IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

CEREBRUM SENSOR TECHNOLOGIES, INC. and TIRE STICKERS LLC,	)	
Plaintiffs,	)	
v.	)	Civil Action No. 24-245-JLH-SRF
REVVO TECHNOLOGIES, INC.,	)	
Defendant.	)	

REPORT AND RECOMMENDATION

Pending before the court is the parties' claim construction dispute regarding thirteen disputed terms across three asserted patents: United States Patent Nos. 10,137,741 ("the '741 patent"), 11,124,027 ("the '027 patent"), and 11,835,421 ("the '421 patent;" collectively, the "Asserted Patents"). (D.I. 85; D.I. 86) The '741 and '027 patents are directed to a display assembly that may be permanently attached to a vehicle tire in the form of lettering, for example. (D.I. 84, Exs. C-D) The '421 patent discloses a tire sensor system designed to attach to the inner surface of a vehicle tire to monitor and report conditions such as tire location, tire wear, tread depth, and/or alignment. (*Id.*, Ex. E) Following a review of the parties' joint claim construction brief and associated materials (D.I. 151; D.I. 152), and after consideration of the arguments presented at the *Markman* hearing held on April 16, 2026, I recommend that the court construe the disputed terms as follows:

Terms	**Recommended Constructions**
"layer" ('741 patent, cls. 1-4, 6, 9-11, 15-17, and 19-20; '027 patent, cls. 1-4, 6, 9-11, 15, 18-22)	a single thickness of material disposed over a surface
"(an) outer layer" ('027 patent, cls. 1, 2, 4, 6, 11, 15, 19-23)	Indefinite

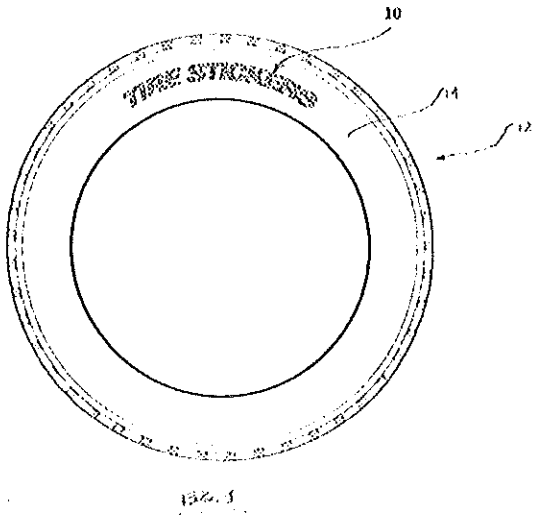
"(an) intermediate layer" ('741 patent, cls. 1, 2, 11, 19)	a "layer" or "layers" interposed between other "layers"
"vulcanized" / "vulcanized to[gether]" ('741 patent, cls. 1, 11, 19)	cross-linked to[gether], whether chemically, by heat, by pressure, or otherwise
"barrier material composition" / "material composition that acts as a barrier" ('027 patent, cls. 1, 11, 15, 19)	a material composition that blocks or is intended to block passage of materials within vulcanized rubber articles such as vulcanized rubber tires
"cavity" ('741 patent, cls. 7-9; '027 patent, cls. 7-9, 16-20)	a space for accommodating an element or object
"direct contact" ('741 patent, cls. 1, 11)	nothing interposed between two surfaces that are touching each other
"before attachment with the vulcanized rubber article" / "before attachment to the vulcanized rubber article" ('741 patent, cls. 1, 11, 19)	plain and ordinary meaning; no construction necessary
"(a) housing" ('421 patent, cls. 1, 28, 41)	a protective casing
"internal cavity" ('421 patent, cls. 1, 28, 41)	an open space inside of the housing
"enclosed" / "enclosed within the housing" ('421 patent, cl. 1)	surrounded on all sides by the housing
"unfilled open space" / "open space" ('421 patent, cls. 1, 31)	space without filling agents or materials
"surface feature[s]" ('421 patent, cls. 5, 28, 43)	structure[s] of a surface

I. BACKGROUND

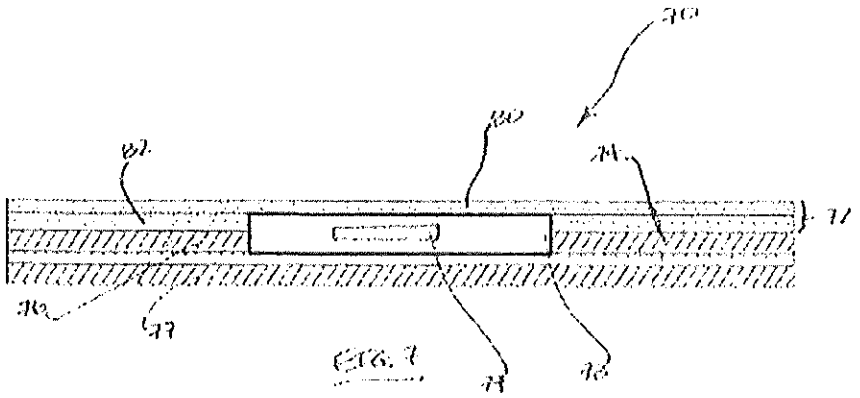
Plaintiffs Cerebrum Sensor Technologies, Inc. and Tire Stickers LLC (collectively, "Plaintiffs") brought this suit on February 23, 2024, alleging infringement of the Asserted Patents by Defendant Revvo Technologies, Inc.'s ("Defendant") tire sensor and wheel sensor products (the "Accused Products").[1] (D.I. 1 at ¶¶ 1-2, 25-26) The '741 and '027 patents, titled "Display Assemblies and Methods for Applying the Same to Vulcanized Rubber Articles," are directed to display assemblies and methods of applying those display assemblies to a vulcanized

1 The court refers to the Accused Products consistent with the way they are defined by Plaintiffs in the complaint. (D.I. 1 at ¶ 25)

rubber article, such as the sidewall surface of a tire. (*Id.* at ¶¶ 10-11; Exs. A-B) These display assemblies may take the form of multi-layered stickers attached to the tire sidewall for branding purposes, as shown at reference number 10 in Figure 1 of the '741 patent:

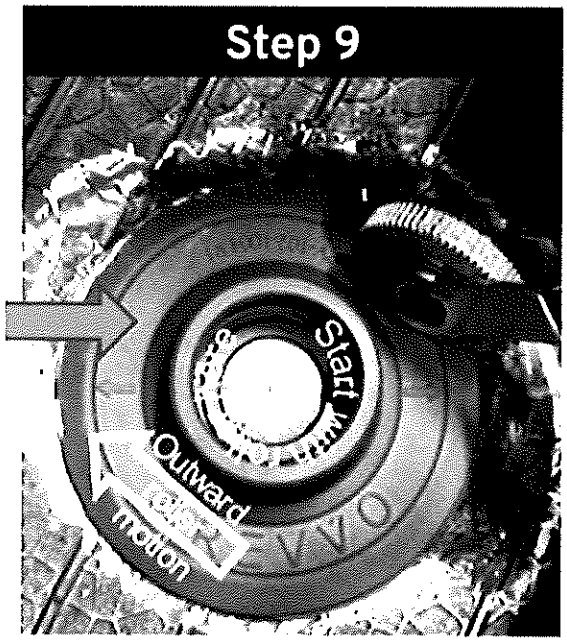


('741 patent, Fig. 1; col. 2:53-55, 4:17-5:52) The display assemblies may also include "a cavity 78 . . . for the purpose of accommodating placement of an element or object 79 therein[,]" as depicted in Figure 7 of the '741 patent:



(*Id.*, Fig. 7; col. 11:35-12:5) The claim chart for the '741 patent maps the claim elements to features of Defendant's tire sensor products depicting a tire sensor with a layer of adhesive backing that is attached to the tire with vulcanizing fluid:

Revvo's Products
(exemplary evidence – Exhibits G, H and K)



Apply Dock onto designated area with firm pressure, keeping arrows along the tire centerline. Use roller tool to apply even adhesion, starting from the center of the Dock and then moving to the outside in an outward fashion. Allow 1-2 minutes for Dock to bond.

