

**United States Court of Appeals  
for the Federal Circuit**

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**SUNOCO PARTNERS MARKETING & TERMINALS  
L.P.,**  
*Plaintiff-Cross-Appellant*

v.

**U.S. VENTURE, INC., U.S. OIL CO., INC.,**  
*Defendants-Appellants*

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2020-1640, 2020-1641

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Appeals from the United States District Court for the Northern District of Illinois in No. 1:15-cv-08178, Judge Rebecca R. Pallmeyer.

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Decided: April 29, 2022

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Before PROST, REYNA, and STOLL, *Circuit Judges*.

PROST, *Circuit Judge*.

U.S. Venture, Inc. and U.S. Oil Co., Inc. (collectively, “Venture”) appeal the judgment of the Northern District of Illinois that Venture infringed patents owned by Sunoco Partners Marketing & Terminals L.P. (“Sunoco”). Sunoco cross-appeals. As to Venture’s appeal, we first reverse the district court’s determination that the experimental-use doctrine insulates a subset of asserted patent claims from the on-sale bar, vacate the infringement judgment as to those claims, and remand for the district court to analyze the second prong of the on-sale bar. Second, we vacate the infringement judgment with respect to patent claims that we affirmed are invalid in a separate appeal. Third, we adopt the district court’s claim constructions and affirm its infringement judgment regarding two patent claims. Fourth, we vacate the district court’s decision to treble the damages award, remanding for further proceedings. On the cross-appeal, we affirm the district court’s decisions to deny lost-profits damages and to award a \$2 million reasonable royalty.

## BACKGROUND

### I. Butane Blending

Gasoline producers blend butane into gasoline before selling it. They do that for at least two reasons: (1) butane makes gasoline more volatile, helping vehicles start more readily in colder temperatures, and (2) butane is cheaper than gasoline, so adding butane increases profitability. Efforts to achieve these benefits, however, are complicated by the need to comply with environmental regulations. Because butane contributes to air pollution in warmer temperatures, the U.S. Environmental Protection Agency (“EPA”) regulates the volatility of gasoline. Sunoco’s patented technology seeks to maximize butane content while

complying with these regulations, which vary depending on season and location.

Gasoline distribution is a multi-stage process. At a refinery, crude oil is refined into gasoline. After that, it goes through a pipeline to a storage facility called a tank farm, or terminal. There, it is dispensed from a “rack” into trucks, which deliver it to gas stations. While butane blending can be done anywhere along the line, doing it at the last possible point—the tank farm—lets producers maximize butane content based on the time of year and the gasoline’s destination. If, by contrast, producers blend “at refineries and in pipelines that serve several regions with varying [volatility] limits,” they “can add only the amount of butane permissible in the region with the strictest butane regulations.” *Sunoco Partners Mktg. & Terminals L.P. v. U.S. Venture, Inc.*, No. 15 C 8178, 2017 WL 1550188, at \*2 (N.D. Ill. Apr. 28, 2017) (“*Claim Construction Op.*”). Sunoco’s patents, accordingly, “describe a system and method for blending butane with the gasoline at a point close to the end of the distribution process: immediately before being distributed to the tanker trucks that take gasoline to consumer gas stations.” *Id.* That way, producers can “blend the maximum allowable butane into each batch based on where the truck is going and what month it is.” *Id.* at \*1.

## II. Procedural History

Sunoco sued Venture, alleging that its operation of butane-blending systems infringed claims of U.S. Patent Nos. 7,032,629 (“the ’629 patent”), 6,679,302 (“the ’302 patent”), 9,494,948 (“the ’948 patent”), and 9,606,548 (“the ’548 patent”). Venture counterclaimed that the asserted patents are not infringed, are invalid, and are unenforceable. After construing the claims, the district court ruled on

various summary judgment motions<sup>1</sup> and held a bench trial—ultimately awarding Sunoco \$2 million in damages, which it trebled to \$6 million. *Sunoco P’ship Mktg. & Terminals L.P. v. U.S. Venture, Inc.*, 436 F. Supp. 3d 1099, 1107 (N.D. Ill. 2020) (“*Post-Trial Op.*”). Venture appeals. Sunoco cross-appeals. We have jurisdiction under 28 U.S.C. § 1295(a)(1).

## DISCUSSION

On appeal, Venture challenges the district court’s (I) rejection of its on-sale-bar defense, (II) determination that it infringed two patents we have since held invalid, (III) construction of two claim terms, and (IV) decision to enhance damages. On cross-appeal, Sunoco challenges the district court’s decision not to grant lost-profits damages and its reasonable-royalty award. We address each issue in turn.

