from incomplete drying of the platelet dispersion." *E.I. du Pont de Nemours & Co. v. Unifrax I LLC*, No. 1:14-CV-1250, 2016 WL 158031, at *5–6 (D. Del. Jan. 13, 2016) ("*Claim Construction Order*"). Unifrax proposed that "100% by weight" be given its "[p]lain meaning—no construction is necessary." *Id.* According to the district court, "the parties' dispute boils down to whether the platelets are 100% of the inorganic refractory layer or 100% relative to carrier material in the inorganic refractory layer." *Id.* at *6.

The district court adopted DuPont's proposed construction. In reaching its conclusion, the district court cited the '926 patent's specification, which states:

The refractory layer comprises platelets. Preferably at least 85% of the layer comprises platelets, more preferably at least 90% and most preferably at least 95%. In some embodiments, platelets comprise 100% of the layer. The refractory layer may comprise some residual dispersant arising from incomplete drying of the platelet dispersion during manufacture.

'926 patent col. 3 ll. 21–26. The district court stated that "[t]he grammatical and most natural reading of this passage is that '[t]he refractory layer may comprise residual

dispersant' refers to all the embodiments mentioned in the paragraph, including the embodiment in which platelets comprise 100% of the layer." *Claim Construction Order*, 2016 WL 158031, at *7. Therefore, the specification supported a construction of "100% by weight" permitting some residual dispersant.

The district court also looked to the specification of the parent '027 patent, which it considered as intrinsic evidence, that states "[i]n one embodiment of this invention, the inorganic platelet layer contains 100% platelets, i.e. there is no carrier material such as resin, adhesive, cloth or paper. However, there may be some residual dispersant arising from incomplete drying of the platelet dispersion." '027 patent col. 2 ll. 32–36. The district court noted that, although the '027 patent and the '926 patent did not share the disputed "100%" claim term, both patents "claim inventions that comprise a layer that comprises platelets" and the '027 patent "illuminate[s] the meaning of '100%' as it pertains to such a layer because the "statement relates to common subject matter." *Claim Construction Order*, 2016 WL 158031, at *8. The district court concluded that the intrinsic evidence supports the construction that "100% by weight" platelets refers to "the quantity of platelets relative to carrier material," which allows for residual dispersant in the inorganic refractory layer. *Id.* at *9.

The district court also considered whether during prosecution of the '926 patent, the patentees disclaimed refractory layers that contain less than 100% by weight platelets to overcome a rejection in view of the prior art—U.S. Patent No. 6,670,291 ("Tompkins"). The examiner rejected the application that led to the '926 patent over Tompkins because Tompkins taught a refractory layer with a platelet concentration of less than 100%. *Id.* The patentees amended the claim to add language reciting that the inorganic refractory layer comprises platelets in the amount of "100% by weight." *Id.* According to the district court, DuPont did not dispute that this resulted in disclaimer of

at least “embodiments comprising an inorganic refractory layer containing platelets in an amount less than 100% by weight.” *Id.*

The district court further considered whether the patentees disclaimed inorganic refractory layers that contained residual dispersant. Noting that the amended language recited “platelets in the amount of 100% by weight . . . and a residual moisture content,” the district court found that the patentees had not disclaimed “refractory layers that contain anything at all other than platelets” and that the disclaimer had no effect on the permissibility of non-carrier materials such as residual dispersants or moisture in the refractory layer. *Id.* In the district court’s view, the disclaimer limited the scope of the claimed layers to those containing no carrier material such as a resin or an adhesive. *Id.*

III. The Accused Product

Unifrax produces the accused Combi-Film 3G11 product. The “vermiculite coating” layer shown in the figure below¹ is the layer that DuPont contends meets the claimed “inorganic refractory layer” limitation in this appeal.

¹ Despite the visible “Unifrax Confidential” designation, this figure appears in DuPont’s non-confidential response brief.



Appellee Br. 10; J.A. 8033. The refractory layer in Combi-Film 3G11 consists of an HTS-SE vermiculite dispersion containing vermiculite, a material known as DEHESIVE 480, tetrasodium pyrophosphate, and water.

DISCUSSION

We review the district court's ultimate determination on claim construction de novo, while any underlying factual findings related to extrinsic evidence are reviewed for clear error. *CardSoft, LLC v. VeriFone, Inc.*, 807 F.3d 1346, 1348, 1349–50 (Fed. Cir. 2015).

Review of the district court's denial of judgment as a matter of law is governed by the law of the regional circuit, here the Third Circuit. *See Transocean Offshore Deepwater Drilling, Inc. v. Maersk Drilling USA, Inc.*, 699 F.3d 1340, 1346–47 (Fed. Cir. 2012). The Third Circuit reviews de novo a district court's ruling on a motion for judgment as

matter of law. *Intellectual Ventures I LLC v. Motorola Mobility LLC*, 870 F.3d 1320, 1324 (Fed. Cir. 2017); *McKenna v. City of Philadelphia*, 582 F.3d 447, 460 (3d Cir. 2009).

Judgment as matter of law is appropriate if “the court finds that a reasonable jury would not have a legally sufficient evidentiary basis to find for [a] party.” Fed. R. Civ. P. 50(a)(1). Judgment as a matter of law is “sparingly invoked” and “granted only if, viewing the evidence in the light most favorable to the nonmovant and giving it the advantage of every fair and reasonable inference, there is insufficient evidence from which a jury reasonably could find” for the nonmovant. *Marra v. Phila. Hous. Auth.*, 497 F.3d 286, 300 (3d Cir. 2007) (internal quotation marks omitted). “The question is not whether there is literally no evidence supporting the party against whom the motion is directed but whether there is evidence upon which the jury could properly find a verdict for that party.” *Becton, Dickinson & Co. v. Tyco Healthcare Grp., LP*, 616 F.3d 1249, 1253 (Fed. Cir. 2010) (quoting *Lightning Lube, Inc. v. Witco Corp.*, 4 F.3d 1153, 1166 (3d Cir. 1993)).

Infringement is a question of fact, reviewed for substantial evidence when tried to a jury. *ACCO Brands, Inc. v. ABA Locks Mfrs. Co.*, 501 F.3d 1307, 1311 (Fed. Cir. 2007). Similarly, anticipation under 35 U.S.C. § 102 is a question of fact, reviewed for substantial evidence when tried to a jury. *TI Grp. Auto. Sys. (N. Am.), Inc. v. VDO N. Am., L.L.C.*, 375 F.3d 1126, 1133 (Fed. Cir. 2004). “Priority, conception, and reduction to practice are questions of law which are based on subsidiary factual findings.” *Cooper v. Goldfarb*, 154 F.3d 1321, 1327 (Fed. Cir. 1998). We have treated the question of whether inventor testimony asserting priority is sufficiently corroborated as a question of fact. See *NFC Tech., LLC v. Matal*, 871 F.3d 1367, 1371 (Fed. Cir. 2017) (citing *Fleming v. Escort Inc.*, 774 F.3d 1371, 1377 (Fed. Cir. 2014)).