(D.I. 1, Ex. D at 27)

The '421 patent, titled "Sensor Assemblies and Systems for Monitoring a Dynamic Object," discloses electrical sensor assemblies and systems configured to monitor and transmit data relating to the operating parameters and/or conditions of a tire. (D.I. 84, Ex. E) The sensor assemblies are designed to be contained within a housing and attached to the inner surface of a tire to monitor and report conditions such as tread depth, pressure, or alignment. ('421 patent, Abstract) Figure 3 of the '421 patent shows a sensor assembly with a housing that contains a recessed groove at reference number 44 for holding the sensor device at reference number 40:

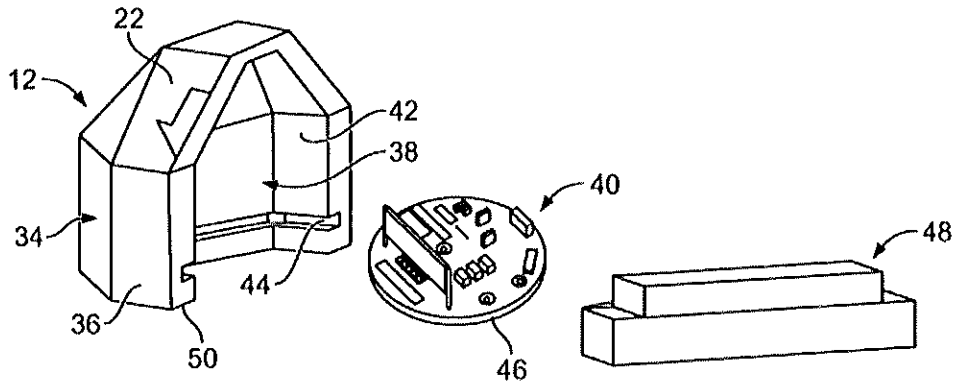


FIG. 3

(*Id.*, Fig. 3) Figure 10 depicts a sensor device at reference number 40 disposed within an internal cavity at reference number 38:

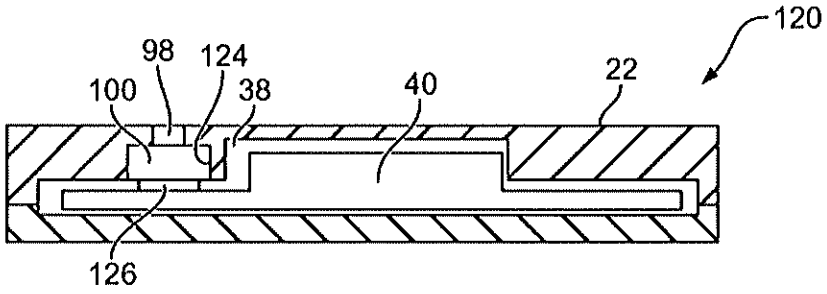
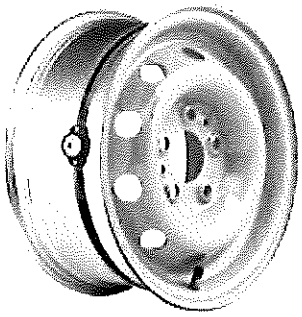


FIG. 10

(*Id.*, Fig. 10) For comparison, Plaintiffs' claim chart depicts Defendant's wheel sensor products, which can be mounted onto a wheel to "provide[ ] data for tire pressure, temperature, wheel security, position, predicted tread, and more."

Revvo's Products
(exemplary evidence – Exhibits G, H and K)



WHEEL

Revvo Wheel uses Revvo's PRO sensor and a modified case to fit on the wheel of any vehicle. This mounting option provides a one time installation of sensors on a vehicle and provides data for tire pressure, temperature, wheel security, position, predicted tread, and more. All data from Wheel sensors are sent to Revvo in vehicle gateways or vehicle telematics via BLE. Sensors are automatically detected and registered to vehicles, no need for additional hardware or apps to setup!

Exhibit G

(D.I. 1, Ex. F at 4)

II. LEGAL STANDARD

The purpose of the claim construction process is to "determin[e] the meaning and scope of the patent claims asserted to be infringed." *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995), *aff'd*, 517 U.S. 370, 388-90 (1996). Construing the claims of a patent presents a question of law, although subsidiary fact finding is sometimes necessary. *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 326 (2015) (citing *Markman*, 52 F.3d at 977-78). An actual dispute regarding the proper scope of a claim term must be resolved by a judge, as opposed to the jury. *Markman*, 52 F.3d at 979.

"[T]here is no magic formula or catechism for conducting claim construction." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1324 (Fed. Cir. 2005). Instead, the court may attach the appropriate weight to appropriate sources "in light of the statutes and policies that inform patent law." *Id.* The words of the claims "are generally given their ordinary and customary meaning," which is "the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Id.* at

1312-13 (internal citations and quotation marks omitted). If the meaning of a claim term is not readily apparent, the court considers sources including "the words of the claims themselves, the remainder of the specification, the prosecution history, and extrinsic evidence concerning relevant scientific principles, the meaning of technical terms, and the state of the art." *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004).

"It is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude." *Phillips*, 415 F.3d at 1312 (internal quotation marks omitted). Accordingly, "the claims themselves provide substantial guidance as to the meaning of particular claim terms." *Id.* at 1314. Claim terms are typically used consistently throughout the patent, and "usage of a term in one claim can often illuminate the meaning of the same term in other claims." *Id.*

The claims must be read in view of the specification, which "is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). "[T]he specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs." *Phillips*, 415 F.3d at 1316 (citing *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002)). The specification may also contain a disclaimer or disavowal of claim scope. *Id.* However, "[e]ven when the specification describes only a single embodiment, the claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction." *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir.

2004) (internal quotation marks omitted). The specification "is not a substitute for, nor can it be used to rewrite, the chosen claim language." *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004).

The court "should also consider the patent's prosecution history, if it is in evidence." *Markman*, 52 F.3d at 980. The prosecution history, which is "intrinsic evidence . . . consists of the complete record of the proceedings before the PTO and includes the prior art cited during the examination of the patent." *Phillips*, 415 F.3d at 1317. "[T]he prosecution history can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be." *Id.*

In some cases, courts "will need to look beyond the patent's intrinsic evidence and to consult extrinsic evidence in order to understand, for example, the background science or the meaning of a term in the relevant art during the relevant time period." *Teva*, 574 U.S. at 331. Extrinsic evidence "consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises." *Markman*, 52 F.3d at 980. Although extrinsic evidence "may be useful to the court," it is "less reliable" than intrinsic evidence, and its consideration "is unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence." *Phillips*, 415 F.3d at 1318-19. Where the intrinsic record unambiguously describes the scope of the patented invention, reliance on any extrinsic evidence is improper. *See Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1308 (Fed. Cir. 1999).

III. ANALYSIS

A. Term 1: "layer" ('741 patent, cls. 1-4, 6, 9-11, 15-17, 19-20; '027 patent, cls. 1-4, 6, 9-11, 15, 18-22)

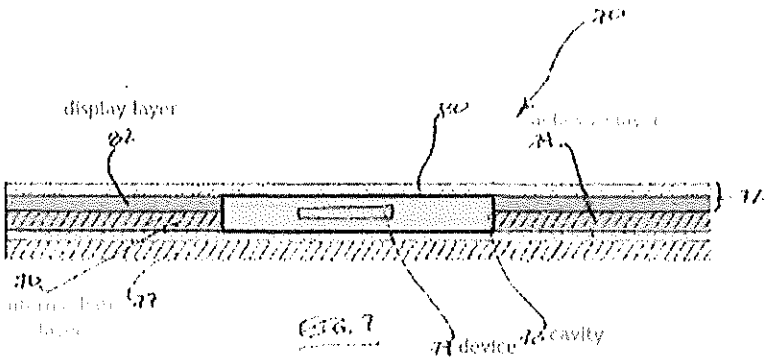
Plaintiffs' proposal	Defendant's proposal	Recommended construction
plain and ordinary meaning; no construction necessary to the extent construed: at least one material disposed over	a single thickness of separate and distinct material with a sheetlike structure	a single thickness of material disposed over a surface

I recommend that the court construe the term "layer" as "a single thickness of material disposed over a surface." This definition adopts aspects of each side's proposed construction and is supported by the intrinsic record. Defining the term "layer" as "a single thickness of material" is supported by the specification, which describes the display layer, the intermediate layer, the adhesive layer, and an optional protective layer as having a thickness within a specified range.[2] ('741 patent, cols. 6:4-8, 6:52-56, 7:41-44, 11:19-22) Although the disclosed ranges of thickness may accommodate different types of material and end-use applications for each type of layer, the specification contemplates that each specific layer has an "exact" uniform thickness. (*Id.*, cols. 6:49-52, 7:38-41, 9:24-28, 11:16-19)

Plaintiff contends that each specific layer may have variations in thickness because the patents include embodiments with cavities in certain layers to accommodate an object, and the specification describes display assemblies in the form of a letter or logo that may be