### I. On-Sale Bar

We first address Venture’s on-sale-bar defense. If successful, this defense would render invalid claim 2 of the ’629 patent and claims 2, 3, and 16 of the ’302 patent under the principle that “no person is entitled to patent an ‘invention’ that has been ‘on sale’ more than one year before filing a patent application” (i.e., before the critical date). *Pfaff v. Wells Elecs., Inc.*, 525 U.S. 55, 57 (1998) (quoting 35 U.S.C. § 102(b) (2006)<sup>2</sup>). To prevail, however, Venture needed to show that, before the critical date, Sunoco’s patented invention was both (1) “the subject of a commercial offer for

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<sup>1</sup> *Sunoco Partners Mktg. & Terminals L.P. v. U.S. Venture, Inc.*, 339 F. Supp. 3d 803, 822 (N.D. Ill. 2018) (“*Summary Judgment Op.*”); *Sunoco Partners Mktg. & Terminals L.P. v. U.S. Venture, Inc.*, No. 15 C 8178, 2017 WL 4283946, at \*10 (N.D. Ill. Sept. 27, 2017).

<sup>2</sup> This version of § 102 also applies here. *Summary Judgment Op.*, 339 F. Supp. 3d at 816.

sale” and (2) “ready for patenting.” *Helsinn Healthcare S.A. v. Teva Pharms. USA, Inc.*, 139 S. Ct. 628, 630 (2019) (quoting *Pfaff*, 525 U.S. at 67). And Venture had to “prove the facts underlying both prongs . . . by clear and convincing evidence.” *Allen Eng’g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1352 (Fed. Cir. 2002).

A patent owner like Sunoco can negate an on-sale bar by demonstrating that the sale occurred “primarily for purposes of experimentation.” *Id.* This experimental-use doctrine draws a “distinction between inventions put to experimental use and products sold commercially,” in the interest of protecting both “the public’s right to retain knowledge already in the public domain and the inventor’s right to control whether and when he may patent his invention.” *Pfaff*, 525 U.S. at 64. As the Supreme Court explained long ago, inventors may delay patenting to engage in “*bona fide* effort[s] to bring his invention to perfection, or to ascertain whether it will answer the purpose intended.” *City of Elizabeth v. Am. Nicholson Pavement Co.*, 97 U.S. 126, 137 (1877). At the same time, “[a]ny attempt to use [the invention] for a profit[] and not by way of experiment” before the critical date will “deprive the inventor of his right to a patent.” *Id.* Otherwise, patent owners could “acquire[] an undue advantage over the public” by “preserv[ing] the[ir] monopoly . . . for a longer period than is allowed.” *Id.*

From this framework, it follows that “[i]f there is adequate proof that a device was sold primarily for experimentation, the first prong of *Pfaff* would not be met and it would be unnecessary to consider” *Pfaff*’s second prong. *Allen*, 299 F.3d at 1353. That is how the district court proceeded here. It denied summary judgment of invalidity because, in its view, Sunoco “demonstrated the requisite experimental intent.” *Summary Judgment Op.*, 339 F. Supp. 3d at 817. And it did so “on [that] basis alone, even though the parties also dispute[d] whether the invention was ready for patenting.” *Id.* After trial, the district

court “adhere[d] to its previous analysis,” again rejecting the defense. *Post-Trial Op.*, 436 F. Supp. 3d at 1120.

“Application of the on-sale bar . . . is ultimately a question of law that we review de novo.” *Helsinn Healthcare S.A. v. Teva Pharms. USA, Inc.*, 855 F.3d 1356, 1363 (Fed. Cir. 2017), *aff’d*, 139 S. Ct. 628 (2019). “The factual findings underlying the district court’s conclusion are reviewed for clear error.” *Id.* For the reasons below, we (A) reverse the district court’s determination that Venture’s on-sale-bar defense is negated by the experimental-use doctrine and (B) remand for the district court to evaluate the ready-for-patenting prong of the on-sale bar.

#### A. Commercial Sale

Two days before February 9, 2000, the critical date, the inventors’ company, MCE Blending (“MCE”), offered to sell an automated butane-blending system to a company called Equilon Enterprise LLC (“Equilon”) and install it at Equilon’s terminal in Detroit. *Summary Judgment Op.*, 339 F. Supp. 3d at 816. MCE offered this system “in consideration for” Equilon’s commitment to purchase at least 500,000 barrels of butane from MCE over roughly five years. J.A. 9049. The district court decided that this transaction occurred primarily for experimental, rather than commercial, purposes. *Post-Trial Op.*, 436 F. Supp. 3d at 1120. We disagree.

Whether the Equilon transaction was for primarily experimental or commercial purposes “is a question of law to be analyzed based on the totality of the surrounding circumstances.” *Petrolite Corp. v. Baker Hughes Inc.*, 96 F.3d 1423, 1426 (Fed. Cir. 1996). We assess the Equilon sale “under the law of contracts as generally understood,” focusing on “those activities that would be understood to be commercial sales and offers for sale ‘in the commercial community.’” *Meds. Co. v. Hospira, Inc.*, 827 F.3d 1363, 1373 (Fed. Cir. 2016) (en banc) (quoting *Grp. One, Ltd. v. Hallmark Cards, Inc.*, 254 F.3d 1041, 1046 (Fed. Cir.

