

UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

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| MAQUET CARDIOVASCULAR LLC, |) | |
| |) | |
| Plaintiff/Counterdefendant, |) | |
| |) | Civil Action No. |
| v. |) | 17-12311-FDS |
| |) | |
| ABIOMED, INC., ABIOMED R&D, INC., |) | |
| and ABIOMED EUROPE GMBH, |) | |
| |) | |
| Defendants/Counterclaimants |) | |
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**MEMORANDUM AND ORDER ON ABIOMED’S
MOTIONS FOR SUMMARY JUDGMENT**

SAYLOR, J.

This is an action for patent infringement. It is the second lawsuit between the parties concerning a line of intravascular blood pumps. *See Abiomed, Inc. v. Maquet Cardiovascular LLC*, No. 16-cv-10914-FDS (D. Mass.) (“*Abiomed I*”). In this case, plaintiff Maquet Cardiovascular LLC has sued defendants Abiomed, Inc., Abiomed R&D, Inc., and Abiomed Europe GmbH for infringing U.S. Patent No. 10,238,783 (filed Sept. 21, 2018) (“the ’783 patent”). Defendants (collectively, “Abiomed”) have counterclaimed for declaratory judgment of noninfringement.

Abiomed has moved for summary judgment of invalidity of claim 2 for lack of written description as well as partial summary judgment of no infringement under the doctrine of equivalents. For the following reasons, the Court will deny the motions.

I. Legal Standard

The role of summary judgment is “to pierce the pleadings and to assess the proof in order

to see whether there is a genuine need for trial.” *Mesnick v. General Elec. Co.*, 950 F.2d 816, 822 (1st Cir. 1991) (quoting *Garside v. Osco Drug, Inc.*, 895 F.2d 46, 50 (1st Cir. 1990)).

Summary judgment shall be granted when “there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law.” Fed. R. Civ. P. 56(a). A genuine issue is “one that must be decided at trial because the evidence, viewed in the light most flattering to the nonmovant, would permit a rational factfinder to resolve the issue in favor of either party.” *Medina-Munoz v. R.J. Reynolds Tobacco Co.*, 896 F.2d 5, 8 (1st Cir. 1990) (citation modified). In evaluating a summary judgment motion, the court indulges all reasonable inferences in favor of the nonmoving party. *See O’Connor v. Steeves*, 994 F.2d 905, 907 (1st Cir. 1993). When “a properly supported motion for summary judgment is made, the adverse party must set forth specific facts showing that there is a genuine issue for trial.” *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 250 (1986) (citation modified). The nonmoving party may not simply “rest upon mere allegation or denials of his pleading,” but instead must “present affirmative evidence.” *Id.* at 256-57.

Because “[a] patent shall be presumed valid,” 35 U.S.C. § 282, a defendant arguing invalidity must prove that defense by clear and convincing evidence. *Microsoft Corp. v. i4i Ltd. P’ship*, 564 U.S. 91, 95 (2011). That heightened burden applies even at the summary judgment stage. *See Anderson*, 477 U.S. at 254 (“[I]n ruling on a motion for summary judgment, the judge must view the evidence presented through the prism of the substantive evidentiary burden.”).

II. Abiomed’s Motion for Summary Judgment of Invalidity of Claim 2 for Lack of Written Description (Dkt. No. 427)

On October 3, 2025, Abiomed moved for summary judgment of invalidity of claim 2 for lack of written description. (Dkt. No. 427). On December 8, 2025, Maquet informed the Court that it is no longer asserting claim 2. (Dkt. No. 533). The Court will therefore terminate the

motion as moot.

III. Abiomed's Motion for Partial Summary Judgment of No Infringement Under the Doctrine of Equivalents (Dkt. No. 431)

Abiomed has moved for summary judgment of no infringement under the doctrine of equivalents on two independent grounds; first, it alleges that Maquet's doctrine of equivalents theories improperly vitiate the "comprising a fluid column" claim limitation from claims 3 and 24. Second, it contends that Maquet has failed to meet its burden to demonstrate that its doctrine of equivalents theories do not ensnare the prior art.

Because the ensnarement dispute overlaps with Maquet's motion to strike the rebuttal expert report of Dr. Dasi, the Court addressed the issue in its memorandum and order on that motion. (Dkt. No. 540, at 19-26). For the reasons stated in that order, the Court will deny summary judgment as to ensnarement. For the reasons stated below, the Court will also deny summary judgment as to vitiation.

A. Background

The following facts are undisputed unless otherwise noted.

Claim 3 of the '783 patent requires "a blood pressure detection mechanism *comprising a fluid column* disposed within the elongate catheter" ('783 patent, col. 34 ll. 24-25 (emphasis added)). Claim 24 similarly requires "a pressure sensing element configured to sense pressure proximate the intravascular blood pump *comprising a fluid column* extending through the catheter." (*Id.* col. 38 ll. 16-18 (emphasis added)).

Two of the accused products, the Impella 5.0 and the Impella CP with SmartAssist, do not use a fluid column to sense blood pressure. (Dkt. No. 433 ¶ 4). Rather, the Impella 5.0 employs a differential pressure sensor and the Impella CP with SmartAssist uses an optical pressure sensor. (*Id.* ¶ 6).