[2] There is no dispute that each type of layer is not required to have the same thickness. (D.I. 151 at 16-17, 20) For example, a display layer exhibiting "a thickness greater than about 0.01 mm, of from about 0.01 to 10 mm, 0.05 to 5 mm, 0.1 to 3 mm, and in a particular example about 0.4 mm" may have a different thickness than an intermediate layer with "a thickness greater than about 0.008 mm, from about 0.008 to 10 mm, about 0.01 to 5 mm, about 0.1 mm to 5 mm, and in a particular example of about 0.5 mm." ('741 patent, col. 6:4-8, 6:52-56)

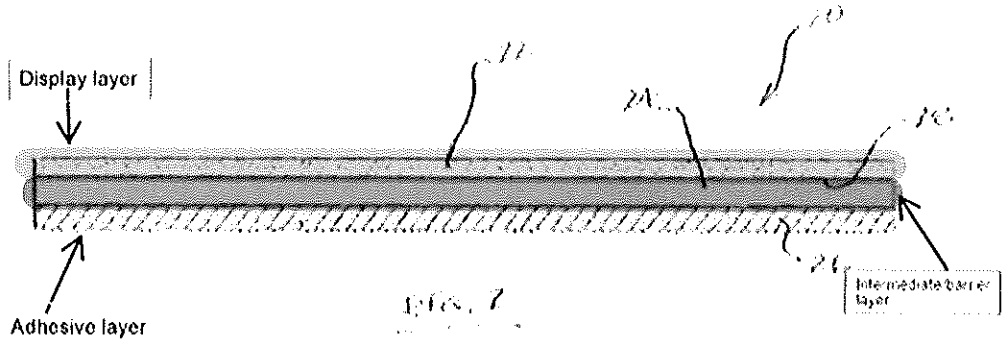
discontinuous. (D.I. 151 at 13) But the specification does not describe these cavities or gaps as part of the layer itself. Rather, it states that display assemblies "in the form of a letter, numeral, symbol, design, pattern, logo, insiginia, or the like . . . may be continuous or non-continuous in form[.]" ('741 patent, col. 4:38-40) Similarly, Figure 7 depicts individual layers having a consistent thickness around a cavity:



(D.I. 151 at 19) (citing '741 patent, Fig. 7). In this context, "[a]n ordinary artisan would understand that portions of a layer that are discontinuous are not part of the layer and have no thickness, rather than a very small thickness." (D.I. 152, JA167 at ¶ 58)

The '741 and '027 patents also describe each layer in terms of its location relative to the other layers and/or the vulcanized rubber article, consistent with construing each "layer" as being "disposed over a surface." For example, the specification states that the intermediate layer "is attached or adhered along an underside surface . . . of the display layer[,]" meaning that the display layer is disposed over the intermediate layer. ('741 patent, col. 6:9-11) Similarly, claim 1 of the '741 patent states that the "adhesive layer [is] in direct contact with an underside surface of the intermediate layer" and is bonded to the surface of the vulcanized rubber article. (*Id.*, cl. 1) These limitations establish that the intermediate layer is disposed over the adhesive layer, and the adhesive layer is disposed over the surface of the vulcanized rubber article. The Figures

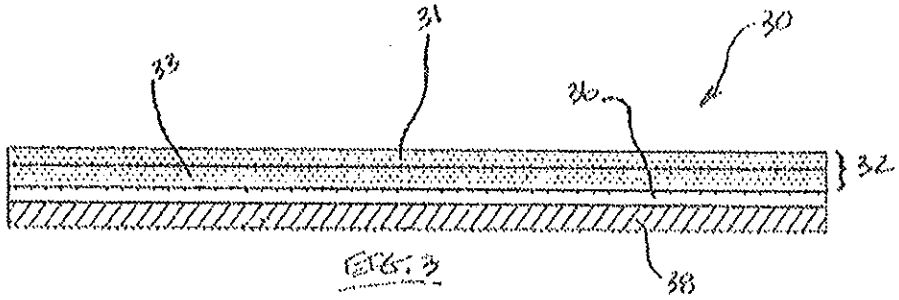
confirm that each layer is disposed over another layer or the surface of the vulcanized rubber article:



(D.I. 151 at 15) (citing '741 patent, Fig. 2). By specifying that each layer is "disposed over a surface," the recommended construction avoids the dangling preposition included in Plaintiffs' proposed construction.

Defendant's proposal to define each "layer" as a "separate and distinct material" lacks sufficient support in the intrinsic record. In one embodiment, "one or both of the display layer or the adhesive layer may be configured so as to include a barrier composition at the interface therebetween" to provide barrier properties without the need for three separate layers. ('741 patent, cols. 7:53-58, 8:38-42) The embodiment contemplates the inclusion of a single "barrier composition" in both the display and adhesive layers to avoid the need for a separate barrier or intermediate layer. Construing the term "layer" to require "separate and distinct materials" would be inconsistent with embodiments having different types of layers that share certain material compositions. *See Immunex Corp. v. Sanofi-Aventis U.S. LLC*, 977 F.3d 1212, 1220 (Fed. Cir. 2020) (articulating a "strong presumption against a claim construction that excludes a disclosed embodiment." (internal quotation marks and citations omitted)).

The specification and asserted claims also expressly contemplate a display assembly having one or more display layers which may be made of an elastomeric material such as "vulcanized rubber, natural rubber, SBR, nitrile rubber, neoprene rubber, rubber based or elastomeric ink having properties of aesthetic appeal of functional use, high elongation, UV and chemical resistance and abrasion resistance, and combinations thereof." ('741 patent, cols. 5:64-6:4) Figure 3 depicts an embodiment featuring two display layers:



(*Id.*, Fig. 3) The detailed description of the embodiment in Figure 3 states that "[t]he display layers 31 and 33 . . . may each be formed from the same types of respective materials described above for the earlier examples." (*Id.*, col. 8:27-30) Nothing in the claims or specification of the '741 patent precludes a display assembly having two or more display layers made of the same material.

Defendant's proposal to limit the term "layer" to one having a "sheetlike structure" also lacks intrinsic support. The "display assemblies" claimed in the '741 and '027 patents are decals "in the form of lettering and/or designs, for the purpose of adding features of aesthetic appearance, branding or the like" to the sidewall of a tire. ('741 patent, col. 1:20-25) Defendant contends that each letter has a "sheetlike" structure, regardless of whether the letter has holes, cavities, or gaps, but Defendant lacks any specific intrinsic support to include their proposed "sheetlike" limitation. (D.I. 151 at 18) The specification imposes no such limitation, and instead

broadly describes the claimed display assembly as "configured having a shape and size as desired for a particular end-use application." ('741 patent, col. 5:58-60); *see also Katana Silicon Techs. LLC v. Micron Tech., Inc.*, 2026 WL 1077444, at *3 (Fed. Cir. Apr. 21, 2026) (explaining that nothing in the claim language required the claimed "adhesion layer" to be a preformed solid sheet).

B. Term 2: "(an) outer layer" ('027 patent, cls. 1, 2, 4, 6, 11, 15, 19-23)

Plaintiffs' proposal	**Defendant's proposal**	**Recommended construction**
plain and ordinary meaning; no construction necessary to the extent construed: at least one layer that is outermost	Indefinite	Indefinite

Defendant argues that the term "(an) outer layer" is indefinite. Section 112 of Title 35 imposes a definiteness requirement on patent claims "to ensure that the claims are written in such a way that they give notice to the public of the extent of legal protection afforded by the patent, so that interested members of the public . . . can determine whether or not they infringe." *All Dental Prodx, LLC v. Advantage Dental Prod., Inc.*, 309 F.3d 774, 779-80 (Fed. Cir. 2002). A patent claim is indefinite if, "read in light of the specification delineating the patent, and the prosecution history, [it] fail[s] to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 901 (2014). Definiteness, like claim construction, should be assessed from the viewpoint of a person of ordinary skill in the art at the time the patent was filed, and it should be considered in view of the patent's specification and prosecution history. *Id.* at 908. A party seeking to prove indefiniteness must do so by clear and convincing evidence. *BASF Corp. v. Johnson Matthey Inc.*, 875 F.3d 1360, 1365 (Fed. Cir. 2017).

