

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE

ECOBEE, INC., )  
)  
Plaintiff, )  
)  
v. ) C.A. No. 21-323 (MN)  
)  
ECOFACOR, INC., )  
)  
Defendant. )

**MEMORANDUM OPINION**

At Wilmington, this 5th day of April 2023:

The Court heard arguments for the disputed claim terms of U.S. Patent Nos. 8,019,567 (“the ’567 patent”), 8,596,550 (“the ’550 patent”), 8,886,488 (“the ’488 patent”), and 10,612,983 (“the ’983 patent”) on December 8, 2022. (D.I. 77). IT IS HEREBY ORDERED that the claim terms of the ’567, ’550, ’488, and ’983 patents with agreed-upon constructions are construed as follows (*see* D.I. 48 at 1-2):

1. “rate of change in inside temperature / rate of change of temperatures inside the structure / rates of change in said inside temperature” means “the difference between inside temperature measurements divided by the span of time between the measurements” (’567 Patent, claims 1, 15; ’550 Patent, claims 1, 9, 17; ’488 Patent, claims 1, 7, 8, 9, 14, 15);
2. “compare” / “comparing” means “analyze/analyzing to determine one or more similarities or differences between” (’567 Patent, claims 1, 8, 15; ’550 Patent, claims 1, 9, 17; ’488 Patent, claims 1, 9);
3. “to relate said one or more predicted rates of change to said outside temperature measurements” / “said predicted rates of change are related to said outside temperature measurements” means “to correlate said one or more predicted rates of change to said outside temperature measurements” / “said predicted rates of change are correlated to said outside temperature measurements” (’488 Patent, claims 1, 9);
4. “difference value based on comparing actual setpoint at the first time for said thermostatic controller to the first automated setpoint for said thermostatic controller” means “a value indicating the difference between

at least one of the actual setpoints at the first time and the first automated setpoint for the thermostatic controller” (’550 Patent, claim 1);

5. “setpoint” means “a temperature setting for a thermostat to achieve or maintain” (’983 Patent, claim 1; ’550 Patent, claims 1, 9, 17);
6. “automated setpoint” means “a computer-calculated temperature setting for a thermostat to achieve or maintain” (’550 Patent, claims 1, 9, 17); and
7. The preamble in claim 1 of the ’983 Patent is limiting.

Further, as announced at the hearing on December 8, 2022, IT IS HEREBY ORDERED that the disputed claim terms of the ’567, ’550, ’488, and ’983 patents are construed as follows:

1. “operational efficiency” / “operational efficiency of a heating, ventilation and air conditioning (HVAC) system” / “operational efficiency of an HVAC system” means “energy or time required by the HVAC system to change inside temperature by a given amount for a set of indoor and outdoor conditions” (’567 Patent, claims 1, 15; ’488 Patent, claims 1, 9);
2. The preambles of claims 1 and 9 of the ’488 patent are limiting;
3. “first state of repair” is not indefinite and shall be given its plain and ordinary meaning, which is “an initial condition,” with the clarification that that it is not necessarily the first or original from the factory condition. (’567 Patent, claims 1 and 15);
4. “expected temperature measurements of a rate of change in inside temperature” is not indefinite and shall be given its plain and ordinary meaning, which is “expected temperature measurements based on historic measured rates of change in inside temperatures” (’567 Patent, claim 15);
5. “performance characteristic” is not indefinite and shall be given its plain and ordinary meaning, which is “a characteristic of performance” (’983 Patent, claim 18); and
6. “said thermostatic control device” is not indefinite and means “thermostatic controller” (’550 Patent, claims 5, 13).

The parties briefed the issues (D.I. 58) and submitted appendices containing intrinsic and extrinsic evidence. (D.I. 59, 60 & 61). Neither side provided a tutorial describing the relevant technology. The Court carefully reviewed all submissions in connection with the parties’

contentions regarding the disputed claim terms, heard oral argument (*see* D.I. 77) and applied the following legal standards in reaching its decision.

