

UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

_____	)	
OCEAN SEMICONDUCTOR LLC,	)	
	)	
Plaintiff,	)	
	)	
v.	)	Civil Action
	)	No. 20-cv-12310-PBS
ANALOG DEVICES, INC.,	)	
	)	
Defendant.	)	
_____	)	

MEMORANDUM AND ORDER

July 15, 2025

Saris, J.

INTRODUCTION

Plaintiff Ocean Semiconductor LLC ("Ocean") alleges that Defendant Analog Devices, Inc. ("ADI") infringed claims 4 and 5 of U.S. Patent No. 6,836,691 ("the '691 patent"), a "Method and Apparatus for Filtering Metrology Data Based on Collection Purpose," through the use of Inficon Inc.'s ("Inficon's") FabGuard system in violation of 35 U.S.C. § 271(a) & (g). ADI moves for summary judgment on the grounds that (1) Ocean relies on new theories that are untimely and prejudicial, (2) Ocean lacks evidence that ADI actually used the accused FabGuard software, (3) Ocean posits infringement theories that fail to satisfy the '691

patent's claim limitations, and (4) the '691 patent claims patent-ineligible subject matter pursuant to 35 U.S.C. § 101.

After a hearing, the Court **ALLOWS** ADI's motion for summary judgment (Dkt. 302) on the third ground that no reasonable juror could find that ADI infringed claims 4 and 5 of the '691 patent.

BACKGROUND

Drawing all reasonable inferences in favor of Ocean, the Court treats the following facts as undisputed. See Quintana-Dieppa v. Dep't of Army, 130 F.4th 1, 7 (1st Cir. 2025). The Court begins by outlining the parties and, drawing from the parties' expert reports, describes the semiconductor manufacturing process. It then turns to the FabGuard software, its use by ADI, and the asserted patent and its claims.

I. The Parties

Ocean, a non-practicing entity, is the assignee and owner of the '691 patent.

ADI is a semiconductor company that develops and sells semiconductor products. ADI operates semiconductor fabrication plants throughout the United States and abroad to produce its semiconductor products. Either directly or through third-party foundries, ADI also contracts with third-party semiconductor manufacturers to produce its products. ADI acquired Maxim

Integrated Products Inc. ("Maxim") in 2021 and assumed control over its semiconductor fabrication plants.

II. Chip Manufacturing

ADI manufactures semiconductor chips. Semiconductor chips are found in a range of technology, including cars, laptops, and smartphones. In simple terms, to create semiconductor chips, a fabrication plant must transform raw silicon extracted from highly purified silica sand into circular, polished wafers. Once the



Figure 1 depicting silicon on the left and wafers on the right. Dkt. 336-1 ¶ 46.

wafers are formed, circuits are built onto the wafers. To build circuits, thin layers of conductive and insulating materials, such as copper or silicon dioxide, are first deposited onto the surface of the wafers with a final coating that is sensitive to light. Ultraviolet light is then used to engrave a pattern onto the wafer. Finally, layers of the circuit are etched away, and the wafer is

broken down into smaller, rectangular pieces to form the semiconductor chips.

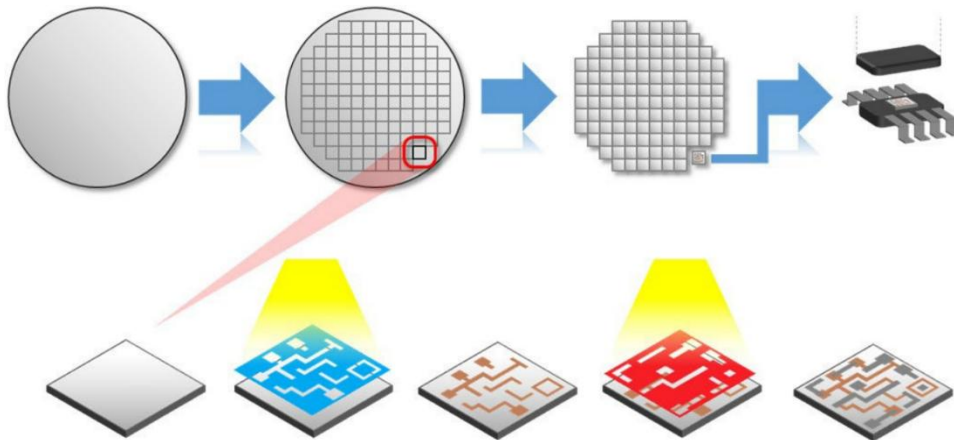


Figure 2 depicting the deposition, light projection, and cutting steps of chip production. Dkt. 330 ¶ 46.