The term "outer layer" appears only in the claims of the '027 patent and is not used or defined in the specification. The independent claims recite "an outer layer of elastomeric material," implying that the outer layer is a single, outermost layer. ('027 patent, cls. 1, 11, 15, 19) Certain dependent claims contradict this understanding. Dependent claim 2 provides that the outer layer comprises two layers, one of which is underneath the other: "[T]he outer layer comprises a first layer and a second layer disposed beneath the first layer." (*Id.*, cl. 2) Dependent claim 6 further muddies the waters by reciting "a protective layer disposed over the outer layer and forming an outermost surface of the assembly[.]" (*Id.*, cl. 6) Plaintiffs do not persuasively explain how "(an) outer layer" can have its plain and ordinary meaning where, as here, the outer layer may be comprised of more than one layer and may be disposed under another "outermost" layer. *See Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 789 F.3d 1335, 1342 (Fed. Cir. 2015) ("The internal coherence and context assessment of the patent, and whether it conveys claim meaning with reasonable certainty, are questions of law.").

Plaintiffs contend that their proposed construction of "(an) outer layer" as "at least one layer that is outermost" is supported by the specification, which describes an "outermost" aesthetic or display layer. (D.I. 151 at 26, 29-30 (citing '027 patent at cols. 2:20-22, 2:60-61, 3:1-2, 3:10-11, 3:19-20, 3:29-30)) As described above, however, dependent claim 6 of the '027 patent distinguishes between the "outer layer" and a separate "protective layer" that covers the outer layer and "form[s] an outermost surface." ('027 patent, cl. 6) This distinction is consistent with the prosecution history. In a preliminary amendment made before examination began, the applicant replaced the term "one or more display layers" with the challenged "outer layer" term. (D.I. 152, Ex. 16 at JA 327-28) The applicant's substitution further demonstrates that the claimed "outer layer" is not equivalent to the protective layer forming the "outermost surface."

Consistent with dependent claim 6 and the original claim language, the specification describes "a transparent protective layer [which] may be disposed over the one or more display layers, forming an outermost surface of the display assembly." (*Id.*, col. 2:20-22) The "one or more display layers" referenced in the specification mirrors the language originally used in the challenged claims prior to the applicant's preliminary amendment, confirming that the claimed "outer layer" is not the same as the "protective layer" forming the outermost surface in this example. (D.I. 152, Ex. 16 at JA 327-28) Although the "outer layer" may be the outermost aesthetic display layer in some embodiments, as depicted in Figure 2, Figure 6 shows the outer display layer(s) at reference number 64 covered by a protective over-laminate layer at reference number 62:

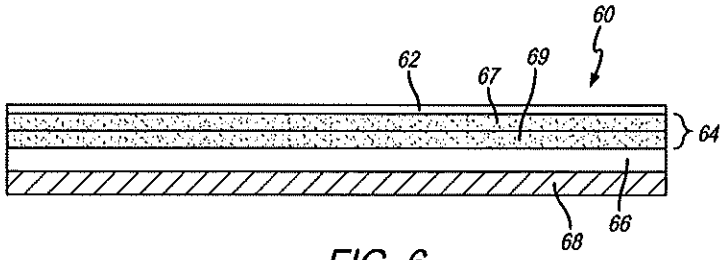


FIG. 6

('027 patent, Fig. 6; *compare id.*, col. 2:58-64, *with* cols. 3:35-42, 10:59-11:3) Plaintiffs' attempt to draw a distinction between an "outermost layer" in their proposed construction and the "outermost surface" in the specification fails because the specification makes clear that the outermost surface is a layer. (*Id.*, col. 2:20-22)

Defendant's expert opines that no objective boundaries can be placed around the term "outer layer" because the claims contemplate an outer layer having multiple layers and outer layers disposed underneath another outermost layer. (D.I. 152, Ex. 6 at JA 173-74, ¶¶ 75-77) As a result, the term "outer layer" could encompass multiple layers and/or layers underneath of other layers. (*Id.*, Ex. 6 at JA 174, ¶¶ 78-79) Plaintiffs suggest that the "outer layer" is

ascertainable because it must have a visual feature, but Plaintiffs' proposed construction includes no such requirement.

In sum, a person of ordinary skill could not reasonably ascertain which layer(s) of the claimed display assembly constitute an "outer layer." An "outer layer" that has multiple layers or is disposed under another layer lacks objective boundaries. Because Defendant has met its burden to show by clear and convincing evidence that "(an) outer layer" is indefinite, I recommend that claims 1, 2, 4, 6, 11, 15, and 19 to 23 be invalidated under 35 U.S.C. § 112(b).

C. Term 3: "(an) intermediate layer" ('741 patent, cls. 1, 2, 11, 19)

Plaintiffs' proposal	**Defendant's proposal**	**Recommended construction**
plain and ordinary meaning; no construction necessary to the extent construed: at least one layer between other materials	a "layer" or "layers" interposed between other "layers" Indefinite	a "layer" or "layers" interposed between other "layers"

The parties dispute whether the "intermediate layer" must be between other separate and distinct "layers," or whether it may be between other "materials." (D.I. 151 at 32-34) The specification supports Defendant's proposal that the "intermediate layer" refers to a layer between other layers. ('741 patent, cols. 3:21-22, 5:56-57, 8:53-54, 9:62-66, 10:5-6, 10:23-28, 10:43-56) For example, Figure 7 of the '741 patent discloses an embodiment having two intermediate layers disposed between other layers. (*Id.*, col. 11:23-30) Plaintiffs do not cite any embodiments describing an intermediate layer disposed between a non-layer material.

D. Term 4: "vulcanized" / "vulcanized to[gether]" ('741 patent, cls. 1, 11, 19)

Plaintiffs' proposal	Defendant's proposal	Recommended construction
cross-linked to[gether], whether chemically, by heat, by pressure, or otherwise	"vulcanized": rubber material(s) that has (have) been cured by a heat and/or chemical vulcanization process that forms a network of permanent and irreversible crosslinks that is essentially insoluble in any solvent and is no longer processable "vulcanized together/to": two rubber materials that have been cured [together/to each other] by a heat and/or chemical vulcanization process that forms a network of permanent and irreversible crosslinks between them that is essentially insoluble in any solvent and no longer processable Otherwise, indefinite	cross-linked to[gether], whether chemically, by heat, by pressure, or otherwise

I recommend that the court construe the term "vulcanized" / "vulcanized to[gether]" as "cross-linked to[gether], whether chemically, by heat, by pressure, or otherwise," consistent with Plaintiffs' proposed construction. This construction is consistent with the specification, which describes subjecting the display layers and the intermediate layer "to vulcanizing conditions of elevated temperature and/or pressure" to form the display assembly. ('741 patent, cols. 7:48-49, 8:46-47, 9:34-37, 10:44-47) Defendant's argument that pressure cannot constitute a vulcanizing condition in isolation is inconsistent with the embodiments disclosed at Figures 2, 3, and 4, which state that vulcanization may occur through heat and/or pressure. (*Id.*)

Defendant also proposes construing "vulcanized" to require the formation of "permanent and irreversible" crosslinks. In support, Defendant refers to the embodiments disclosed at Figures 2 and 5, which describe the bond between the display layer and the intermediate or

barrier layer as a permanent bond. (D.I. 151 at 37) (citing '741 patent, cols. 2:58-62, 3:27-30)) Primarily, however, Defendant relies on its expert's declarations to support the inclusion of these limitations. (*Id.* at 36-37) On this record, the court declines to import the limitation from the specification into the claims. *See IQRIS Techs. LLC v. Point Blank Enters., Inc.*, 130 F.4th 998, 1003-04 (Fed. Cir. 2025) (acknowledging the "fine line between reading the claims in light of the specification and importing limitations from the specification into the claims").

Defendant does not cite intrinsic evidence supporting its proposal to limit the term "vulcanized to[gether]" to crosslinks which are "essentially insoluble in any solvent and . . . no longer processable." Defendant discusses these proposed limitations together with its discussion of the bond as "permanent," suggesting some level of redundancy. (D.I. 151 at 37) Defendant also uses equivocal language to support these limitations, arguing that "vulcanized materials cannot *readily* be dissolved using any *standard* solvent" and describing the network of crosslinks as "*essentially* insoluble." (*Id.*) (emphasis added). Including these limitations in the construction will not clarify the meaning and scope of the term in light of the stated purpose of the invention, which is to form decals for attachment to a vehicle tire. ('741 patent, col. 1:20-56)

E. Term 5: "barrier material composition" / "material composition that acts as a barrier" ('027 patent, cls. 1, 11, 15, 19)

Plaintiffs' proposal	Defendant's proposal	Recommended construction
material composition that has properties of shock absorbance, elastomeric expansion and/or contraction	a material composition that blocks or is intended to block passage of discoloring chemicals, particularly antioxidants, within vulcanized rubber articles such as vulcanized rubber tires	a material composition that blocks or is intended to block passage of materials within vulcanized rubber articles such as vulcanized rubber tires

I recommend that the court adopt a modified version of Defendant's proposed construction and construe the term "barrier material composition" / "material composition that acts as a barrier" to mean "a material composition that blocks or is intended to block passage of materials within vulcanized rubber articles such as vulcanized rubber tires." This construction is consistent with the claim language, the specification, and the prosecution history.