I. Claim Construction

We review the district court’s ultimate determination on claim construction de novo. *CardSoft*, 807 F.3d at 1349–50. The parties dispute whether the district court correctly construed the claim term “100% by weight.” The first step in the patent infringement analysis requires the court to construe the scope and meaning of the asserted claims. See *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 372–74 (1996). The purpose of claim construction is to give meaning to the claim terms according to how a person of ordinary skill in the art would have understood them at the time of the invention in light of the entire patent, including the claims in which the terms appear and the specification. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc). “We cannot look at the ordinary meaning of [a] term . . . in a vacuum” but must consider “the context of the written description and the prosecution history.” *Medrad, Inc. v. MRI Devices Corp.*, 401 F.3d 1313, 1319 (Fed. Cir. 2005). “When the specification ‘makes clear that the invention does not include a particular feature, that feature is deemed to be outside the reach of the claims of the patent, even though the language of the claims, read without reference to the specification, might be considered broad enough to encompass the feature in question.” *Microsoft Corp. v. Multi-Tech Sys., Inc.*, 357 F.3d 1340, 1347 (Fed. Cir. 2004) (quoting *SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.*, 242 F.3d 1337, 1341 (Fed. Cir. 2001)).

Although the court may consider extrinsic evidence, “[i]t is well-settled that, in interpreting an asserted claim, the court should look first to the intrinsic evidence of record.” *Vitronics Corp. v. Conception, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). We have designated the prosecution history as part of the intrinsic evidence, including “the prior art cited during the examination of the patent.” *Phillips*, 415 F.3d at 1317; *Powell v. Home Depot U.S.A., Inc.*, 663 F.3d 1221, 1230–31 (Fed. Cir. 2011). The prosecution

history “contains the entire record of the proceedings in the Patent Office from the first application papers to the issued patent.” *Autogiro Co. of Am. v. United States*, 384 F.2d 391, 398 (Ct. Cl. 1967); *see also Phillips*, 415 F.3d at 1317.

Unifrax argues that the “100% by weight” term does not allow for any amount of organic additives in the refractory layer. According to Unifrax, “100%’ means one hundred percent.” Appellant Br. 35. We must consider whether the context of the entire patent and other intrinsic evidence supports such an interpretation. We hold that it does not.

We begin our analysis with the claim language itself. Claim 1 of the ’926 patent recites that “the inorganic refractory layer of (iii) comprises platelets in an amount of 100% by weight with a dry areal weight of 15 to 50 gsm and a residual moisture content of no greater than 10 percent by weight.” ’926 patent col. 9 ll. 14–17. That claim 1 recites a residual moisture content of up to “[10%] by weight” in addition to “100% by weight” platelets in the refractory layer undercuts Unifrax’s plain meaning argument that “100%’ means one hundred percent.” Unifrax’s position would require that the term “100% by weight” be considered alone, without reference to the surrounding claim language. The claim’s reference to both “100% by weight” platelets and 10% residual moisture, however, supports the conclusion that “100% by weight” is relative to carrier material. It would be nonsensical if the total percentage of components comprising the inorganic refractory layer exceeded 100%. As the district court noted, this claim language does not suggest that “100%” excludes all refractory layers containing “anything at all other than platelets” from the claim scope. *Claim Construction Order*, 2016 WL 158031, at *9.

We next look at the specification. The specification provides that “[t]he refractory layer comprises platelets. Preferably at least 85% of the layer comprises platelets, more

preferably at least 90% and most preferably at least 95%. In some embodiments, platelets comprise 100% of the layer. The refractory layer may comprise some residual dispersant.” ’926 patent col. 3 ll. 21–25. This language supports the district court’s conclusion that the disclosed embodiments, including the 100% platelet embodiment, all allow for some amount of residual dispersant. Like the language of claim 1, this passage further supports that “100% by weight” is relative to carrier material in the refractory layer.

Unifrax contends that all twenty-four examples of the refractory layer in the laminates shown in the specification have 100% by weight inorganic platelets with no residual dispersant. Appellant Br. 5. Indeed, the specification states that all laminate examples are based on the use of a single commercial vermiculite product known as MicroLite 963 for the refractory layer that has 0% organic material. ’926 patent col. 4 ll. 62–67; J.A. 7617–20. But the ’926 patent also lists other “suitable materials” (e.g., MicroLite HTS-XE) that contain a residual dispersant, and thus, less than 100% inorganic material, for the refractory layer. ’926 patent col. 3 ll. 47–50; J.A. 7617–26 (stating that MicroLite HTS-XE may contain organic additives).

Unifrax also argues that the district court erred by treating the ’027 patent’s specification as intrinsic evidence in construing “100% by weight.” We disagree. This court’s precedent supports treating the specification of the ’027 patent as intrinsic evidence in construing claims in the ’926 patent, which issued from a continuation-in-part of the application for the ’027 patent, because “the subject matter is common to the continuation-in-part application.” *Wang Labs., Inc. v. Am. Online, Inc.*, 197 F.3d 1377, 1384 (Fed. Cir. 1999) (applying statements from prosecution of a parent application where subject matter was common to the continuation-in-part application); *see also Jonsson v. Stanley Works*, 903 F.2d 812, 818 (Fed. Cir. 1990) (affirming claim construction relying on “arguments and remarks”

made during the prosecution of a parent application for claim terms in a patent resulting from a continuation-in-part application despite recognizing the claims used different language).

The district court’s construction of “100% by weight” comes directly from language in the parent ’027 patent and its application:

In one embodiment of this invention, the inorganic platelet layer contains 100% platelets i.e. there is no carrier material such as resin, adhesive, cloth or paper. However, there may be some residual dispersant arising from incomplete drying of the platelet dispersion.

’027 patent col. 2 ll. 32–36. We agree with the district court that this passage relates to common subject matter and informs the meaning of the “100% by weight” claim term as it is used in the ’926 patent by clarifying what is not included in the refractory layer—a carrier material such as resin, adhesive, cloth, or paper.

Unifrax cites *Advanced Cardiovascular Systems, Inc. v. Medtronic, Inc.*, 265 F.3d 1294, 1305–06 (Fed. Cir. 2001), to assert that considering the ’027 patent specification was improper. *Advanced Cardiovascular* provides one example of circumstances when it is plainly appropriate to treat a parent application as intrinsic evidence: when considering two related patents with identical claim terms. *Id.* (“The prosecution history of a related patent can be relevant if, for example, it addresses a limitation in common with the patent in suit.”). We do not read *Advanced Cardiovascular* to create a strict requirement that to consider a parent patent as intrinsic evidence, the exact claim term at issue in the child patent must appear in the parent patent’s claims. *Id.* In *Advanced Cardiovascular*, we declined to *import a limitation* into the child patent claims based on the prosecution history of the parent application where “[t]he patentee’s whole point in filing the [child application] was to

secure broader claims” by removing a claim term. *Id.* Thus, *Advanced Cardiovascular* concerned the “absence of a claim term[,]” not merely “no common claim terms in dispute.” *Id.* That is not the case here.

Other cases set forth additional circumstances where familial patents inform the construction of a claim term and are appropriately treated as intrinsic evidence. When a parent application includes statements involving “common subject matter” with the terms at issue, those statements are relevant to construction of the terms in the child patent. *See Wang Labs*, 197 F.3d at 1384; *Jonsson* 903 F.2d at 818; *see also, e.g., Ormco Corp. v. Align Tech., Inc.*, 498 F.3d 1307, 1314 (Fed. Cir. 2007). Such is the case in this action.