## **I. LEGAL STANDARDS**

### **A. Claim Construction**

“[T]he ultimate question of the proper construction of the patent [is] a question of law,” although subsidiary fact-finding is sometimes necessary. *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 325 (2015). “[T]he words of a claim 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.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005) (en banc) (internal citations and quotation marks omitted). Although “the claims themselves provide substantial guidance as to the meaning of particular claim terms,” the context of the surrounding words of the claim must also be considered. *Id.* at 1314. “[T]he ordinary meaning of a claim term is its meaning to the ordinary artisan after reading the entire patent.” *Id.* at 1321 (internal quotation marks omitted).

The patent specification “is always highly relevant to the claim construction analysis . . . [as] 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). It is also possible that “the 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. “Even when the specification describes only a single embodiment, [however,] 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.” *Hill-Rom*

*Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1372 (Fed. Cir. 2014) (internal quotation marks omitted) (quoting *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004)).

In addition to the specification, a court “should also consider the patent’s prosecution history, if it is in evidence.” *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 980 (Fed. Cir. 1995) (en banc), *aff’d*, 517 U.S. 370 (1996). The prosecution history, which is “intrinsic evidence, . . . consists of the complete record of the proceedings before the PTO [Patent and Trademark Office] 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. Expert testimony can be useful “to ensure that the court’s understanding of the technical aspects of the patent is consistent with that of a person of skill in the art, or to establish that a particular term in the patent or the prior art has a particular meaning in the pertinent field.” *Phillips*, 415 F.3d at 1318. Nonetheless, courts must not lose sight of the fact that “expert reports and testimony [are] generated at the time of and for the purpose of litigation and thus can suffer from bias that is not present in intrinsic evidence.” *Id.* Overall, 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.” *Id.* 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) (citing *Vitronics*, 90 F.3d at 1583).

**B. Indefiniteness**

“The primary purpose of the definiteness requirement is to ensure that the claims are written in such a way that they give notice to the public of the extent of the legal protection afforded by the patent, so that interested members of the public, *e.g.*, competitors of the patent owner, can determine whether or not they infringe.” *All Dental Prodx, LLC v. Advantage Dental Prods., Inc.*, 309 F.3d 774, 779-80 (Fed. Cir. 2002) (citing *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 28-29 (1997)). Put another way, “[a] patent holder should know what he owns, and the public should know what he does not.” *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 535 U.S. 722, 731 (2002).

A patent claim is indefinite if, “viewed in light of the specification and prosecution history, [it fails to] inform those skilled in the art about the scope of the invention with reasonable certainty.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910 (2014). A claim may be indefinite if the patent does not convey with reasonable certainty how to measure a claimed feature. *See Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 789 F.3d 1335, 1341 (Fed. Cir. 2015). But “[i]f such an understanding of how to measure the claimed [feature] was within the scope of knowledge possessed by one of ordinary skill in the art, there is no requirement for the specification to identify a particular measurement technique.” *Ethicon Endo-Surgery, Inc. v. Covidien, Inc.*, 796 F.3d 1312, 1319 (Fed. Cir. 2015).

Like claim construction, definiteness is a question of law, but the Court must sometimes render factual findings based on extrinsic evidence to resolve the ultimate issue of definiteness. *See, e.g., Sonix Tech. Co. v. Publications Int'l, Ltd.*, 844 F.3d 1370, 1376 (Fed. Cir. 2017); *see also Teva*, 574 U.S. at 334-36. “Any fact critical to a holding on indefiniteness . . . must be proven by the challenger by clear and convincing evidence.” *Intel Corp. v. VIA Techs., Inc.*, 319 F.3d 1357, 1366 (Fed. Cir. 2003); *see also Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1338 (Fed. Cir. 2008).

## II. THE COURT’S RULING

The Court’s ruling regarding the disputed claim terms of the ’567, ’550, ’488, and ’983 patents was announced during the Markman hearing on December 8, 2022, as follows:

Thank you for the arguments today. They were helpful. At issue, there are six disputed terms in four patents,<sup>[1]</sup> I am prepared to rule on all of the disputes.

I will not be issuing a written opinion, but I will issue an order stating my rulings. I want to emphasize, before I announce my decisions, that although I am not issuing a written opinion, we have followed a full and thorough process before making the decisions I am about to state. I have reviewed the patents in dispute. I have also reviewed the ITC papers, the expert declarations, and all of the other materials submitted in the more than 1,500 pages of appendices. There was full briefing on each of the disputed terms and we had argument here today. All of that has been carefully considered.