Semiconductor chip manufacturing takes place inside a fabrication facility which consists of sterile rooms and closed environments called chambers. While in a chamber, a wafer is isolated from the rest of the fabrication plant while it undergoes a specific process step that requires a particular pressure or other environmental condition.

The actual process of deposition, light projection, and etching involves hundreds of small steps, each of which “requires a microscopic degree of precision.” Dkt. 330 ¶ 47. Accordingly, fabrication plants employ process monitoring techniques to assist in optimizing the process, verifying that each step is performed accurately, and troubleshooting when they are not. Two

complementary forms of process monitoring are relevant here: process control and Fault Detection and Classification ("FDC"). Process control refers to "[t]he process of reviewing measurements and considering whether and how to update the process" to improve product quality and consistency. Id. ¶ 49. FDC is an automated system that evaluates large volumes of process and wafer data against predefined thresholds to determine whether a fault has occurred and, if so, what may have caused it. A fault refers to "an abnormal tool condition, such as when a parameter strays beyond its acceptable boundary." Id. ¶ 50. By detecting these faults, a fabrication plant can stop continuing to process a wafer that is already defective, and the tools that caused the fault may be identified more efficiently.

III. FabGuard

FabGuard is a software FDC tool designed by Inficon to assist semiconductor fabrication plants by "analyzing data and identifying manufacturing faults" to prevent and remedy faulty chip production. Dkt. 336-1 ¶ 162. To do so, FabGuard implements a system of data triggers that interface with sensors. Sensors are tools that measure various conditions -- for example, temperature or pressure -- inside a manufacturing chamber at various points in the process. The measurements taken during the manufacturing process are called metrology data.

FabGuard's data triggers determine when the software starts and stops collecting metrology data. Certain parameters can be configured to direct FabGuard under what conditions it should begin data collection and under what conditions to end data collection. Some start and stop triggers include when the chamber pressure is above or below a certain point; when the endpoint signal, indicating the completion of a process step, is received; or when a fault signal, indicating that an error has occurred during the process step, is received. There are other conditions in which FabGuard will collect data, such as when FabGuard has not received any trigger for 15 minutes. In that case, FabGuard begins "idle acquisition." Dkt. 324-2 at 8. This mode collects data while a tool is idle, which means it is not processing wafers. All modes are pre-configured, and the user can select which sensors to collect data from.

IV. ADI's Use of FabGuard

ADI used FabGuard's acquisition and idle triggers. ADI used FabGuard's acquisition triggers to collect data for two purposes: first, to determine when a given process step, such as the etch step, was complete; and second, to identify whether a fault had occurred during the process step. If the process step was completed without faults, then the data collection ended because the purpose for the data collection -- the determination of the endpoint --

had been achieved. Alternatively, if a fault was detected, the tool was placed in idle mode. When a tool or chamber in a fabrication plant was in idle mode, an idle trigger was used to collect a new dataset with baseline measurements. The purpose of this data was to monitor chamber stability (e.g., temperature, or pressure conditions) to ensure that the next wafer processed in the chamber would experience the correct environmental conditions.

Each dataset collected by FabGuard is associated with the trigger that initiated it, for example, to identify the endpoint of the process step or to take baseline measurements. See Dkt. 336-1 ¶¶ 299, 316. FabGuard did not retroactively change the trigger associated with a dataset that was previously collected. See Dkt. 309-8 at 406:11-13.