The parties dispute the characterization of fluid-column, differential, and optical pressure sensors. (*Contrast* Dkt. No. 433 ¶¶ 2, 7, 8, *with* Dkt. No. 482 ¶¶ 2, 7, 8). For present purposes, it is sufficient to state that a fluid-column pressure sensor employs a fluid-filled column; a differential pressure sensor employs an electric signal; and an optical sensor employs an optical fiber.

At the time of the '783 patent filing, methods for determining blood pressure other than fluid columns were known. (Dkt. No. 433 ¶ 3; Dkt. No. 482 ¶ 3).

Maquet does not assert that the Impella 5.0 or the Impella CP with SmartAssist literally infringe the fluid-column limitations of claims 3 and 24. (Dkt. No. 433 ¶ 5; Dkt. No. 482 ¶ 5). Rather, it contends that those models infringe those elements under the doctrine of equivalents—that is, the differential and the optical pressure sensors contain elements equivalent to the claimed fluid-column. (Dkt. No. 482 ¶ 5).

B. Legal Standard

A patentee may be able to prove infringement even if an accused device does not literally infringe a claim. *See Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 40 (1997). Under the doctrine of equivalents, an accused product may “be found to infringe if there is ‘equivalence’ between the elements of the accused product or process and the claimed elements of the patented invention.” *Id.* at 21. That is, if there is only an “insubstantial difference” between the claimed element and the substitute element on the accused product, “or ‘whether the substitute element matches the function, way, and result of the claimed element.’” *Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349, 1356 (Fed. Cir. 2012) (quoting *Warner-Jenkinson Co.*, 520 U.S. at 40). Ordinarily, equivalence is “reserved for a fact finder.” *See Sage Prods., Inc. v. Devon Indus., Inc.*, 126 F.3d 1420, 1423 (Fed. Cir. 1997).

There are several legal limitations to the doctrine of equivalents, however. *See DePuy*

Spine, Inc. v. Medtronic Sofamor Danek, Inc., 469 F.3d 1005, 1013 (Fed. Cir. 2006). Claim vitiation or the “all elements rule” is one. *Id.* at 1017. Vitiation is a “legal conclusion of a lack of equivalence.” *Cadence Pharms. Inc. v. Exela PharmSci Inc.*, 780 F.3d 1364, 1371 (Fed. Cir. 2015). It asks whether a “reasonable jury could conclude that an element of an accused device is equivalent to an element called for in the claim.” *DePuy Spine*, 469 F.3d at 1018-19. “In short, saying that a claim element would be vitiated is akin to saying that there is no equivalent to the claim element in the accused device based on the well-established ‘function-way-result’ or ‘insubstantial differences’ tests.” *Brilliant Instruments, Inc. v. GuideTech, LLC*, 707 F.3d 1342, 1347 (Fed. Cir. 2013).

C. Analysis

To start, the Court agrees with Abiomed that “any pressure sensing structure” cannot be equivalent to the claimed fluid-column pressure sensor. (Dkt. No 432, at 7). The ’783 patent drafters expressly limited the patent to a subset of pressure sensors.¹ It cannot vitiate that limitation by now claiming equivalence to all pressure sensors. *See, e.g., Tronzo v. Biomet, Inc.*, 156 F.3d 1154, 1160 (Fed. Cir. 1998) (finding that a conical shape cannot be equivalent to a spherical shape without writing the limitation out of the claim because then “any shape would be equivalent to the conical limitation”). If the drafters had wanted to do so, then they should have “sought claims with fewer structural encumbrances.” *Sage Prods.*, 126 F.3d at 1425; *see Planet Bingo, LLC v. GameTech Int’l, Inc.*, 472 F.3d 1338, 1344 (Fed. Cir. 2006) (“This court cannot overlook the limitation or expand the doctrine of equivalents beyond its purpose to allow recapture of subject matter excluded by a deliberate and foreseeable claim drafting decision.”).

¹ At the time, other types of pressure sensors were known. (Dkt. No. 434-1 ¶¶ 102-05). Therefore, fluid-column pressure sensors cannot be read as synonymous with “all pressure sensors.” A skilled patent drafter “would foresee the limiting potential of the [fluid-column] limitation.” *Sage Prods.*, 126 F.3d at 1425.

However, Maquet does not offer an “any pressure sensor will do” theory of equivalence. *See DePuy Spine*, 469 F.3d at 1022. Rather, it asserts that the fluid-column pressure sensor is equivalent to the differential pressure sensor in the Impella 5.0 and the optical pressure sensor in the Impella CP with SmartAssist. The questions before the Court are therefore (1) whether a reasonable factfinder could find that the claimed fluid-column pressure sensor is equivalent to the substitute differential pressure sensor, and (2) whether a reasonable factfinder could find the claimed fluid-column pressure sensor is equivalent to the substitute optical pressure sensor.