As to my rulings, I am not going to read into the record my understanding of claim construction law and definiteness. I have a legal standard section that I have included in earlier opinions, including somewhat recently in *CAO Lighting v. GE*, C.A. No. 20-681. I incorporate that law and adopt it into my ruling today and will also set it out in the order that I issue.

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<sup>1</sup> U.S. Patent Nos. 8,019,567 (“the ’567 patent”), 8,596,550 (“the ’550 patent”), 8,886,488 (“the ’488 patent”), 10,612,983 (“the ’983 patent”).

Neither party has suggested any differences in the definition of a POSA that are relevant to the claim construction issues.

The first term is “operational efficiency” in Claims 1 and 15 of the ’567 patent and Claims 1 and 9 of the ’488 patent. Plaintiff proposes “energy required by the HVAC system to change inside temperature by a given amount over a given time for a set of indoor and outdoor conditions.” Defendant proposes “energy or time required by the HVAC system to change inside temperature by a given amount for a set of indoor and outdoor conditions.” The crux of the dispute is whether the term is limited to energy, or if it can alternatively be defined as time. Here, like the ITC and the District Court in Texas, I agree with Defendant.

I don’t think that there is anything in the intrinsic evidence to justify the limit proposed by Plaintiff. To the contrary, the specification states that “many factors affect the efficiency of HVAC systems,” some of which are fixed and others of which are more dynamic.<sup>[2]</sup> In further describing these factors, it explains that the “signature” of a particular problem affecting the efficiency of HVAC systems can be identified by how each problem affects the cycle times of a given HVAC system over time, and thus longer cycle times may be indicative of a problem and correspond to a value of operational efficiency.<sup>[3]</sup> The specification therefore explains that cycle times, not just energy, can correspond to a value of operational efficiency.

I think that Figures 8a and 8b and the text describing them in Column 5 of the ’488 patent also support my construction as they disclose that longer cycle times not explained by a higher outdoor temperature indicates a decrease in efficiency.

So I think that intrinsic evidence supports that time can be an expression of efficiency, at least as long as it is expressed for a given set of indoor and outdoor conditions.<sup>[4]</sup> And I will construe “operational efficiency” to mean “energy or time required by the HVAC system to change inside temperature by a given amount for a set of indoor and outdoor conditions.”

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<sup>2</sup> (’488 patent, col. 3, ll. 35-42).

<sup>3</sup> (’488 patent, col. 3, ll. 43-61).

<sup>4</sup> (D.I. 58, Ex. 31 ¶ 42-45).

The second dispute is whether the preambles of claims 1 and 9 of the '488 patent are limiting. Plaintiff says yes they are and Defendant disagrees. Here I agree with Plaintiff.

A preamble is limiting if it provides “life, meaning, and vitality” to the claims.<sup>[5]</sup> There is no litmus test that defines when a preamble limits claim scope.<sup>[6]</sup> Rather “[w]hether to treat a preamble as a limitation is ‘determined on the facts of each case in light of the overall form of the claim, and the invention as described in the specification and illuminated in the prosecution history.’”<sup>[7]</sup>

In Claims 1 and 9, the preambles recite “calculating a value for the operational efficiency.” The body of the claims following the preambles require receiving and storing temperature measurements, making certain calculations and comparisons. Nowhere in the body of the claims[,] however[,] is it evident that steps are being performed to figure out the operational efficiency of the system. Thus, without the preamble a POSA would not understand the utility of the system described or the invention claimed. And I think that calculating the operational efficiency is more than just the intended purpose or use of the system[;] I think it is a fundamental characteristic of the claimed system. Thus, the preambles do add life, meaning and vitality to the claims and they are limiting.

The third term is “first state of repair” in Claims 1 and 15 of the '567 patent. Plaintiff argues that the term is indefinite because it lacks a definition in the patent or relevant art. Defendant argues that the term is not indefinite and the term should be given its plain and ordinary meaning, which is “state or condition which forms a baseline for comparison.”

I note that neither “repair” nor “state of repair” is used in the specification. But I don’t think that is dispositive because “state of repair” is simple language understandable to a POSA as evidenced

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<sup>5</sup> *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999).

<sup>6</sup> *Catalina Mktg. Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002).