V. The Patent

The '691 patent was filed on May 1, 2003, and issued on December 28, 2004. It discloses "a method and apparatus for filtering metrology data based on collection purpose in a semiconductor device manufacturing environment." '691 patent at 1:9-11. In general, the '691 patent teaches a method that involves collecting metrology data, determining the collection purpose for that data (e.g., process control purposes, fault detection purposes), and filtering the data based on its purpose. See id. at 2:33-40.

The '691 patent presents the manufacturing problem to which its inventions are "directed to":

Typically, when a process controller gathers metrology data to update its control model or generate a control action for subsequent processing, it retrieves metrology data related to wafers processed in the tool or tools under its control and employs that data to perform its control task. The data retrieved includes metrology data collected through the regular sampling plans implemented in the facility, and the metrology data collected for other purposes. Some of the metrology data does not accurately reflect the state of the process or the devices manufactured. For example, devices processed by a tool that was malfunctioning may have characteristics that were affected by the malfunction (i.e., a special cause) rather than by normal process variation (i.e., common cause). Employing this data for use in process control routines may introduce a source of variation that cannot be addressed by the process controller and thus reduce the effectiveness of the process controller.

The present invention is directed to overcoming, or at least reducing the effects of, one or more of the problems set forth above.

Id. at 2:10-29.

Ocean accuses ADI of infringing claims 4 and 5 of the '691 patent through its use of Inficon's FabGuard system. Claims 4 and 5 are dependent on claim 1, which is a method claim that recites the following four steps:

1. A method, comprising:

collecting metrology data related to the processing of workpieces in a plurality of tools;

generating context data for the metrology data, the context data including collection purpose data;

filtering the metrology data based on the collection purpose data; and

conducting a process control activity related to one of the tools based on the filtered metrology data.

Id. at 8:19-27. The asserted claims, claims 4 and 5, add the following steps:

4. The method of claim 1, further comprising:

identifying a fault condition for a workpiece based on the metrology data; and

changing the collection purpose data responsive to identifying the fault condition.

5. The method of claim 1, further comprising:

identifying an absence of a fault condition for a workpiece based on the metrology data; and

changing the collection purpose data responsive to identifying the absence of the fault condition.

Id. at 8:39-48.

VI. Procedural Background

ADI brings this motion for summary judgment after the Court dismissed without prejudice its first summary judgment motion to allow discovery to conclude. This motion is the latest installment in a prolonged litigation between the parties. See Ocean Semiconductor LLC v. Analog Devices, Inc., 664 F. Supp. 3d 195 (D. Mass. 2023) (first motion to dismiss); Ocean Semiconductor LLC v. Analog Devices, Inc., 698 F. Supp. 3d 204 (D. Mass. 2023) (second

motion to dismiss); Dkt. 212 (claim construction); Ocean Semiconductor, LLC v. Analog Devices, Inc., No. 20-cv-12310-PBS, 2024 WL 3567350 (D. Mass. Apr. 19, 2024) (motion for protective order); Ocean Semiconductor LLC v. Analog Devices, Inc., No. 20-cv-12310-PBS, 2024 WL 3567351 (D. Mass. June 27, 2024) (motion to amend preliminary infringement contentions to add more than sixty new systems and tools); see also Ocean Semiconductor LLC v. Analog Devices, Inc., No. 24-cv-11759-PBS (D. Mass. July 9, 2024) (second lawsuit between the same parties, accusing ADI of infringing the '691 patent through its use of, among other systems, Inficon's Discover system).

In its claim construction memorandum and order, the Court construed the term "collection purpose data" as "data indicating the initial purpose for collecting the metrology data" and held that the term "conducting a process control activity related to one of the tools based on the filtered metrology data" did not require construction. Dkt. 212 at 15-16. At that time, the parties did not argue, and the Court did not construe, the meaning of the phrase "changing the collection purpose data" as it appears in claims 4 and 5 of the '691 patent. '691 patent at 8:42, 8:47.