The '027 and '926 patents have a familial relationship: the '926 patent issued from a continuation-in-part of the application that issued as the '027 patent. *See* '926 patent col. 1 ll. 5–8; *id.*, Related U.S. Application Data. Accordingly, as a continuation-in-part, the '926 patent “disclos[es] all or a substantial part of the subject-matter of the prior application,” i.e., the application that led to the '027 patent. *U.S. Water Servs., Inc. v. Novozymes A/S*, 843 F.3d 1345, 1348 n.1 (Fed. Cir. 2016). In addition to the familial relationship, the application that led to the '027 patent is listed on the face of the '926 patent as a prior art reference cited during prosecution. '926 patent, References Cited.

Both patents claim composite laminates that are used as flame barriers comprised of a polymeric film layer and an inorganic refractory layer that itself comprises platelets. Both specifications disclose 100% platelet refractory layer embodiments that also allow for “residual dispersant” in the 100% platelet layer. Given the familial relationship, citation during prosecution, and common subject matter, the district court’s treatment of the '027 patent as intrinsic

evidence² was consistent with our precedent. *See Wang Labs*, 197 F.3d at 1384; *Powell*, 663 F.3d at 1230–31.

We also find it persuasive that the patentees did not delete the definition of “100% platelet” from the ’027 patent specification and substantially copy the remaining language into the ’926 patent specification. Had they done so, one could reasonably infer that they intended to change the meaning of “100%” in the ’926 patent specification. But as the district court correctly observed, the “patentees wrote a new specification for the ’926 patent, drawing from the ’027 patent more in substance than in language.” *Claim Construction Order*, 2016 WL 158031, at *8. The patentees demonstrated in the ’926 patent the same understanding of 100% that we set forth here; it is relative to certain other materials in an embodiment where “platelets comprise 100% of the layer” while also comprising “residual dispersant.” The revised language of the ’926 patent omits only the clarification that the 100% platelet layer contains “no carrier material.” The ’027 patent explicitly clarified that a dispersant and a carrier are distinct.

The language in the ’926 patent specification is consistent with the understanding of the 100% platelet layer described in the ’027 patent specification. As such, there is no reason to infer that the patentees intended to change

² The dissent implies that statements in a parent patent’s specification may somehow have less relevance than “certain statements made during the *prosecution history*” for the claim construction of a child patent. Dissent Op. 9–10. The prosecution history of the parent patent, here the ’027 patent, however, encompasses its “first application papers” to the “issued patent,” including the specification. *Autogiro Co. of Am.*, 384 F.2d at 398. Thus, statements in the issued ’027 patent have no less relevance than other statements in its prosecution history in construing the claims of the child patent, here the ’926 patent.

the meaning of the term or that a person of ordinary skill in the art would understand “100%” differently in the context of the ’926 patent. Thus, the ’027 patent specification illuminates the meaning of “100% by weight” to a person of ordinary skill in the art, who would understand that the term is used in the same way in the ’926 patent, relative to carrier material, and that while the claimed “100% by weight” platelet refractory layer may comprise residual dispersant, “there is no carrier material.”

Next, we must consider the ’926 patent’s prosecution history to determine whether the patentees “limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be.” *Phillips*, 415 F.3d at 1317. Unifrax argues that the patentees disclaimed a refractory layer with any other material at all, including residual dispersants, to overcome the rejection based on *Tompkins*. DuPont does not dispute that the patentees disclaimed refractory layers comprising less than “100% by weight” platelets but contends that the disclaimer did not exclude refractory layers containing residual dispersant from the scope of the claim. J.A. 25. The question is whether, to get around *Tompkins*, the patentees’ disclaimer went so far as to also exclude embodiments with a refractory layer containing any non-carrier materials such as a residual dispersant. *See Chimie v. PPG Indus., Inc.*, 402 F.3d 1371, 1384 (Fed. Cir. 2005). It did not.

During prosecution of the application for the ’926 patent, DuPont argued that the *Tompkins* reference cited by the examiner disclosed a laminate with a 70% by weight platelet concentration secured to a fiber carrier (i.e., the “second layer”). J.A. 373; J.A. 525 col. 7 ll. 6–9; J.A. 528 col. 14 ll. 20–24. The patentees amended the claim language and explained that they had found a solution with a platelet concentration of 100% platelets, not requiring a carrier, while also clarifying that the refractory layer required “a defined areal weight and a *defined residual moisture content*.” J.A. 372–73 (emphasis added). The

patentees overcame the deficiency in Tompkins where more platelets made the refractory layer too brittle or too heavy. *Id.* In adding a platelet percentage term to the claim language to overcome the rejection based on the platelet percentage disclosed in Tompkins, the '926 patentees understood the claimed percentage as relative to carrier material in the same way that Tompkins used the term. That the '926 patent specification identifies Tompkins as one of only two references in the Background of the Invention section further suggests that the patentees had the same understanding of the platelet percentage terms. *See* '926 patent col. 1 l. 22. Thus, the patentees' amendment does not disclaim embodiments with a refractory layer containing moisture from "dispersant arising from incomplete drying of the platelet dispersion," i.e., non-carrier materials. *Id.* col. 3 ll. 21–26.

The dissent concludes that "100% by weight" permits residual moisture but no other ingredients (such as a dispersant). Dissent Op. 7. This conclusion contradicts the undisputed fact that the accused Unifrax vermiculite layer contains a dispersant, tetrasodium pyrophosphate ("TSPP"). Appellant Br. 15 n.2. ("The specific function of TSPP is to be a dispersant.") Unifrax has never contended the presence of TSPP avoids infringement, even under the plain meaning of "100% by weight." *See id.* at 46–47 (arguing instead that Combi-Film 3G11 does not infringe under the plain meaning of "100% by weight" because of the presence of an organosilicon material, polydimethylsiloxane); J.A. 6016 ("Q. Now, you mentioned that there are the two additives in the Unifrax vermiculite layer, TSPP and adhesive 480. Is there any dispute about what TSPP is? A. No, sir. Q. Okay. Is that a dispersant? A. It is a dispersant, sir."). Thus, Unifrax's own arguments oppose the dissent's conclusion.

Further, the history of this case and statements made by Unifrax during claim construction belie the dissent's assertions that "[t]here is no ambiguity in [the claim]

language” and “[t]here is perhaps no clearer or simpler way the patentee could have conveyed such a requirement.” Dissent Op. 2. At claim construction, Unifrax argued that the claim language was indefinite because “[n]othing in the specification or the claims informs one how the inorganic refractory layer may contain 100% by weight platelets and also include additional amounts of material to exceed 100% by weight . . . to accommodate some percentage of other content.” J.A. 797–98. Thus, Unifrax previously argued that the claim language contained unresolvable ambiguities, contrary to the dissent’s assertions.

We discern no error in the district court’s construction of “100% by weight” to mean “[t]here is no carrier material such as resin, adhesive, cloth, or paper in addition to the inorganic platelets. There may be some residual dispersant arising from incomplete drying of the platelet dispersion.”