The express language of claims 11, 15, and 19 supports Defendant's position that the primary purpose of the barrier material composition is "to mitigate migration of material from the vulcanized rubber article." ('027 patent, cls. 11, 15, 19) The specification further explains that this barrier layer should be "formed from a material capable of acting as a barrier to minimize or prevent the migration of any unwanted constituents of the adhesive layer 26 and/or the vulcanized rubber article [that] may otherwise operate to damage or degrade the design image and/or feature provided by the display layer 22." (*Id.*, col. 6:33-39) During prosecution of the '027 patent, the applicant amended the independent claims "to recite the feature that the outer layer of the assembly comprises a barrier material composition (to mitigate the unwanted migration of material from the vulcanized rubber article or tire)." (D.I. 152, Ex. 17 at JA 346) This amendment was made to overcome a prior art rejection under 35 U.S.C. § 102 based on a prior art reference that did not disclose a composition capable of mitigating the migration of contaminants. (*Id.*)

Plaintiffs rely on claim differentiation to counter Defendant's proposed construction, noting that independent claim 1 recites a "barrier material composition," while dependent claim 5 specifies that the barrier material composition of claim 1 "impairs migration of a material constituent within the assembly when the assembly is attached to a vulcanized rubber article." (D.I. 151 at 42 (citing '027 patent, cl. 5)). Although the doctrine of claim differentiation

provides that "two claims of a patent are presumptively different in scope[,]" it "only creates a presumption that each claim in a patent has a different scope; it is not a hard and fast rule of construction." *Kraft Foods, Inc. v. Int'l Trading Co.*, 203 F.3d 1362, 1366 (Fed. Cir. 2000) (internal citations and quotation marks omitted). "Different terms or phrases in separate claims may be construed to cover the same subject matter where the written description and prosecution history indicate that such a reading of the terms or phrases is proper." *Nystrom v. TREX Co., Inc.*, 424 F.3d 1136, 1143 (Fed. Cir. 2005). Here, the written description and the prosecution history confirm that the patentee included the "barrier material composition" term to convey that this composition mitigates the migration of material from the vulcanized rubber article. ('027 patent, col. 6:33-39; D.I. 152, Ex. 17 at JA 346)

Plaintiffs' proposed construction is taken from one example in the specification: "In an example, the intermediate or barrier layer 24 is formed from a material capable of providing properties of shock absorbance, elastomeric expansion and/or contraction properties compatible with the vulcanized rubber article[.]" ('027 patent, col. 6:19-23) Plaintiffs' proposal does not account for the other barrier layer properties listed in the ensuing paragraph: "It is also desired that the intermediate or barrier layer 24 be formed from a material capable of acting as a barrier to minimize or prevent the migration of any unwanted constituents of the adhesive layer 26 and/or the vulcanized rubber article may otherwise operate to damage or degrade the design image and/or feature provided by the display layer 22." (*Id.*, col. 6:33-39) Unlike Defendant's proposed construction, the limitations in Plaintiffs' proposed construction are not referenced in the claim language or the prosecution history. Moreover, Defendant's expert opines that the shock absorbance and elastomeric expansion and contraction properties included in Plaintiffs'

proposal are inherent properties of any elastomeric material, and their inclusion offers no additional clarification of the term. (D.I. 152, Ex. 6 at JA 87-88, ¶ 115)

I recommend that the court modify Defendant's proposed construction to omit the requirement that the mitigation is aimed at "discoloring chemicals, particularly antioxidants[.]" Nothing in the claim language or specification limits the term to blocking discoloring chemicals or antioxidants. Defendant relies on extrinsic evidence to support the inclusion of this limitation, arguing that a person of ordinary skill would understand that the unwanted constituents being blocked from a vulcanized rubber article would be discoloring chemicals. (D.I. 151 at 43; D.I. 152, Ex. 6 at JA 186-87, ¶ 113) In the absence of intrinsic evidence to support the inclusion of this limitation, I recommend that the court construe the term as a composition that blocks or is intended to block the passage of "materials" within vulcanized rubber articles.

F. Term 6: "cavity" ('741 patent, cls. 7-9; '027 patent, cls. 7-9, 16-20)

Plaintiffs' proposal	**Defendant's proposal**	**Recommended construction**
a space for accommodating an element or object	a hole or hollow space	a space for accommodating an element or object

I recommend that the court construe "cavity" as "a space for accommodating an element or object," consistent with Plaintiffs' proposed construction. This construction is consistent with the specification, which describes embodiments that include a cavity in the display assembly "for the purpose of accommodating placement of an element or object 79 therein." ('741 patent, col. 11:35-38; *see also id.*, col. 11:45-59) During his deposition, Defendant's expert could not identify any examples or embodiments in the specification that describe another purpose for the cavity. (D.I. 152, Ex. 10 at JA 262, 112:11-113:25)

The focus of the parties' dispute is on whether the cavity is intended to accommodate an element or object. (D.I. 151 at 47-49) Defendant argues there is no requirement that an object or

element be disposed within the cavity because claim 7 of the '741 patent requires the existence of a cavity, whereas claim 8 specifies that "an element [is] disposed within the cavity." (D.I. 151 at 47, 49) (citing '741 patent, cls. 7-8). But Plaintiffs' proposed construction imposes no such requirement. By defining the cavity as "a space for accommodating an element or object," Plaintiffs' construction clarifies that the cavity must be capable of accommodating an element or object without requiring the actual placement of an element or object in the cavity.

During the *Markman* hearing, Defendant argued that the claimed display assemblies may take the form of lettering that has cavities not intended to accommodate an object, such as the space within the letter "D." (4/16/2026 Tr.) But the specification does not describe the spaces inherent in lettering as "cavities." Instead, the claimed cavity is described in the specification as a space specifically designed to accommodate an object. (*See, e.g.*, '741 patent, col. 12:6-25) According to the specification, the purpose of the cavity is to "accommodat[e] placement of an element or object . . . therein[,]" consistent with Plaintiffs' proposed construction. (*Id.*, col. 11:28-30, 11:35-38)

G. Term 7: "direct contact" ('741 patent, cls. 1, 11)

Plaintiffs' proposal	**Defendant's proposal**	**Recommended construction**
plain and ordinary meaning; no construction necessary to the extent construed: bonded to	nothing interposed between two surfaces that are touching each other	nothing interposed between two surfaces that are touching each other

I recommend that the court construe "direct contact" to mean "nothing interposed between two surfaces that are touching each other," consistent with Defendant's proposed construction. This construction is consistent with the intrinsic record and the understanding of

an ordinary artisan that "direct contact" indicates two surfaces touching each other with nothing interposed between them. (D.I. 152, Ex. 6 at JA 191, ¶ 128)

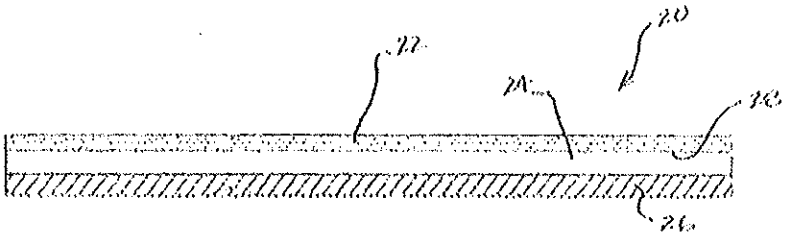
The term "direct contact" is not referenced in the specification and appears only in the claims of the '741 patent. Claim 11 is particularly instructive because it uses the term "contact" in a manner that distinguishes its meaning from the term "direct contact," consistent with Defendant's proposed construction. When describing how the display assembly is attached to the surface of a vulcanized rubber article, claim 11 recites "applying an adhesive material to form an adhesive layer; placing a display assembly into contact with the surface [of the vulcanized rubber article] with the adhesive layer interposed therebetween to form a bond between the display assembly and surface[.]" ('741 patent, cl. 11) Thus, "contact" may occur between two surfaces even when an adhesive layer is interposed between them. In contrast, "direct contact" occurs between the underside surface of the intermediate layer and the adhesive layer, with nothing interposed between those two layers. (*Id.*)

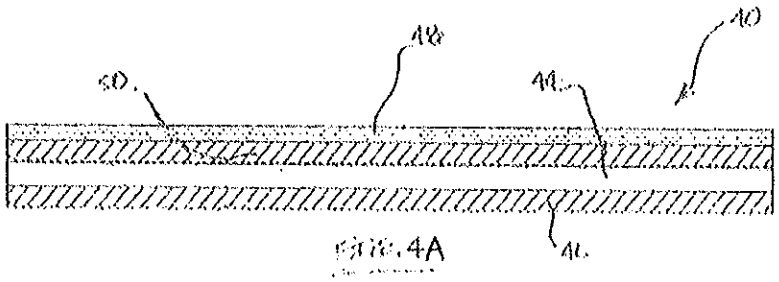
Claim 1 recites an intermediate layer "in direct contact with at least [one] of the one or more display layers, and wherein the one or more display layers and the intermediate layer are vulcanized together[.]" ('741 patent, cl. 1) This limitation includes two requirements: (1) the intermediate and one or more display layers must be in direct contact with each other; and (2) the intermediate and one or more display layers must be vulcanized together. As discussed at Section III.D, *supra*, vulcanization is a form of bonding. Plaintiffs' proposal to construe "direct contact" as "bonded to" would therefore conflate the two requirements recited in claim 1.