LEGAL STANDARD

Summary judgment is appropriate "if the movant shows that 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 dispute is one which ‘a reasonable jury could resolve . . . in the favor of the non-moving party,’ and a material issue is one with the ‘potential to affect the outcome . . . under the applicable law.’” Kinzer v. Whole Foods Mkt., Inc., 99 F.4th 105, 108 (1st Cir. 2024) (alterations in original) (quoting Cherkaoui v. City of Quincy, 877 F.3d 14, 23-24 (1st Cir. 2017)). In determining whether to grant summary judgment, a court must construe “the facts in the light most favorable to the non-moving party” and “draw[] all reasonable inferences” in its favor. Id. (quoting Harley-Davidson Credit Corp. v. Galvin, 807 F.3d 407, 408 (1st Cir. 2015)).

The party seeking summary judgment “must [first] adumbrate ‘an absence of evidence to support the nonmoving party’s case.’” Pleasantdale Condos., LLC v. Wakefield, 37 F.4th 728, 733 (1st Cir. 2022) (alteration in original) (quoting Brennan v. Hendrigan, 888 F.2d 189, 191 (1st Cir. 1989)). Once the movant does so, “[t]he burden then shifts to the nonmovant to establish the existence of a genuine issue of material fact.” Id. To satisfy this burden, the nonmovant “must present definite, competent evidence” demonstrating that a trialworthy issue exists. Id. (quoting Mesnick v. Gen. Elec. Co., 950 F.2d 816, 822 (1st Cir. 1991)). “[C]onclusory allegations, improbable inferences, and unsupported

speculation” do not suffice. Kinzer, 99 F.4th at 108 (quoting Ellis v. Fid. Mgmt. Tr. Co., 883 F.3d 1, 7 (1st Cir. 2018)).

A finding of noninfringement “is amenable to summary judgment when no reasonable factfinder could find that the accused [process practices] every claim limitation.” Akzo Nobel Coatings, Inc. v. Dow Chem. Co., 811 F.3d 1334, 1339 (Fed. Cir. 2016). Accordingly, “[e]valuation of summary judgment of noninfringement is a two-part inquiry: first, a court construes the scope and meaning of the asserted patent claims, and then compares the construed claims to the accused product or process.” Medgraph, Inc. v. Medtronic, Inc., 843 F.3d 942, 949 (Fed. Cir. 2016).

DISCUSSION

ADI moves for summary judgment on four independent grounds. However, because the Court concludes that no reasonable juror could find that ADI’s use of FabGuard practiced the changing step of claims 4 and 5 of the ’691 patent, the Court grants summary judgment on this ground and does not address ADI’s alternative arguments. See Advanced Steel Recovery, LLC v. X-Body Equip., Inc., 808 F.3d 1313, 1321 (Fed. Cir. 2015).

I. Scope of “Changing the Collection Purpose Data”

As stated, the Court previously construed the term “collection purpose data” to mean “data indicating the initial purpose for collecting the metrology data.” Dkt. 212 at 15. The

parties now dispute the meaning of the phrase “changing the collection purpose data” as it appears in dependent claims 4 and 5. Specifically, the parties disagree in the briefing over whether those claims require modifying the collection purpose data associated with an already collected set of metrology data, or whether it is sufficient to collect a new set of data under a different trigger or purpose. See Dkt. 326-3 at 13; Dkt. 344-1 at 8-9.

Because the meaning of the term “changing the collection purpose data” was not previously addressed at the Markman stage, and because the scope of that language is dispositive of the pending motion, the Court now construes the claim term. See O2 Micro Int’l Ltd. v. Beyond Innovation Tech. Co., 521 F.3d 1351, 1360 (Fed. Cir. 2008) (“When the parties raise an actual dispute regarding the proper scope of [a claim term], the court, not the jury, must resolve that dispute.”); see also Jack Guttman, Inc. v. Kopykake Enters., 302 F.3d 1352, 1361 (Fed. Cir. 2002) (explaining that “[d]istrict courts may engage in a rolling claim construction”).

Claim 1 of the ’691 patent recites four method steps: (1) collecting metrology data; (2) generating “context data” for that metrology data, the context data “including collection purpose data”; (3) filtering the metrology data based on the collection

purpose data; and (4) conducting a process control activity based on the filtered metrology data. '691 patent at 8:19-27. Claims 4 and 5 add a further step: "changing the collection purpose data responsive to identifying" either a fault condition (claim 4) or the absence thereof (claim 5). Id. at 8:39-48 (emphasis added).