II. Infringement

We review the jury’s infringement verdict for substantial evidence. *ACCO Brands*, 501 F.3d at 1311. An infringement analysis requires a comparison of the claims to the accused device. *Mas-Hamilton Grp. v. LaGard, Inc.*, 156 F.3d 1206, 1211 (Fed. Cir. 1998). For literal infringement, the patentee must prove that the accused product meets all the limitations of the asserted claims; if even one limitation is not met, there is no literal infringement. *Id.*

Unifrax argues that the district court erred in denying judgment of non-infringement as a matter of law because DuPont did not prove that Combi-Film 3G11 met the “platelets in an amount of 100% by weight” claim limitation by showing the absence of a carrier material such as an adhesive or resin in the refractory layer. Unifrax makes two alternative non-infringement arguments. First, Unifrax argues that the 5% polydimethylsiloxane (“PDMS”) in Combi-Film 3G11 functions as an adhesive. Second, Unifrax argues that silane—another material present in

Combi-Film 3G11—is a carrier material in the refractory layer.

Unifrax’s non-infringement arguments rely on the premises that the DEHESIVE 480 material (which is comprised of PDMS) used in Combi-Film 3G11 is a carrier, or alternatively, that silane is both included in the refractory layer and is a carrier. If either DEHESIVE 480 or silane constitutes a carrier present in the refractory layer, the accused Combi-Film 3G11 does not meet all the limitations of the asserted claims, and there is no literal infringement. *See Mas-Hamilton Grp.*, 156 F.3d at 1211. We must determine whether substantial evidence supports a jury finding that DEHESIVE 480 is not a carrier and that silane is either not in the refractory layer or is not a carrier.

A. DEHESIVE 480

We agree with the district court that substantial evidence supports the jury’s finding that DEHESIVE 480 is not a carrier. Unifrax’s expert, Dr. Nosker, testified that a carrier is something that helps the platelets stick together in the refractory layer. J.A. 6667. DuPont’s expert, Dr. Morgan, agreed. J.A. 6080–81. The question therefore is whether DEHESIVE 480 helps platelets stick together and thus, is a carrier.

Unifrax points to trial testimony in support of its assertion that silicones like PDMS can serve different functions in different applications and environments depending on how they are formulated, including functioning as an adhesive. The product data sheet from the manufacturer of DEHESIVE 480 refers to it repeatedly as a “release coating.” J.A. 8109–11. Dr. Haber, another Unifrax expert, admitted that the DEHESIVE 480 product data sheet states that it has *anti-adhesive* qualities. *E.g.*, J.A. 6882. Dr. Nosker also admitted that the PDMS in Microlite HTS-SE is sold as a dispersant, i.e., not a carrier or binder. J.A. 6640–41.

Both the DEHESIVE 480 product data sheet and DuPont's expert testimony show that a "crosslinker" could be added to DEHESIVE 480 to improve adhesion, which could make it then act as a "carrier." J.A. 8109–11; J.A. 6096–98. But it is undisputed that no crosslinker is added to the accused Unifrax products. Thus, the jury's conclusion that DEHESIVE 480 is not a carrier is supported by substantial evidence.

B. Silane

Substantial evidence also supports that silane is not in the refractory layer, and that silane is not a carrier. DuPont's expert testified that the vermiculite plates prevent silane from impregnating the refractory layer. J.A. 6036–37. In Unifrax's schematic of the accused product, Combi-Film 3G11 (shown above), silane is shown as a separate layer from the vermiculite layer. J.A. 8033. Another Unifrax document similarly shows silane separately from the vermiculite layer, referring to it as the "3g coating." J.A. 8102; *see* J.A. 8103. In an internal email, Unifrax's manager of the Combi-Film product team called silane an "overlay coating" and "not the binder." J.A. 6467–68; J.A. 8482. There was also testimony that silane is not added until after the vermiculite is dry, and thus, it would not be part of the refractory layer. Additionally, Unifrax's expert, Dr. Nosker, admitted that he had no direct evidence that silane impregnates the vermiculite layer. Accordingly, there was substantial evidence to support the jury's conclusion that silane was not part of the refractory layer.

DuPont's expert also testified that even if silane did impregnate the refractory layer, it would not be a carrier. J.A. 6036–37. This testimony is supported by the above-referenced email from Unifrax's Combi-Film team manager, stating that silane was "not the binder" in Combi-Film 3G11. Consistent with the manufacturer's product data sheet for silane, Unifrax's expert testified that it could

be used as an additive to improve binding between an organic binder and an inorganic binder. Unifrax's expert's argument that silane functioned as a binder or carrier in Combi-Film 3G11 assumed that the PDMS in DEHESIVE 480 was itself the organic binder. As discussed above, DuPont presented substantial evidence to support the jury's conclusion that the PDMS in Combi-Film 3G11 is not a binder. As such, we conclude that substantial evidence supports the jury's conclusion that silane is not a carrier in Combi-Film 3G11.

Accordingly, because the jury's infringement verdict is supported by legally sufficient evidence, we affirm the district court's denial of Unifrax's motion for judgment of non-infringement as a matter of law.

III. Invalidity

A. Mormont

We review the jury's verdict on anticipation for substantial evidence. *TI Grp. Auto. Sys*, 375 F.3d at 1133. Unifrax asserts that U.S. Patent Application Publication No. 2003/0170418 ("Mormont") anticipates the asserted claims of the '926 patent. To prove anticipation, Unifrax must show that Mormont teaches each limitation of the asserted claims. *See ClearValue, Inc. v. Pearl River Polymers, Inc.*, 668 F.3d 1340, 1344 (Fed. Cir. 2012). The dispute over anticipation by Mormont turns on whether, despite describing methyl silicone as a resin, Mormont discloses a silicon material in the refractory layer that is essentially the same as the PDMS in DEHESIVE 480 in the infringing Combi-Film 3G11 product.

Mormont discloses a fireproofing barrier laminate material for aircraft with a polymeric film, adhesive, and a "mica paper" layer. J.A. 8726–30. Unifrax points to Example 2 in the Mormont reference that discloses mica paper as a refractory layer consisting of platelets reinforced by a methyl silicone material such as the "resin Wacker K."

J.A. 8729. Wacker K (also referred to in the briefing and record as “Silres K”) is manufactured by Wacker, the same company that produces the DEHESIVE 480 material comprised of PDMS in Combi-Film 3G11. J.A. 8729. Unifrax argues that the methyl silicone in Wacker K is the same as the PDMS in DEHESIVE 480 in the refractory layer in Combi-Film 3G11. Unifrax points to its expert’s testimony detailing how Mormont disclosed each limitation of claim 1 of the ’926 patent. Unifrax asserts that DuPont failed to rebut that testimony by not putting up its own expert on anticipation by Mormont.