Maquet has offered expert testimony supporting the conclusion that he could. As to the differential pressure sensor, Boris Leschinsky, one of Maquet’s experts, opined “that the ‘differential pressure sensor’ of the Impella 5.0 performs substantially the same function of the ‘blood pressure detection mechanism comprising a fluid column disposed within the elongate catheter and configured to detect a pressure of blood proximate the intravascular blood pump’ in substantially the same way leading to the same or substantially the same result.” (Dkt. No. 484-1 ¶ 245). He further explained:

For example, the function, way, and result of the blood pressure detection mechanism element are described above. This is at least substantially the same as the function and way of the “differential pressure sensor” of the Impella 5.0 and at least the same or substantially the same as the result of the “differential pressure sensor” of the Impella 5.0, which detects a pressure of blood using the piezo resistive “electronic differential pressure sensor located at the proximal end of the 21 Fr cannula.”

In my opinion, the way this is accomplished in the accused Impella 5.0 is by transmitting a deflection signal measured with the piezo resistive differential pressure sensor at the outflow through a wire or cable disposed within the elongate catheter to the “red Impella plug.” Accordingly, similarly to the asserted claim, and contrary to Abiomed’s assertions, the Impella 5.0 relies on blood pressure deforming a diaphragm, which is translated into a pressure reading, which is then sent to the console.

Doing so achieves the result of allowing a pressure of blood proximate the pump to be detected to inform correct placement of the pump during operation because

the deflection due to pressure is interpreted by the sensor and sent to the Impella console.

(*Id.* ¶¶ 246-48 (citations omitted)).

As to the optical pressure sensor, Leschinsky similarly opined that “‘optical fiber’ of the Impella CP with SmartAssist performs substantially the same function of the ‘fluid column disposed within the elongate catheter’ in substantially the same way leading to the same or substantially the same result” and that “any differences between the two are insubstantial.” (*Id.* ¶ 235). He elaborated:

[T]he function of the “fluid column disposed within the elongate catheter” is to transmit a pressure of blood to a sensor through an elongate catheter.

In my opinion, the way this is accomplished is by communicating a deflection of a surface exposed to the blood through the elongate catheter to a sensor. Doing so achieves the result of detecting a pressure of blood proximate the pump.

This is at least substantially the same as the function and way of the “optical sensor” of the Impella CP with SmartAssist and at least the same or substantially the same as the result of the “optical sensor” of the Impella CP with SmartAssist, which uses an optical fiber disposed within the elongate catheter to transmit deflection of a diaphragm due to a pressure of blood.

The way the Impella CP with SmartAssist performs that function is by having the optical fiber extend from the location of the diaphragm proximate the pump at the outflow through the elongate catheter to a sensor in the “red Impella plug,” thus achieving the result of detecting a pressure of blood proximate the pump.

(*Id.* ¶¶ 235-38).

To be sure, the claimed fluid-column pressure sensor is different than the substitute differential and optical pressure sensors. As Abiomed points out, “[t]hese devices rely on different physical phenomena—hydraulic pressure versus optical reflection or electrical signal processing.” (Dkt. No. 502, at 4). The question before the Court, however, is not the existence of difference but its degree. Abiomed contends that the different physical phenomena represent a “difference in kind.” (*Id.* (quoting *Freedman Seating Co. v. American Seating Co.*, 420 F.3d

1350, 1361 (Fed. Cir. 2005)). Leschinsky, however, opines that the physical phenomena make an “insubstantial difference” and do not change his function-way-result analysis. (Dkt. No. 484-1 ¶ 231 (“That the Impella CP with SmartAssist uses fiber optics to measure the deflection of a diaphragm instead of a fluid column does not change the above analysis and is an insubstantial difference.”); *id.* ¶ 249 (“That the Impella [5.0] uses a piezoelectric sensor to measure the deflection of a diaphragm instead of a fluid column does not change the above analysis and is an insubstantial difference in light of the above arguments.”)).

While it is certainly plausible that the physical phenomena employed make a substantial difference, Leschinsky has offered a function-way-result analysis to the contrary. And, at this stage, the Court “must accept [Maquet’s] expert’s factual assertions as true.” *Charles Mach. Works, Inc. v. Vermeer Mfg. Co.*, 723 F.3d 1376, 1380 (Fed. Cir. 2013). Maquet has therefore raised genuine disputes about equivalence that must be decided at trial.

As a final note, it is undeniably true that the doctrine of equivalents, particularly the function-way-result test, is fraught with problems. It tends to reward poor draftsmanship, promote gamesmanship, and increase litigation expense and risk. Moreover, it “conflicts with the definitional and public-notice functions of the statutory claiming requirement.” *Warner-Jenkinson*, 520 U.S. at 29. Nonetheless, this Court is obligated to follow binding precedent, and will therefore deny summary judgment as to vitiation.

IV. Conclusion

For the foregoing reasons, Abiomed’s motion for summary judgment of invalidity of claim 2 (Dkt. No. 427) is DENIED as moot and motion for partial summary judgment of no infringement under the doctrine of equivalents (Dkt. No. 431) is DENIED.

So Ordered.

Dated: April 8, 2026

/s/ F. Dennis Saylor IV
F. Dennis Saylor IV
United States District Judge