The phrase "changing the collection purpose data," as it appears in claims 4 and 5, incorporates the definite article "the," signaling that it refers back to a previously introduced term. See Wi-Lan, Inc. v. Apple, Inc., 811 F.3d 455, 462 (Fed. Cir. 2016) ("[T]he definite article[] 'the' . . . in a claim refers back to the same term recited earlier in the claim."); see also ABS Glob., Inc. v. Cytonome/St, LLC, 84 F.4th 1034, 1040 (Fed. Cir. 2023) (recognizing antecedent basis established by use of "the" to refer back to a prior recitation).

Here, the antecedent phrase "collection purpose data" appears in step two of claim 1, which recites: "generating context data for the metrology data, the context data including collection purpose data." '691 patent at 8:22-23. Claim 1 teaches that collection purpose data is generated for a particular set of metrology data collected in step one. Thus, the claim structure reflects a clear progression: metrology data is collected (step one), context data is generated for that data (step two), and the collection purpose is part of that context.

Claims 4 and 5, which depend on claim 1, require “changing the collection purpose data” in response to a detected fault (claim 4) or absence thereof (claim 5). Given the antecedent structure, this phrase necessarily refers to the collection purpose data generated in step two and, by extension, to the metrology data set from step one to which it is attached. The plain language of the claims therefore requires modifying the collection purpose data associated with a specific, already-collected set of metrology data. It does not encompass assigning a different purpose to a newly collected data set.

Ocean does not offer an alternative interpretation of the significance of the word “the.” Instead, it characterizes ADI’s construction as “overly narrow” and argues that ADI waived its antecedent basis argument by raising it for the first time in reply. Dkt. 344-1 at 8. The Court disagrees. This is not a new argument: ADI’s position in its opening brief was that claims 4 and 5 require modifying existing collection purpose data rather than assigning new codes to newly collected data. See Dkt. 309-6 at 18-20.

The specification reinforces ADI’s reading. While courts must take care not to import limitations from the specification into the claims, the Federal Circuit has long held that “the specification ‘is always highly relevant to the claim construction

analysis'” and “is the single best guide to the meaning of a disputed term.” Phillips v. AWH Corp., 415 F.3d 1303, 1315 (Fed. Cir. 2005) (en banc) (quoting Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed. Cir. 1996)); see also Homeland Housewares, LLC v. Whirlpool Corp., 865 F.3d 1372, 1376 (Fed. Cir. 2017) (“Claims must also be read in view of the specification, of which they are a part.”)

Here, the specification repeatedly describes scenarios in which collection purpose data initially assigned to a metrology dataset is later modified in light of fault analysis results. In one example, metrology data collected under a standard sampling plan for process control is initially assigned a collection purpose code of “01,” while data collected for fault detection receives the code “02.” ‘691 patent at 7:5-10. The specification explains that the collection purpose code may later be changed: “If the fault monitor identifies a faulty die or wafer, it may change the collection purpose code of the ‘01’ or ‘02’ . . . data to ‘99.’ If no fault is identified . . . , the fault monitor may change the collection purpose code to ‘88.’” Id. at 7:36-40.

In another example, the system initially assigns a purpose code reflecting process control sampling, but that label may be updated if later analysis reveals that the data corresponds to a fault. In that case, the collection purpose is changed to ensure

the faulty data is filtered out from future process control activities.

A third example describes data initially collected for fault detection during random sampling. If no defect is found, the system may change the collection purpose to indicate that the data is suitable for process control.