The Wacker K manufacturer’s product data sheet repeatedly refers to Wacker K as a “methyl silicon resin” and as an ideal “binder” with “high binding strength.” J.A. 8218. Unifrax’s expert opined that the methyl silicone in Mormont and the PDMS in Combi-Film 3G11 were the same, yet he also admitted that (1) there are different types of silicones that serve different functions; (2) that Wacker K serves as a resin in Mormont and is a different chemical than the DEHESIVE 480 in Combi-Film 3G11; and (3) Mormont requires 5% to 25% binder or resin. J.A. 6878–84. Unifrax’s expert also conceded that silicone can function as a release agent and that the Wacker data sheets distinguish between silicon release agents and silicone resins. In contrast to Wacker K, the product data sheet for DEHESIVE 480 refers to it as a release agent with anti-adhesive, i.e., non-binding, properties. Although DuPont did not call an expert to testify as to the differences between Mormont and the asserted claims, there was substantial documentary evidence and cross-examination testimony from Unifrax’s expert for the jury to conclude that the silicones in Combi-Film 3G11 and Mormont were distinct and that DEHESIVE 480 was not a resin or carrier. Thus, substantial evidence supports the jury verdict that Mormont does not anticipate the asserted claims of the ’926 patent.

B. Antedating 3G7

We review subsidiary factual findings related to priority, conception, and reduction to practice, including whether the evidence sufficiently corroborates inventor testimony, for substantial evidence. *See NFC Tech., LLC*, 871 F.3d at 1371; *Singh v. Brake*, 317 F.3d 1334, 1340 (Fed. Cir. 2003). Unifrax contends that its FyreWrap® Combi-Film 3G7 (“3G7”) product—a predecessor flame barrier product to Combi-Film 3G11—anticipates the asserted claims of the ’926 patent. DuPont does not dispute that 3G7 describes each limitation of claim 1 and was known and in public use on May 17, 2011, before the December 2011 filing date of the application that led to the ’926 patent. DuPont, however, argues that the inventors conceived of the invention of the ’926 patent and reduced it to practice prior to 3G7’s May 2011 public use date. The question is one of priority of invention. We consider whether DuPont presented substantial evidence to support the jury’s implicit finding that the asserted claims of the ’926 patent antedated the public use of 3G7.

“[P]riority of invention ‘goes to the first party to reduce an invention to practice unless the other party can show that it was the first to conceive the invention and that it exercised reasonable diligence in later reducing that invention to practice.’” *Mahurkar*, 79 F.3d at 1577 (quoting *Price v. Symsek*, 988 F.2d 1187, 1190 (Fed. Cir. 1993)). Conception requires formation of a “definite and permanent idea of the complete and operative invention” in the mind of the inventor. *Id.* To establish an actual reduction to practice, as opposed to the constructive reduction to practice that occurs when a patent application is filed, “the inventor must prove that: (1) he constructed an embodiment or performed a process that met all the limitations [of the claim]; and (2) he determined that the invention would work for its intended purpose.” *Cooper*, 154 F.3d at 1327.

Dr. Richardson testified that he and Dr. Kawka—the named inventors of the '926 patent—conceived of a “laminated with this combination of a vermiculite layer, adhesive layer, and polymer film layer” in November or December 2009 while working at DuPont. J.A. 5675. Yet an inventor’s testimony alone is insufficient to prove conception; some corroborating evidence is required. *See Price*, 988 F.2d at 1194. An inventor’s testimony on conception can be corroborated through several pieces of evidence, even though no one piece of evidence independently proves conception, and even circumstantial evidence, so long as the evidence supports that the “inventor’s story is credible.” *NFC Tech*, 871 F.3d at 1372. “There is no particular formula” required for corroboration, and instead, a “rule of reason” analysis applies to the evaluation of all pertinent evidence. *Singh*, 317 F.3d at 1341. The same requirement for evidence that corroborates inventor testimony on conception also applies to the reduction to practice determination. *See Cooper*, 154 F.3d at 1330; *see also Holmwood v. Sugavanam*, 948 F.2d 1236, 1238–39 (Fed. Cir. 1991) (stating that the court must apply a “rule of reason” standard and evaluate all pertinent evidence “when weighing the credibility of an inventor’s story” as to reduction to practice).

In this case, the question of entitlement to a priority date before the May 2011 public use date for the '926 patent turns on whether DuPont offered corroborating evidence that, when considered in its totality and applying a “rule of reason” analysis, supports the credibility of Dr. Richardson and Dr. Kawka’s story of prior invention. *See NFC Tech*, 871 F.3d at 1372. We conclude that it does.

In 2008 and 2009, Dr. Richardson was working on developing a new refractory layer for composite laminates. J.A. 8276–77. Dr. Richardson’s work led to the '027 patent that disclosed a refractory layer comprised of vermiculite platelets, including MicroLite 963 and MicroLite HTS-XE. *See e.g.*, '027 patent col. 2 l. 50–col. 3 l. 6, col. 8 ll. 5–7. As

noted above, the '027 patent claims a polymeric film layer and an inorganic refractory layer but not the adhesive layer claimed by the '926 patent. It is against this backdrop that he began collaborating with Dr. Kawka on work that led to the '926 patent.

Emails from December 2009 reflect Dr. Richardson and Dr. Kawka discussing plans for a new three-layer DuPont composite film including a polymeric film layer, a vermiculite layer, and a new adhesive layer and their efforts to begin developing and testing the three-layer composite laminate. Testimony and evidence also showed that DuPont began developing and testing the three-layer laminate shortly thereafter, culminating in a successful burnthrough test at a Federal Aviation Administration ("FAA") facility in August 2010.

We next consider the specific testimony and record evidence as to each laminate layer and the claimed limitations in turn. As to the film layer, both inventors testified that the polymeric film layer capable of withstanding at least 200° C for 10 minutes claimed in the '926 patent was based on known attributes of materials, such as "PEEK" and "Tedlar," used by DuPont in 2009 and 2010. Product data sheets for those materials and documents showing the use of those materials in August 2010 FAA testing corroborated this testimony. Internal DuPont documents reflect that DuPont used PEEK in the August 2010 FAA testing.

As to the adhesive layer, Dr. Kawka testified that in 2009, he conceived of an adhesive layer between the polymeric film layer and refractory layer with the weight range of 2 to 40 gsm and an activation temperature range from 75 to 200° C and that such an adhesive layer was used in the August 2010 FAA testing. Documentary evidence, including a 2009 email sent by Dr. Kawka describing an adhesive layer with "0.3 osy," or approximately 10 gsm, corroborated Dr. Kawka's testimony. J.A. 8291. Other documentary evidence showed DuPont developed and tested

laminates with adhesive weights between 5 gsm and 30 gsm in 2010, including in the August 2010 FAA testing. Evidence also showed adhesive activation temperature ranges between 75 and 200° C, including a May 2010 email to a contractor disclosing an activation temperature of 200° C; another May 2010 email identifying activation temperatures across the entire claimed range; and a July 2010 email showing that the activation temperature for the adhesive to be used in the August 2010 FAA test was within the claimed range.

As to the refractory layer, Dr. Richardson testified that he began using 100% vermiculite films in the laminates in 2008 and successfully tested vermiculite dispersions of MicroLite 963 and MicroLite HTS-XE by 2009. Dr. Richardson also testified that he conceived of the weight range of 15 to 50 gsm for the inorganic refractory layer in 2009 and began trying to get the moisture content below 10%. Dr. Kawka testified that DuPont's vermiculite films had a residual moisture content of 3% to 5%.