<sup>7</sup> *Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349, 1357 (Fed. Cir. 2012) (quoting *Applied Materials, Inc. v. Advanced Semiconductor Materials America, Inc.*, 98 F.3d 1563, 1572-73 (Fed. Cir. 1996)).



by the various definitions from dictionaries and patents related to HVAC systems that Defendant cites.<sup>[8]</sup>

And I think that even though the specification doesn't use the words, it does disclose the concept of a state of repair. For example, at column 9, the patent talks about being able to diagnose problems and determine whether the operational efficiency of the HVAC system has decreased.<sup>[9]</sup> It explains how drops in efficiency can be determined by evaluating the cycle time of an HVAC system on "date X" that is working at a level of efficiency (such as "normal") on that date versus the cycle time on a different date "X+1." So I think that this supports that a state of repair is really just the condition of the system.

Now, as to Defendant's proposed language regarding a baseline.<sup>[10]</sup> I don't know that I see the support for that. But I do

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<sup>8</sup> (D.I. 58 at 46 (citing to Ex. 17 (Merriam-Webster) (defining "good/bad **state of repair**" as "good/bad **condition**"); Ex. 18 (World Law Dictionary) (defining "**state of repair**" as "the physical **condition** of something, especially of a building" in the context of property law); Ex. 19 (U.S. Patent App. Pub. No. 2021/0021972) ¶¶ 29, 57 (explaining how a subject device 200—including a "heating, ventilation, and air conditioning (HVAC) device"—has a current "**state of repair**" that may be provided in a record "indicating that the subject device 200 has broken down, is working sub-optimally, is giving off a warning or 'maintenance needed' signal, or the like"); Ex. 20 (U.S. Patent App. Pub. No. 2015/0323211) ¶ 80 (describing data "used to assess the **state of repair**" of HVAC equipment); Ex. 21 (Air Conditioning Contractors of America Standard) at 34 (in 2013 industry standard for "Maintenance of Residential HVAC Systems," referring to inspection of "**state of repair**" of HVAC equipment filters); Ex. 22 (Sama HVAC) (2018 HVAC company webpage noting that "[t]o understand the work needed, the technician needs to see the system *in situ*, and assess the **state of repair** of the system"); Ex. 23 (East Cooper HVAC) (HVAC company webpage explaining: "When an air conditioner is not routinely maintained, it will fall into disrepair. This **state of repair** requires the air conditioner to work harder in order to perform at the demanded level."); Ex. 24 (Ball HVAC) (HVAC company webpage explaining that "[w]hen your ducts are in a poor **state of repair**, you could see your home's energy efficiency decline sharply, and your heating and air conditioning make up a huge portion of your overall energy costs")) (emphases in original)).

<sup>9</sup> ('567 patent, col. 9, ll. 1-25).

<sup>10</sup> Plaintiff argues that "first state of repair" cannot refer to a baseline because that would change the meaning of the claims because nothing in the claim language requires it to be used as a baseline to compare against a second state. Plaintiff, however, has failed to show that a POSA would not understand "first state of repair" in the claims in the context of the specification. Initially, a "first state" is not necessarily required to have subsequent states

think that a POSA would understand the “first state of repair” refers to the condition of the HVAC system when calculating the “estimate[ed] rate of change in inside temperature” or “expected temperature measurements” in Claims 1 and 15, respectively, that are then used in comparison to the inside temperature to determine the operational efficiency of the HVAC system. So I will construe the term to mean an initial condition, with the clarification that I do not mean that it is the first or original from the factory condition.

So with that I am going to reject the argument that the term is indefinite. Plaintiff has not proven that by clear and convincing evidence. I suppose it is possible that other arguments will be made or new evidence will come out that sheds new light on the definiteness issue. So I won’t preclude Plaintiff from raising it again if appropriate later based on something new.

The fourth term is “expected temperature measurements of a rate of change in inside temperature” in Claim 15 of the ’567 Patent. Plaintiff argues the term is indefinite because there is no discernable meaning in the patent for what constitutes this expected measurement of a rate of change, nor how it could be calculated. Defendant argues that the term is not indefinite and the term should be given its plain and ordinary meaning, which is “expected temperature measurements resulting from a rate of change in inside temperature.” I find the term not indefinite and will give the term its plain and ordinary meaning, which is “expected temperature measurements based on historic measured rates of change in inside temperatures.”