Plaintiffs cite an embodiment where the display layer(s) and barrier layer are "vulcanized and bonded" together with "a permanent adhesive layer" interposed between the display and barrier layers. ('741 patent, col. 3:45-49) According to Plaintiffs, this embodiment is consistent

with the recitation in claim 1 of an intermediate layer that is both in direct contact with and vulcanized together with one or more display layers. However, the embodiment disclosed at Figure 7 does not describe the contact between the display and barrier layers as "direct contact." In contrast, the embodiment at Figure 2 describes a display layer and an intermediate barrier layer bonded together through vulcanizing conditions such as elevated temperature and/or pressure, without disclosing any layer or substance interposed between the display layer and the intermediate barrier layer, indicating that those layers are in direct contact with each other. (*Id.*, col. 7:46-49)

The distinction between "direct contact" and bonding is further illustrated by the Figures:





('741 patent, Figs. 2, 4A) Figure 2 depicts the display layer (22) and intermediate layer (24) directly contacting each other at the underside surface (28) of the display layer, with nothing interposed between those layers. (*Id.*, col. 6:9-11) In contrast, an intermediate adhesive layer (50) is interposed between the display layer (48) and the intermediate barrier layer (44) in Figure 4A, such that the display layer and the intermediate barrier layer are not in direct contact. (*Id.*,

col. 8:55-63) Both of these examples describe bonding, but direct contact between the display layer and the intermediate layer only occurs in Figure 2. (*Id.*, cols. 6:9-30, 9:8-11)

The prosecution history further supports Defendant's proposed construction. The patentee amended claims 1 and 11 by adding the "direct contact" language to overcome a prior art rejection. (D.I. 84, Ex. F at 3, 5, 9) The prior art reference included a "compatibilizing layer" disposed between a barrier layer and an adhesive layer. (*Id.*, Ex. F at 9) The applicants explained that the claim amendment was intended "to clarify that no such compatibilizing layer exists in its display assembly, rather the barrier layer of the display assembly is chemically bonded to the vulcanized rubber article." (*Id.*)

H. Term 8: "before attachment with the vulcanized rubber article" / "before attachment to the vulcanized rubber article" ('741 patent, cls. 1, 11, 19)

Plaintiffs' proposal	**Defendant's proposal**	**Recommended construction**
plain and ordinary meaning; no construction necessary Claims 1 and 19 do not recite this term as a method step	Claims 1 and 19 recite this term as a method step within apparatus claims, thereby rendering the claims indefinite	plain and ordinary meaning; no construction necessary

I recommend that the court construe the term "before attachment with the vulcanized rubber article" / "before attachment to the vulcanized rubber article" in accordance with its plain and ordinary meaning, consistent with Plaintiffs' proposal. Defendant contends that the asserted claims are indefinite because the "before attachment" term imports a temporal requirement for the vulcanization process, and there is no way to determine when vulcanization occurs. (4/16/2026 Tr. at 91:6-92:4) Defendant's position that the asserted claims recite the term as a method step within an apparatus claim is not persuasive. The term is not an action or a method step, and attachment to the tire is not required by the challenged claim term. The cases cited by Defendant in support of its indefiniteness argument focus on actions performed by a user. *See*

IPXL Holdings, L.L.C. v. Amazon.com, Inc., 430 F.3d 1377, 1384 (Fed. Cir. 2005) (invalidating as indefinite a claim reciting an apparatus in which "the user uses the input means to change the predicted transaction information"); *UltimatePointer, L.L.C. v. Nintendo Co., Ltd.*, 816 F.3d 816, 826 (Fed. Cir. 2016) (explaining that a single claim covering both an apparatus and a method of use is invalid because it is unclear whether infringement occurs when the system is created or when the user actually uses the system). The asserted claims of the '741 patent do not fit neatly into this framework based on user action.

In *MasterMine Software, Inc. v. Microsoft Corp.*, the Federal Circuit held that references to user selection did not render a claim indefinite because the patent did not "explicitly claim the user's act of selection, but rather, claim the system's capability to receive and respond to user selection." 874 F.3d 1307, 1316 (Fed. Cir. 2017). Similarly, the asserted claims of the '741 patent describe a capability of the display assembly to the extent that the layers of the display assembly are vulcanized together before the assembly is attached to a tire. Defendant contends that the term is nonetheless indefinite because it is unclear when the layers become sufficiently vulcanized to permit attachment to the tire. (D.I. 151 at 55) But the specification and expert testimony suggest that a person of ordinary skill would be able to determine when the layers of the display assembly are sufficiently vulcanized.

The specification of the '741 patent contemplates allowing the display assembly to cure for a predetermined amount of time. ('741 patent, col. 14:55-63) Although this excerpt does not describe the "before attachment" limitation and instead refers to a curing period after the display assembly is attached to the tire, it nonetheless supports Plaintiffs' position that a person of ordinary skill would consider vulcanization to be a scientifically discernable event. Expert testimony also confirms that a person of ordinary skill would understand when the vulcanization

process is complete even after accounting for different levels of vulcanization required for different applications. (D.I. 152, Ex. 4 at JA 78, ¶ 21; Ex. 10 at JA 267, 136:19-137:7) The fact that vulcanization is discernable to a person of ordinary skill distinguishes this case from *Halliburton Energy Services, Inc. v. M-I LLC*, 514 F.3d 1244, 1254-55 (Fed. Cir. 2008). In assessing the term "fragile gel," the Federal Circuit in *Halliburton* accepted the plaintiff's position that a person of ordinary skill would know how to perform the requisite measurements and tests but determined that uncertainty remained regarding which fluids were "fragile gels" as the term was used in the claims. *Id.* at 1255. Here, the evidence supports Plaintiffs' position that a person of ordinary skill would know how to measure vulcanization. The fact that "the same display assembly could be 'infringing' or 'not infringing' depending on when attachment occurs" does not render the term indefinite under these circumstances. (D.I. 151 at 55)

I. Term 9: "(a) housing" ('421 patent, cls. 1, 28, 41)

Plaintiffs' proposal	**Defendant's proposal**	**Recommended construction**
plain and ordinary meaning; no construction necessary to the extent construed: a protective cover	a protective casing that surrounds the sensor device and constructed to provide an "internal cavity" and does not use or require the use of any coating or filling agents or materials to fix and retain the placement position of the electrical sensor device therein[3]	a protective casing

[3] Defendant initially proposed construing this term as "a protective casing that surrounds the sensor device and is constructed to provide an 'internal cavity' that is configured with surface features that mechanically fix and retain the placement position of the sensor device and does not use or require the use of filling agents or materials to fix and retain the placement position of the electrical sensor device therein." (D.I. 151 at 57) Defendant has since withdrawn the portion of the proposed construction requiring the housing to be "configured with surface features that mechanically fix and retain the placement position of the sensor device." (4/16/2026 Tr. at 105:24-106:5)

I recommend that the court adopt a modified version of Plaintiffs' proposal and construe the term "(a) housing" to mean "a protective casing." The parties agree that the housing is intended to be protective, and this characteristic is supported by the specification. ('421 patent, col. 13:34-52) They dispute whether the housing must "surround" the sensor device and whether the housing precludes "coating or filling agents or materials."