Dr. Richardson's testimony about his work with MicroLite 963 and MicroLite HTS-XE was corroborated by documents related to his work on the '027 patent and a 2010 presentation that showed successful testing of a vermiculite refractory layer. Dr. Richardson's testimony regarding the claimed weight range was corroborated by DuPont emails, progress reports, and an internal presentation between October 2009 and February 2010 showing the development and testing of laminates with the refractory layer at various weights between 17 and 53 gsm. Evidence showed that the August 2010 FAA testing used a vermiculite layer of 37.2 gsm. An October 2009 progress report reflects that Dr. Richardson and Dr. Kawka were working together on a laminate with a refractory layer using vermiculite films with the claimed 10% or less residual moisture content.

Unifrax asserts that independent of the inventors' testimony, the documentary evidence does not disclose the conception or reduction to practice of the exact material attribute ranges (e.g., "a dry areal weight of 15 to 50 gsm") claimed in the '926 patent for the laminate components. But our case law does not require that evidence have a source independent of the inventors on every aspect of conception and reduction to practice; "such a standard is the antithesis of the rule of reason." *Cooper*, 154 F.3d at 1331 (quoting *Knorr v. Pearson*, 671 F.2d 1368, 1374 (CCPA 1982)). Here, the law requires only that the corroborative evidence, including circumstantial evidence, support the credibility of the inventors' story. *NFC Tech*, 871 F.3d at 1372.

Notably, Unifrax does not point to any evidence that contradicts or calls the credibility of the inventors' testimony into question. Applying the "rule of reason" analysis, we conclude that the corroborative evidence supports the credibility of Dr. Richardson and Dr. Kawka's story.

The documents from 2009 and 2010 related to the refractory layer support Dr. Richardson's testimony. For example, these documents show refractory layer weights between 17 and 53 gsm and support his testimony that he conceived of the claimed 15 to 50 gsm weight range in 2009, and at least before May 2011. Even though no single independent document precisely shows the entire claimed range, these documents sufficiently support the credibility of his account. *See Fleming v. Escort Inc.*, 774 F.3d 1371, 1377 (Fed. Cir. 2014) (finding sufficient corroboration although "none of the corroborating evidence constitute[d] definitive proof of [the inventor's] account or disclose[d] each claim limitation as written" because "the corroboration requirement has never been so demanding"). Documents also corroborated Dr. Kawka's testimony that the 37.2 gsm vermiculite layer used in the August 2010 FAA testing met the claimed limitations for the refractory layer. For each aspect of the claimed limitations, other corroborating

evidence similarly supported the credibility of the inventors' story of conception of the claimed ranges and reduction to practice of an embodiment meeting the limitations.

Under the "rule of reason" analysis, the evidence in its totality supports the jury's finding that the inventors' testimony was sufficiently corroborated. Therefore, substantial evidence supports the inventors' story of a conception date and reduction to practice before the May 17, 2011 public use date of 3G7, and, therefore, 3G7 is not anticipatory prior art.

Accordingly, because the jury's verdict of no-invalidity is supported by legally sufficient evidence, we affirm the district court's denial of Unifrax's motion for judgment of invalidity as a matter of law.

CONCLUSION

We have considered Unifrax's other arguments and find them unpersuasive. For the foregoing reasons, the decisions of the district court are affirmed.

AFFIRMED

COSTS

No costs.

United States Court of Appeals for the Federal Circuit

E.I. DUPONT DE NEMOURS & COMPANY,
Plaintiff-Appellee

v.

UNIFRAX I LLC,
Defendant-Appellant

2017-2575

Appeal from the United States District Court for the District of Delaware in No. 1:14-cv-01250-RGA, Judge Richard G. Andrews.

O'MALLEY, *Circuit Judge*, dissenting.

I respectfully dissent from the majority's ruling affirming the district court's denial of JMOL on noninfringement. That ruling is predicated on an erroneous construction of "100% by weight" that ignores the plain meaning of "100%" and introduces more ambiguity than it resolves. Because this construction led the jury down the wrong path en route to its infringement verdict, the construction should be vacated and the noninfringement JMOL ruling reversed.

I. THE '926 PATENT CLAIMS AND SPECIFICATION SUPPORT UNIFRAX'S PLAIN AND ORDINARY MEANING CONSTRUCTION

The '926 patent claims recite "an *inorganic* refractory layer" that "comprises *platelets in an amount of 100% by*

weight with a dry areal weight of 15 to 50 gsm and a residual moisture content of no greater than 10 percent by weight.” ’926 patent, col. 9, ll. 13–17 (emphases added).

There is no ambiguity in this language. The “platelets” must be present in the refractory layer “in an amount of 100% by weight.” The “100% by weight” language, coupled with the requirement that the platelets exist in an “*inorganic* refractory layer,” clearly contemplates that the platelets—i.e., inorganic material—constitute the entirety of the refractory layer.¹ That leaves no room for other organic additives. There is perhaps no clearer or simpler way the patentee could have conveyed such a requirement. See *Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (en banc) (“In some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words.”); *Takeda Pharm. Co. v. Zydus Pharm. USA, Inc.*, 743 F.3d 1359, 1363–64 (Fed. Cir. 2014) (“[T]here is no indication in the claim that 400 μm was intended to mean anything other than exactly 400 μm .”). In short, the claims “mean precisely what they say,” *Cent. Admixture Pharmacy Servs., Inc. v. Advanced Cardiac Sols., P.C.*, 482 F.3d 1347, 1355 (Fed. Cir. 2007), and we should construe them accordingly.

¹ Unifrax does not appear to dispute that “100% by weight” could encompass the presence of minor impurities. See *E.I. du Pont de Nemours & Co. v. Unifrax I LLC*, No. 14-1250-RGA, 2016 WL 158031, at *6 (D. Del. Jan. 13, 2006) (noting Unifrax’s argument that “the plain and ordinary meaning of ‘100%’ would not necessarily preclude the presence of impurities or ‘one particle of dust, [or] one drop-let of moisture, [or] one molecule of a residual dispersant”).

The majority finds ambiguity in “100%” because the claims allow the refractory layer to comprise “a residual moisture content of no greater than 10 percent by weight.” The majority suggests that, if one were to adopt the plain and ordinary meaning of “100% by weight,” the components of the refractory layer would add up to 110%. Majority Op. at 11 (“It would be nonsensical if the total percentage of components comprising the inorganic refractory layer exceeded 100%.”). But this purported ambiguity is easily resolved by viewing “residual moisture” in context. The claims refer to a “*dry* areal weight of 15 to 50 gsm,” which implies that the “100% by weight” requirement applies when the refractory layer is *dry*. The “residual moisture” language, by contrast, clarifies that there can be moisture present *after* the remaining steps of the manufacturing process are carried out. For example, the ’926 patent describes experiments in which the refractory layer is immersed in a cation-rich solution and then dried in an oven until the laminate contains “about 3% moisture content.” ’926 patent, col. 8, ll. 49–58 (“Once dried to about 3% moisture content, the cation treated material was removed from the oven.”).²

² Other portions of the specification confirm this understanding. For example, the specification states that the refractory layer can have “some residual dispersant *arising from incomplete drying* of the platelet dispersion during manufacture.” ’926 patent, col. 3, ll. 24–26 (emphasis added). The ’926 patent also states that “[v]ermiculite typically comprises by (*dry*) weight, on a theoretical oxide basis, about 38–46% SiO₂, about 16–24% MgO, about 11–16% Al₂O₃, about 8–13% Fe₂O₃ and the remainder generally oxides of K, Ca, Ti, Mn, Cr, Na, and Ba.” *Id.* at col. 3, ll. 40–44 (emphasis added). These passages imply that the refractory layer is a 100%-platelet composition dispersed in

Put simply, the claim language says that the refractory layer initially comprises a 100%-platelet composition and then it also allows the refractory layer to retain up to 10% “residual moisture” after drying. DuPont’s counsel conceded as much before the district court. *See* J.A. 819 at 63:13–64:25 (The Court: “[T]he ‘100% by weight of platelets,’ is that ‘100% by weight,’ itself, 15 to 50 gsm?” DuPont: “Yes. The dry aerial [sic] weight.” . . . The Court: “And that 10% by weight is relative to what?” DuPont: “To the total weight of the layer when it’s not dry. . . . [T]he dry weight would be without the water, and the residual moisture is with.”).