As we discussed during the argument, the ITC has addressed this claim term already. I am not bound by that determination, but in this case, I find that the reasoning set forth is persuasive.

So I will adopt that reasoning and the result of it here. Let me quote:

[T]he whole point of the invention is to monitor an HVAC system’s operation over time to determine its operational efficiency. 567 patent, Abstract. The patent teaches that temperatures inside a house and outside a house are measured, and these measurements are used to predict what the house temperature should be at similar times of day,

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or be the first in a sequence of events. *See, e.g., 3M Innovative Properties Co. v. Avery Dennison Corp.*, 350 F.3d 1365, 1371 (Fed. Cir. 2003).

seasons, etc. *See, e.g.*, 567 patent, 9:1-35; 11:11-56. Moreover, claim 15 recites how the expected temperature measurements are derived, which are “based at least in part upon past temperature measurements and based at least in part on outside temperature measurements.” 567 patent, cl. 15. And the parties already agree that the meaning of “rate of change” is “the difference between inside temperature measurements divided by the span of time between the measurements.”<sup>[11]</sup> . . . Thus, a POSITA would understand, reading claim 15 and the specification, that “expected temperature measurements of a rate of change in inside temperature” means exactly that – the inside temperature that would be expected based on historic measured rates of change in inside temperatures.”<sup>[12]</sup>

And in so ruling, it means that Plaintiff has failed to put forth clear and convincing evidence that the term is indefinite for lack of discernible meaning.

The fifth term is “performance characteristic” in Claim 18 of the ’983 patent. Plaintiff argues that the term is indefinite because the claims and specification fail to inform a POSA about the scope of the invention. Defendant argues that the term is definite and should be accorded its plain and ordinary meaning, which means “property feature, or attribute of the HVAC system indicating its ability to change temperature.”

I am going to construe this term for now according to its plain and ordinary meaning, which as I see it is “a characteristic of performance.” At this point, I am not convinced that EcoFactor’s argument that the characteristic must indicate the system’s ability to change the temperature is correct so I am not including that. And like the ITC, I have some questions about the definiteness of this term and think it may be useful to see if anything more comes out after more fulsome discovery. So I will reject Ecobee’s definiteness argument on the current record, but allow it to raise the issue again as appropriate.

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<sup>11</sup> (D.I. 48 at 1).

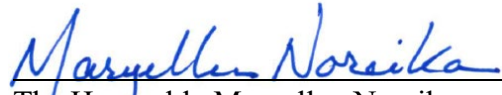
<sup>12</sup> (D.I. 58, Ex. 8 (*Certain Smart Thermostat Systems, Smart Hvac Systems, Smart Hvac Control Systems, and Components Thereof*, Inv. No. 337-TA-1258, Order No. 18) at 28).

Finally, we have the term “said thermostatic control device” in Claims 5 and 13 of the ’550 patent. Plaintiff argues that the term is indefinite because there is no reasonably ascertainable antecedent basis for the term. Defendant argues that the term is definite and should be accorded its plain and ordinary meaning, which it says is “the thermostatic controller.” Here, I agree with Defendant.

It is true that independent Claims 1 and 9 only recite a “thermostatic controller” and not the thermostatic control device in the dependent claims that rely on those. But I think that Defendant is correct that the claim appraises a POSA of the scope even if the words are slightly different, and therefore satisfies the notice function.<sup>[13]</sup> Moreover, Plaintiff’s “overly formalistic attack on this claim language ignores the relatively forgiving standard that the claim language must only reasonably appraise a POSA of its scope.”<sup>[14]</sup> Here, it is clear that “thermostatic control device” means “thermostatic controller,” and a POSA would, with reasonable certainty, be informed of the scope of the invention.

Therefore, I will construe “said thermostatic control device” to mean “the thermostatic controller.”

(D.I. 77 at 86:16-95:9).

  
The Honorable Maryellen Noreika  
United States District Judge

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<sup>13</sup> See *In re Downing*, 754 F. App’x 988, 996 (Fed. Cir. 2018).

<sup>14</sup> *Linksmart Wireless Tech., LLC. v. Caesars Ent. Corp.*, No. 218CV00862MMDNJK, 2020 WL 2308953, at \*9 (D. Nev. May 8, 2020).