Defendant contends that the housing should be defined to surround the sensor device on all sides, including the bottom, consistent with the language of independent claims 1, 28, and 41 of the '421 patent. (D.I. 151 at 61) Independent claim 1 provides that the housing is comprised of an outer surface and an internal cavity "that is enclosed within the housing." ('421 patent, col. 30:23-24) Similarly, independent claims 28 and 41 describe the housing as "an outer structure that defines [the] internal cavity[.]" ('421 patent, cols. 32:27-28, 34:8-9) In this manner, the independent claims themselves make clear that the housing must surround the internal cavity, and including Defendant's proposal to define "housing" as "surround[ing] the sensor device" would be redundant of other limitations in the independent claims. The parties also agree that defining the housing as a protective "casing" "reflects Defendant's position that the claimed 'housing' surrounds or 'encases' the electrical sensor device within." (D.I. 151 at 62; 4/16/2026 Tr. at 98:11-18)

The specification also supports Defendant's position that the housing encloses the internal cavity, explaining that the housing "is specially configured to include an internal cavity to retain the electrical sensor device . . . and to provide a protective surrounding to the electrical sensor device." ('421 patent, col. 10:56-59; *see also id.* at 6:15-16, 6:53-54, 11:60-63) Plaintiffs allege that the housing need not surround or enclose the internal cavity because the independent claims of the '421 patent do not recite a bottom or base section. (D.I. 151 at 57-58) But the

specification and claims contemplate two primary means of forming the housing. In one, a top cover, a wall structure, and a base or bottom section are joined together. ('421 patent, cols. 4:8-9; 30:44-50) In the other, the housing "may be formed as a one-piece construction around the electrical sensor device 40 by injection molding process or the like." (*Id.*, col. 12:49-51; 31:1-6 (describing only "a wall structure that surrounds the internal cavity")). The latter formation still surrounds the internal cavity even though it may not have a defined top and bottom section.

Plaintiffs also contend that the housing need not enclose the internal cavity on all sides because certain embodiments contemplate a small opening in the top cover to provide air flow. This argument is not persuasive. As depicted in Figure 1, the small opening at reference number 98 would not be needed for the stated purpose of "enabl[ing] air outside of the housing to reach the internal cavity" if the housing did not enclose and surround the internal cavity:

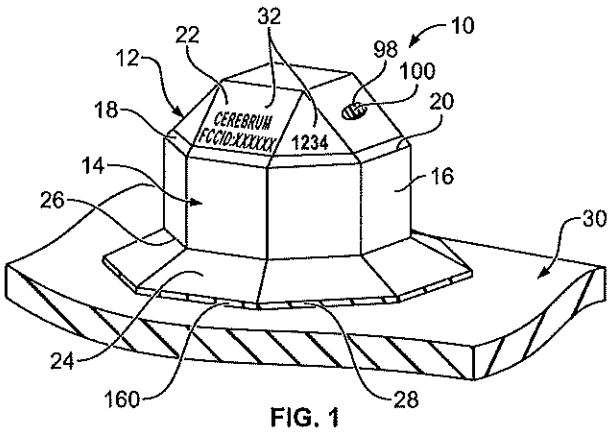


FIG. 1

('421 patent, Fig. 1 & col. 14:25-28)

Plaintiffs argue that the housing is a protective "cover" rather than a protective "casing," as proposed by Defendant, because the specification does not use the word "casing" or "case." (D.I. 151 at 57) But defining the housing as a protective "cover" presents its own problems. The specification of the '421 patent uses the word "cover" to describe the "top cover" of the housing, in contrast to the "wall structure" and/or "base section" or "bottom section" of the housing in

certain embodiments. (*See, e.g.*, '421 patent, cols. 4:5-13, 10:13-24, 10:47-55, 11:34-38, 12:51-54) Because the specification describes the entire housing as the protective component, rather than only the top cover, the court construes the term "housing" as "a protective casing" to avoid confusion with the distinct elements of the housing in certain disclosed embodiments.

The parties' next dispute is whether the claimed housing must be defined in a manner that precludes the use of any coating or filling agents or materials to fix and retain the placement position of the electrical sensor device in the internal cavity. (D.I. 151 at 61) Defendant's proposed limitation on filling agents is narrower than the asserted claims of the '421 patent. Claim 1 provides that the electrical sensor device is "attached therein to prevent movement of the device within the internal cavity" without specifying how the sensor device is attached. ('421 patent, col. 30:25-27) Claim 1 describes "an unfilled open space above or below the electrical sensor device in the housing," confirming that filling agents or materials cannot be used to completely fill the internal cavity. (*Id.*, col. 30:28-30) But nothing in the claim language bars the use of any amount of filling agent or other material to attach the electrical sensor device to the housing.

Defendant focuses on a portion of the specification distinguishing the invention from the prior art technique of fixing an electrical sensor device by "fill[ing] the internal cavity with a coating material such as a neutral silicone or the like for purposes of retaining placement position." ('421 patent, col. 13:58-60) This portion of the specification, which describes the embodiment disclosed at Figure 9 of the '421 patent, states that the claimed sensor assemblies "do not use or require the use of any such coating or filling agents or materials for any fixturing of the electrical sensor device 40 within the internal cavity 38." (*Id.*, col. 13:62-64) The same is true of Figures 6 and 7, which provide that the internal cavity is "configured in a manner to

fixedly retain and house the electrical sensor device 40 therein without the need for filling agents or materials." (*Id.*, col. 12:41-45)

However, other recited embodiments do not support Defendant's position that the '421 patent prohibits the use of coating or filling agents to fix the electrical sensor device in place within the internal cavity of the housing. For example, the specification recites one embodiment in which "the electrical sensor device is mechanically attached within the internal cavity by one or more surface features," consistent with Defendant's construction, before describing another embodiment in which the sensor device is "encapsulated by the inner cavity of the housing during a process of making the housing that operates to retain the position of the electrical sensor device within the housing." ('421 patent, col. 4:20-29) The latter embodiment places no limits on the material used to form the housing and, as Plaintiffs note, the housing itself may be made of injection molded coatings or filling agents. (D.I. 151 at 59; *see* D.I. 152, Ex. 5 at JA 112-13, ¶ 43)

According to Defendant, the patentee disclaimed the use of fillers to fixture the sensor assembly in the specification by describing "[a] feature of the sensor assembly housings 12 as disclosed herein," indicating that it refers to all sensor assembly housings. (D.I. 151 at 72) (citing '421 patent, col. 13:52-53). In support, Defendant cites *SciMed Life Systems v. Advanced Cardiovascular System*, 242 F.3d 1337, 1344 (Fed. Cir. 2001). But in *SciMed*, the Federal Circuit determined that the patentee disclaimed scope in the specification by using the words "all embodiments of the present invention," which were "broad and unequivocal." *Id.* Here, neither the specification nor any embodiment includes words of manifest restriction. *See Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1372 (Fed. Cir. 2014) (noting that disclaimer applies when the patentee makes statements such as "all embodiments of the present invention are..." or

"the present invention requires...," or the specification indicates that a feature of a preferred embodiment is a "very important feature").

Defendant also points to the prosecution history to support its position that the use of coating or filling agents to fix and retain the placement position of the sensor device within the internal cavity would be inconsistent with the key features of the claimed invention. (D.I. 151 at 65) Defendant focuses this argument on a May 22, 2023 response to a non-final office action distinguishing independent claim 41 from a prior art reference, Saito, which features a resin-filled housing to protect the sensor components. (D.I. 152, Ex. 12 at JA 295) The applicant stressed that claim 41 of the '421 patent features an opening extending from the outer surface of the housing to the internal cavity, the purpose of which is to provide air flow communication between the external environment and the sensor device. (*Id.*; '421 patent, col. 14:17-21) According to the applicant, this opening would not serve its intended purpose if the internal cavity were filled with resin, which would block air flow between the external environment and the sensor device. (D.I. 152, Ex. 12 at JA 295)

The applicant also stated that the combination of Saito with another reference that disclosed an open space in the housing's internal cavity "would result in a bizarre situation where any unfilled open space in . . . Saito would be contrary to the purpose and intent of Saito and thus frustrate the purpose of Saito's sensor construction that is intentionally filled with resin to protect the sensor components[.]" (*Id.*, Ex. 12 at JA 294) Defendant contends that this statement shows the applicant believed any combination of the resin-filled housing in Saito with surface features would frustrate the purpose of Saito. (4/16/2026 Tr. at 109:1-8) But the quoted language from the prosecution history does not address surface features at all. Instead, the applicant explained that the other reference, Brusarosco, disclosed "features admittedly not

disclosed in Saito such as display features or indicia on the housing outer surface and the existence of an open space in the housing internal cavity above and/or below the electrical sensor device." (D.I. 152, Ex. 12 at JA 294) This excerpt does not suggest that Brusarosco disclosed surface features designed to mechanically fix the sensor device within the housing. The focus of the applicant's statements was on Saito's requirement that the housing must be completely filled with resin to protect the sensor components. (*Id.*)

In sum, the applicant's statements during prosecution do not establish that Defendant's proposed construction is correct. *See Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1324 (Fed. Cir. 2003) (declining to apply the doctrine of prosecution disclaimer when statements made during prosecution were "far to slender a reed to support the judicial narrowing of a clear claim term[.]"). These statements confirm that the internal cavity cannot be entirely filled with resin, but they do not unambiguously disclaim the use of a filling agent, or a combination of filling agents and surface features, to fix and retain the placement of the position of the electrical sensor device in the housing.