The majority also relies on a passage in the ’926 patent’s specification referring to “residual dispersant”:

Preferably at least 85% of the layer comprises platelets, more preferably at least 90% and most preferably at least 95%. In some embodiments, platelets comprise 100% of the layer. The refractory layer may comprise some residual dispersant arising from incomplete drying of the platelet dispersion during manufacture.

’926 patent, col. 3, ll. 21–26. But this passage does not justify a construction that deviates from the plain language of the claim. As an initial matter, the claims recite “residual moisture” and *not* “residual dispersant.” In any event, this passage *supports* Unifrax’s reading. It suggests that the refractory layer should contain source material comprised of 100% dry platelets dispersed in water using a “dispersant,” and that, “during manufacture,” the water is dried (and therefore evaporated). Some “residual dispersant” can remain in the layer—just as residual moisture can remain—if the layer is not completely dried. *Id.* (permitting

an aqueous solution and dried during the manufacturing process (leaving some residual moisture behind).

the refractory layer to contain residual dispersant “arising from incomplete drying”). But, critically, the “100% by weight” limitation focuses on the dried source material (i.e., the platelets), not on the residual dispersant.

The majority asserts that a construction excluding dispersants goes further than Unifrax requests. Majority Op. at 17. Our task, however, is to interpret the claims based on their plain language in view of the intrinsic and extrinsic record. *See, e.g., Exxon Chem. Patents, Inc. v. Lubrizol Corp.*, 64 F.3d 1553, 1556 (Fed. Cir. 1995) (“[T]he judge’s task is not to decide which of the adversaries is correct. Instead the judge must independently assess the claims, the specification, and if necessary the prosecution history, and relevant extrinsic evidence, and declare the meaning of the claims.”). Regardless, Unifrax argued that the ’926 patent claims, as amended, “claim[] embodiments where platelets comprise 100% of the dried layer.” Appellant’s Br. at 40; *see also* J.A. 779 (criticizing DuPont for shifting away from its earlier position that “its inorganic refractory layer requires 100% by weight platelets without qualification”). It is irrelevant that Unifrax took a different position at trial, where it could not challenge the district court’s construction. *Compare* Majority Op. at 17 (citing statements during trial), *with O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1359 (Fed. Cir. 2008) (“When the claim construction is resolved pre-trial, and the patentee presented the same position in the Markman proceeding as is now pressed, a further objection to the district court’s pre-trial ruling may indeed have been not only futile but unnecessary.”).

The majority also rests its construction on the fact that the ’926 patent mentions MicroLite HTS-XE as a “suitable material[].” Majority Op. at 12. But the datasheet published by the manufacturer of MicroLite—cited by the majority—distinguishes between “unformulated” and “formulated” dispersions. J.A. 7617. The former category includes products that “are 100% inorganic, consisting only

of vermiculite and water.” J.A. 7617. The latter, by contrast, includes products, such as MicroLite HTS-XE, with other “additives.” *Id.* That the claims recite the same language this manufacturer used to describe *unformulated* dispersions—100% inorganic—implies that DuPont claimed those dispersions and not formulated ones. This is particularly salient here because the “100% by weight” language was specifically added to overcome prior art.³ And so, while the original claims may have been broad enough to encompass a refractory layer made of MicroLite HTS-XE, the amended claims are not. *See, e.g., Elekta Instrument S.A. v. O.U.R. Sci. Int’l, Inc.*, 214 F.3d 1302, 1308 (Fed. Cir. 2000) (noting that “the unambiguous language of the amended claim controls over any contradictory language in the written description” even when this means the claims, as amended, no longer cover the “only embodiment disclosed in the specification”). Besides MicroLite HTS-XE, the majority acknowledges that “all twenty-four

³ Original claim 1 recited an “inorganic refractory layer” without limitation as to the layer’s composition. *See* J.A. 300. That claim was rejected over a prior art reference (Tompkins) that taught a refractory layer having platelets as the main component, up to 70% by weight. DuPont amended the claim by adding the “100% by weight” limitation at issue here. *See* J.A. 374. In so doing, DuPont distinguished Tompkins by noting that, while “Tompkins . . . directly require[s] a platelet concentration which is considerably less than 100%,” the amended claims recite a multilayer structure in which “the platelet concentration is 100%.” J.A. 373. At the very least, by distinguishing Tompkins based on its 70%-platelet concentration, DuPont disclaimed platelet concentrations considerably less than 100%. The majority’s contrary conclusion—that the refractory layer can include dispersants because it has a defined moisture content—simply repeats its misreading of the claim language. Majority Op. at 15.

[other] examples of the refractory layer . . . shown in the specification have 100% by weight inorganic platelets with no residual dispersant.” Majority Op. at 12.

For these reasons, I would conclude that a proper reading of “100% by weight” permits the refractory layer to contain residual moisture but no other ingredients.

II. THE '027 PARENT PATENT DOES NOT JUSTIFY A CONTRARY CONSTRUCTION

Rather than giving “100%” its plain and ordinary meaning, the majority concludes that “100% by weight” means 100% “relative to carrier material in the refractory layer.” *See, e.g.*, Majority Op. at 12. But the '926 patent does not mention “carrier material” and neither party proffered any expert testimony stating that a skilled artisan would read the patent as describing such material. Instead, this term comes from the specification of the '926 patent's *parent*—the '027 patent. The specification of *that* patent includes the following passage:

In one embodiment of this invention, the inorganic platelet layer contains *100% platelets i.e. there is no carrier material such as resin, adhesive, cloth or paper*. However, there may be some residual dispersant arising from incomplete drying of the platelet dispersion.

'027 patent, col. 2, ll. 32–36 (emphasis added). Both parties agree—and the district court found—that this passage does *not* rise to the level of lexicography. *See E.I. du Pont*, 2016 WL 158031, at *8 (“DuPont’s construction does not meet the exacting standards for finding lexicography.”); Appellee Br. 16 n.3 (DuPont agreeing that lexicography does not apply). Yet the district court’s construction imported this passage from the '027 patent into the '926 patent claims nearly verbatim. Majority Op. at 13 (“The district court’s construction of ‘100% by weight’ comes directly from language in the parent '027 patent . . .”). That is improper.