The specification therefore contemplates a reassignment or reclassification of collection purpose for data already collected and labeled with a collection purpose, not a wholesale switch to collecting new data under a new collection purpose. This distinction reflects the invention's goal of ensuring that only data unaffected by special-cause variation such as a fault is used in process control.¹

Ocean's contrary interpretation -- that claims 4 and 5 are satisfied merely by collecting a new set of metrology data using a different trigger for a different purpose -- does not accord with the claim limitations. Ocean's interpretation effectively

¹ Ocean's prior representations in this litigation also invoked the specification to explain that the collection purpose code associated with a given dataset may change. In its opening claim construction brief, Ocean argued that the specification "teaches that . . . the same metrology data would be reassigned with a collection purpose data . . . that is different from the initial collection purpose." Dkt. 103 at 9 (second emphasis added). That earlier position aligns with the intrinsic record and confirms that the patent contemplates a change to the label or classification applied to previously collected data, not merely assigning a different purpose code to new metrology data.

collapses the “changing” step of claims 4 and 5 into the act of collecting data with a particular collection purpose as described in claim 1. Put differently, if “changing the collection purpose data” merely means collecting new data with a different purpose code, it risks rendering the added limitation in claims 4 and 5 redundant. That result is disfavored. See Lashify, Inc. v. Int’l Trade Comm’n, 130 F.4th 948, 964 (Fed. Cir. 2025) (“A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so” (quoting Merck & Co. v. Teva Pharms. USA, Inc., 395 F.3d 1364, 1372 (Fed. Cir. 2005))).

II. Application to FabGuard

A. Acquisition Triggers

Ocean’s primary infringement theory rests on the fact that the FabGuard system uses different acquisition triggers, for example, to collect fault-monitoring data when the chamber is active, and baseline stability data when the chamber is idle. Ocean contends that this switch in trigger configuration represents a change in collection purpose data.

But Ocean’s own expert concedes that FabGuard does not reassign or relabel the purpose code associated with previously collected metrology data. Rather, when the conditions for one trigger lapse and a new trigger is activated, FabGuard begins

collecting a new metrology dataset associated with that new trigger. As the expert explained, a user “cannot go back in time and change the data [the user] ha[s] already collected.” Dkt. 309-8 at 406:11-13. Because claims 4 and 5 require modifying the collection purpose data already associated with a previously collected set of metrology data, collecting a new data set with a different collection purpose does not satisfy this requirement.

B. Ocean’s Alternative Infringement Theories

Ocean points to alternative ways in which FabGuard purportedly practiced claims 4 and 5. In particular, Ocean’s expert identifies instances in which FabGuard allegedly collected data under normal conditions and later used that data to construct a model for fault identification. According to Ocean, this reflects a change in the collection purpose data. But the record does not support that assertion. The cited document is a 2008 summary of Inficon’s technical support at a Maxim facility.² In the examples Ocean highlights, the document does not indicate that the collection purpose data itself -- i.e., the “data indicating the initial purpose for collecting the metrology data,” Dkt. 212 at 15 -- was ever changed. Instead, the document suggests that FabGuard “was used to determine the root cause of [a processing] issue” and

² The 2008 document predates the relevant infringement period, which spanned from December 31, 2014, six years prior to the filing of the complaint, to May 1, 2023 when the ‘691 patent expired.

the data collected by FabGuard from an associated sensor successfully helped diagnose the issue. Dkt. 326-5 at 7; see also id. at 3 ("FabGuard was introduced to collect process data in real-time and perform fault analysis"), 4 ("The FabGuard demonstration . . . was performed with the intention of determining the root cause for three fault conditions."). In other words, the document describes a use of FabGuard consistent with its original configuration for fault detection. Even if the collected data was later used to support a different diagnostic task, that is not equivalent to changing the collection purpose data associated with a given metrology dataset. Claims 4 and 5 require a modification to the collection purpose data already generated for a particular data set, not merely a secondary or downstream use of that data.

C. Conclusion

Accordingly, because no reasonable jury could find that ADI's use of FabGuard satisfies the "changing" limitation in claims 4 and 5 as properly construed, summary judgment is warranted in ADI's favor. See Medgraph, 843 F.3d at 949 ("[S]ummary judgment of noninfringement is proper when no reasonable factfinder could find that the accused product contains every claim limitation"); Akzo Nobel Coatings, Inc., 811 F.3d at 1339 (similar). Because this ground is dispositive, the Court need not address ADI's alternative arguments for summary judgment.

ORDER

For the reasons stated above, the Court **ALLOWS** ADI's motion for summary judgment (Dkt. 302).

SO ORDERED.

/s/ PATTI B. SARIS
Hon. Patti B. Saris
United States District Judge