J. Term 10: "internal cavity" ('421 patent, cls. 1, 28, 41)

Plaintiffs' proposal	**Defendant's proposal**	**Recommended construction**
plain and ordinary meaning; no construction necessary to the extent construed: an open space inside of the housing	Indefinite If construed: a hollow or "open space" surrounded by and inside (but not included as part of) the housing	an open space inside of the housing

I recommend that the court construe "internal cavity" as "an open space inside of the housing," consistent with Plaintiffs' proposed construction. Plaintiffs' proposal finds support in the specification of the '421 patent, which describes disposing an electrical sensor device "within the housing internal cavity." ('421 patent, cols. 4:14-15, 6:49-51, 8:62-64) Plaintiffs' proposal

gives meaning to the word "internal" by referring to the "inside of the housing." Defendant's suggestion that the internal cavity is "not included as part of" the housing is inconsistent with the cited portions of the specification and is contradicted by the description of Figure 3, which explains that "[t]he housing 12 includes an internal cavity 38 that is disposed within the top cover 22 and wall structure 34 and that is specially configured to accommodate placement of one or more electrical sensor device 40 therein." (*Id.*, col. 10:17-21) For the reasons described at Section III.I, *supra*, Defendant's proposal to define the internal cavity as "surrounded by" the housing is redundant because the claim language confirms that the internal cavity is enclosed or surrounded by the housing.

K. Term 11: "enclosed/enclosed within the housing" ('421 patent, cl. 1)

Plaintiffs' proposal	**Defendant's proposal**	**Recommended construction**
Plain and ordinary meaning; no construction necessary To the extent construed: surrounded within the housing	"enclosed": surrounded on all sides "enclosed within the housing": surrounded on all sides by the "housing"	surrounded on all sides by the housing

I recommend that the court construe the term "enclosed / enclosed within the housing" to mean "surrounded on all sides by the housing," consistent with Defendant's proposed construction. This construction is consistent with the analysis at § III.I-J, *supra*, as well as the specification, which consistently describes the internal cavity as being "enclosed within the housing." ('421 patent, cols. 4:5-7, 6:50-51)

L. Term 12: "unfilled open space" / "open space" ('421 patent, cls. 1, 31)

Plaintiffs' proposal	Defendant's proposal	Recommended construction
space without filling agents or materials	"unfilled open space": Indefinite "open space" – plain and ordinary meaning; no construction necessary; to the extent construed: an empty space	space without filling agents or materials

I recommend that the court construe "unfilled open space / open space" to mean "space without filling agents or materials" consistent with Plaintiffs' proposed construction. This definition is consistent with the specification, which describes an open space above and/or below the sensor device within the internal cavity after the sensor device is placed in the housing. ('421 patent, col. 4:20-25) In this particular embodiment, the electrical sensor device is secured by surface features that mechanically attach the device within the internal cavity. (*Id.*) The specification contrasts this embodiment with another example in which the sensor device "may be encapsulated by the inner cavity of the housing during a process of making the housing that operates to retain the position of the electrical sensor device within the housing." (*Id.*, col. 4:25-29) The specification does not describe the presence of an unfilled open space in this latter example.

The prosecution history further supports Plaintiffs' proposed construction by showing that claim 1 was amended to include the term "unfilled open space" to overcome a rejection under 35 U.S.C. § 102 based on the Saito prior art reference. (D.I. 152 at JA 292-93) The applicant explained that Saito disclosed sensor components encapsulated within a housing structure by a resin filling agent for protection. (*Id.* at JA 293) By amending claim 1 of the '421 patent to include an unfilled open space above or below the electrical sensor device in the internal cavity, the applicant distinguished the invention from the prior art reference. (*Id.*) The

amendment was made specifically to overcome a reference that exclusively used a filling agent to secure the claimed sensor components within the housing.

Defendant proposes construing the challenged claim term to mean "an empty space." This proposed construction is inconsistent with the embodiment depicted at Figure 10, which illustrates a housing with an opening to permit external air to reach the electrical sensor device within the internal cavity. ('421 patent, col. 14:41-47; Fig. 10) Although the internal cavity includes open space to permit the air flow, the cavity also "includes a moisture barrier 100 disposed therein" and thus is not entirely empty. (*Id.*, col. 14:48-49)

M. Term 13: "surface feature[s]" ('421 patent, claims 5, 28, and 43)

Plaintiffs' proposal	**Defendant's proposal**	**Recommended construction**
structure[s] on or of a surface	feature(s) of a surface.	structure[s] of a surface

I recommend that the court construe "surface feature[s]" to mean "structure[s] of a surface," representing a hybrid of each side's proposed construction. During the claim construction hearing, both sides represented that they were amenable to this construction. (4/16/2026 Tr. at 134:9-135:24) The specification explains that surface features may be grooves, slots, ribs, tabs, or other configurations that attach the electrical sensor device within the internal cavity of the housing to prevent it from moving. ('421 patent, col. 10:24-46)

IV. CONCLUSION

For the reasons set forth above, I recommend that the court construe the disputed terms as follows:

Terms	**Recommended Constructions**
"layer" ('741 patent, cls. 1-4, 6, 9-11, 15-17, and 19-20; '027 patent, cls. 1-4, 6, 9-11, 15, 18-22)	a single thickness of material disposed over a surface

"(an) outer layer" ('027 patent, cls. 1, 2, 4, 6, 11, 15, 19-23)	Indefinite
"(an) intermediate layer" ('741 patent, cls. 1, 2, 11, 19)	a "layer" or "layers" interposed between other "layers"
"vulcanized" / "vulcanized to[gether]" ('741 patent, cls. 1, 11, 19)	cross-linked to[gether], whether chemically, by heat, by pressure, or otherwise
"barrier material composition" / "material composition that acts as a barrier" ('027 patent, cls. 1, 11, 15, 19)	a material composition that blocks or is intended to block passage of materials within vulcanized rubber articles such as vulcanized rubber tires
"cavity" ('741 patent, cls. 7-9; '027 patent, cls. 7-9, 16-20)	a space for accommodating an element or object
"direct contact" ('741 patent, cls. 1, 11)	nothing interposed between two surfaces that are touching each other
"before attachment with the vulcanized rubber article" / "before attachment to the vulcanized rubber article" ('741 patent, cls. 1, 11, 19)	plain and ordinary meaning; no construction necessary
"(a) housing" ('421 patent, cls. 1, 28, 41)	a protective casing
"internal cavity" ('421 patent, cls. 1, 28, 41)	an open space inside of the housing
"enclosed" / "enclosed within the housing" ('421 patent, cl. 1)	surrounded on all sides by the housing
"unfilled open space" / "open space" ('421 patent, cls. 1, 31)	space without filling agents or materials
"surface feature[s]" ('421 patent, cls. 5, 28, 43)	structure[s] of a surface

This Report and Recommendation is filed pursuant to 28 U.S.C. § 636(b)(1)(B), Fed. R. Civ. P. 72(b)(1), and D. Del. LR 72.1. The parties may serve and file specific written objections within fourteen (14) days after being served with a copy of this Report and Recommendation. Fed. R. Civ. P. 72(b)(2). The objections and responses to the objections are limited to ten (10) pages each. The failure of a party to object to legal conclusions may result in the loss of the right to de novo review in the District Court. *See Sincavage v. Barnhart*, 171 F. App'x 924, 925 n.1 (3d Cir. 2006); *Henderson v. Carlson*, 812 F.2d 874, 878-79 (3d Cir. 1987).

The parties are directed to the court's Standing Order For Objections Filed Under Fed. R. Civ. P. 72, dated March 7, 2022, a copy of which is available on the court's website, http://www.ded.uscourts.gov.

Dated: May 22, 2026

Sherry R. Fallon
UNITED STATES MAGISTRATE JUDGE