See Meds. Co. v. Mylan, Inc., 853 F.3d 1296, 1306 (Fed. Cir. 2017) (rejecting the patentee’s attempt to take a statement “verbatim” from the common specification where the statement “lacks the clear expression of intent necessary for a patentee to act as its own lexicographer”).

The majority treats the ’027 patent as persuasive, however, because the two patents purportedly share “common subject matter” and “[t]he patentees demonstrated in the ’926 patent the same understanding of 100%” that is reflected in the ’027 patent. Majority Op. at 15. But the ’926 patent is a continuation-*in-part* of the ’027 patent with a different specification. And the applicant chose to write this new specification without mentioning “carrier material” or incorporating the ’027 patent by reference, which underscores the impropriety of importing that limitation into the ’926 patent claims. *See, e.g., Trading Techs. Int’l, Inc. v. Open E Cry, LLC*, 728 F.3d 1309, 1323 (Fed. Cir. 2013) (distinguishing between a patent and its continuation-*in-part* parent for purposes of claim construction where the former “include[d] extensive disclosures that were not present” in the latter). It also indicates that the subject matter of these patents is not common in the only way that matters for interpreting these claims. The majority, thus, relies on a commonality that does not exist.

Worse still, the ’027 patent does not contain a claim limitation analogous to “100% by weight.” This difference implies that the ’027 patent and the ’926 patent claims were intended to have different scopes. The district court’s and the majority’s heavy reliance on the ’027 patent is therefore unjustified. *See Advanced Cardiovascular Sys., Inc. v. Medtronic, Inc.*, 265 F.3d 1294, 1305–06 (Fed. Cir. 2001) (refusing to consider prosecution history of related patent where there were “no common claim terms in dispute” across the patents); *ResQNet.com, Inc. v. Lansa, Inc.*, 346 F.3d 1374, 1382 (Fed. Cir. 2003) (“These similarities reflect the parentage of the ’608 patent, which is a continuation-*in-part* (CIP) of the ’961 patent. Although the

related patents are similar, their claims are not identical . . . This difference is significant. Therefore, this court interprets the claim anew, without regard to the interpretation of claim 1 of the '961 patent.”).

Of course, a parent patent is relevant to claim construction issues involving its continuation-in-part child and therefore ought to be considered for its probative value. *See, e.g., Jonsson v. Stanley Works*, 903 F.2d 812, 818 (Fed. Cir. 1990) (acknowledging it was “not disputed” that the two patents contained similar limitations); *Wang Labs., Inc. v. Am. Online, Inc.*, 197 F.3d 1377, 1383 (Fed. Cir. 1999) (concluding that the patents had common subject matter); *Ormco Corp. v. Align Tech., Inc.*, 498 F.3d 1307, 1314 (Fed. Cir. 2007) (noting that the specifications of the parent and child patents “have the same content”). But that value is limited where the two patents recite different claims based on different specifications using different words. To be sure, *Jonsson* and its progeny emphasized the value of certain statements made during the *prosecution history* of a parent patent. *See Jonsson*, 903 F.2d at 818 (discussing “arguments and remarks” offered during prosecution of the parent patent to distinguish it from the prior art); *Wang*, 197 F.3d at 1384 (considering arguments made “during the prosecution of the parent application” to distinguish the parent from a prior art reference); *Ormco*, 498 F.3d at 1314 (“When the application of prosecution disclaimer involves statements from prosecution of a familial patent relating to the same subject matter as the claim language at issue in the patent being construed, those statements in the familial application are relevant in construing the claims at issue.”). But, as noted above, the majority imports a limitation from the parent patent’s *specification* which was *removed* from the '926 patent.⁴ At the very

⁴ The parent patent’s specification is certainly part of the child’s prosecution history. But statements from the

least, it is improper to rely so heavily on a related patent's specification to drive the claim construction analysis of a different patent, as the district court and majority appear to have done here.

III. THE DISTRICT COURT'S CONSTRUCTION OF "100% BY WEIGHT" LED THE JURY ASTRAY

The district court's construction created confusion at trial and distracted the jury from its infringement inquiry because the construction shifted focus away from the *concentration of platelets* in the refractory layer. As a result, the jury was asked to determine whether certain non-platelet additives count as "carriers" or "dispersants," even though neither term is mentioned in the claims. And those terms were moving targets throughout the trial. For example, the jury received competing definitions—as well as permutations of similar definitions—from the parties. *See, e.g.*, J.A. 6080, 681:19–23 (DuPont's expert testified that "push[ing] materials apart or help[ing] them separate" is "*one of the things* [a dispersant] can do" (emphasis added)); J.A. 6081, 682:2–6 (DuPont's expert testified that a "[c]arrier can mean many things" and that "it's kind of a vague term").

This confusion led the jury to conclude, improperly, that Unifrax's 95%-platelet refractory layer satisfies the

parent patent's specification that fall short of lexicography do not have the same force as arguments about claim scope from the prosecution history. *See Ormco*, 498 F.3d at 1314 ("While all those statements by the inventors in the specification of the Ormco patents, standing alone, may not be conclusive in showing that the claims require completely automatic determination of final tooth positions, those in the prosecution history make it even clearer.").

claims' 100%-platelet requirement.⁵ But that defies the plain claim language, as well as common sense, and should not be permitted to stand. *See CytoLogix Corp. v. Ventana Med. Sys., Inc.*, 424 F.3d 1168, 1173 (Fed. Cir. 2005) (“[I]t appears that the conflicting expert views as to claim construction created confusion and may have led to a verdict of infringement with respect to the asserted claims of the '061 patent that was not supported by substantial evidence . . .”).

For these reasons, I would vacate the district court's construction of “100% by weight” and adopt instead the term's plain meaning—i.e., that the refractory layer must comprise a 100%-platelet composition when dry, and that, only after the remaining steps of the manufacturing process are completed may there be up to 10% of residual moisture remaining. Because DuPont does not dispute that

⁵ The district court “acknowledge[d] the possibility that [its] construction of ‘100% by weight’ may yield questions in the future regarding the meaning of other terms,” *E.I. du Pont*, 2016 WL 158031, at *10, but the court declined to subsequently construe those other terms. To be clear, there is nothing inherently wrong in this decision. District court judges are often faced with the difficult task of avoiding the “*O2 Micro* trap” that inevitably arises when ambiguous claims terms are left unconstrued, while simultaneously managing their patent cases to ensure efficient and orderly resolution and to deter belated claim construction proposals. *See Nobelbiz, Inc. v. Global Connect, L.L.C.*, 876 F.3d 1326, 1328–29 (Fed. Cir. 2017) (O'Malley, J., dissenting from the denial of en banc rehearing). We should generally defer to district court judges on such matters. *See id.* Here, however, the district court's construction created ambiguity where there should have been none. In such instances, district courts must be vigilant to resolve such ambiguities.

Unifrax's product does not infringe under that construction, I would reverse the district court's denial of JMOL as to noninfringement. *See Finisar Corp. v. DirecTV Grp., Inc.*, 523 F.3d 1323, 1333 (Fed. Cir. 2008) ("If no reasonable jury could have found infringement under the proper claim construction, this court may reverse a district court's denial of JMOL without remand.").