2001)). Accordingly, we begin by analyzing the Equilon agreement. The agreement begins by expressly describing the transaction as a sale, without reference to any experimental purpose. And as “consideration,” it identifies “the purchase” of butane:

*MCE agrees to sell to Equilon, and Equilon agrees to purchase, the Equipment (as hereinafter defined) along with a license to use certain technology and software owned by MCE pertaining to the computerized blending of Butane and gasoline stocks, in consideration for the purchase and sale of Butane as set forth herein.*

J.A. 9049 (emphases added). As the agreement later specifies, Equilon “agree[d] to purchase a minimum of 500,000 barrels of Butane.” J.A. 9060.

The recitals section of the agreement reinforces the sale’s commercial character. It states that MCE already “developed” the relevant technology and equipment, that Equilon wanted to purchase it, and that MCE was willing to sell it, install it, and supply butane for it:

*Whereas MCE has developed certain technology and Equipment for the blending of butane and similar components into gasolines in refined product terminals utilizing butane to maximize the Reid Vapor Pressure of the gasolines;*

*Whereas Equilon desires to utilize such blending technology and have installed and purchase such Equipment for blending butane in the refined petroleum products terminal facility owned and operated by Equilon in Detroit, Michigan (the “Terminal”); and*

*Whereas MCE is willing to install or cause to have installed said blending Equipment and to supply the butane to Equilon required for such blending at the Terminal.*

J.A. 9049 (emphases added).

This agreement in some respects resembles a contract we analyzed in *Helsinn*, in which a distributor “agreed to purchase exclusively from Helsinn, and Helsinn agreed to supply [its] requirements” of certain drugs. 855 F.3d at 1361. Similarly here, the Equilon agreement bears “all the hallmarks of a commercial contract for sale.” *Id.* at 1364. As in *Helsinn*, it represents “a ‘contract between parties to give and to pass rights of property for consideration which the buyer pays or promises to pay the seller for the thing bought or sold.’” *Id.* (quoting *Trading Techs. Int’l, Inc. v. eSpeed, Inc.*, 595 F.3d 1340, 1361 (Fed. Cir. 2010)). Specifically, the Equilon agreement obligated Equilon “to purchase a minimum of 500,000 barrels of butane from MCE at set prices over roughly five years” in exchange for MCE providing and installing the butane-blending system. *Summary Judgment Op.*, 339 F. Supp. 3d at 816.

Additionally, as in *Helsinn*, there is here “no suggestion” that the agreement “did not involve transfer of title.” 855 F.3d at 1364. Rather “it expressly contemplate[s] it.” *Id.* Ownership of MCE’s system would pass to Equilon via a bill of sale attached to the agreement:

*The ownership and title to the Equipment shall be conveyed to Equilon by MCE upon completion of the Equipment installation and training, as verified by written confirmation to Equilon, and subject to the provisions below. At such time, MCE shall execute a bill of sale in the form attach[ed] hereto as Schedule 1.04 to effectuate the conveyance of ownership of the Equipment to Equilon.*

J.A. 9051 (emphases added); *see also* J.A. 9076 (bill of sale).

The district court saw things differently. In its view, “the contract did not require Equilon to pay MCE anything in exchange for the system in the normal course of events.” *Summary Judgment Op.*, 339 F. Supp. 3d at 818; *see also*

Cross-Appellant's Br. 26 (asserting that "Equilon paid nothing for" the system). But while it is true that the agreement allocated the cost of installation to MCE (up to \$450,000), *Summary Judgment Op.*, 339 F. Supp. 3d at 818, that does not mean Equilon "exchanged no value for the *equipment* it received," Appellants' Br. 34. Rather, Equilon purchased MCE's equipment by committing to buy MCE's butane. That's a sale. *See Netscape Commc'ns Corp. v. Konrad*, 295 F.3d 1315, 1324–25 (Fed. Cir. 2002) (concluding that an offer to make a "remote database object . . . in exchange for four months full time employment or no more than \$48,000" was a "commercial offer for sale").

The district court discounted Equilon's butane-buying commitment because "butane is not the invention." *Summary Judgment Op.*, 339 F. Supp. 3d. at 820. According to the district court, the Equilon agreement had "two distinct sections," one for "the installation of the butane blending system" and another that was a "butane supply agreement." *Id.* at 821. But the provisions quoted above intertwine the sale of the equipment with the butane-supply commitment. Indeed, without Equilon's agreement to buy butane in exchange for the equipment, it could hardly be called a "sale"—but that is how the agreement describes itself. Moreover, other provisions expressly interrelate the cost of the blending system with Equilon's purchase of butane. Under one scenario, if there is a "change in applicable laws and regulations" resulting in "the inability to lawfully blend Butane into gasoline at the Terminal using the Equipment" but Equilon "has not purchased" a "minimum [of] 450,000 barrels" of butane, the agreement provides Equilon the option to "(1) purchase the balance of 450,000 barrels of Butane minus the Butane theretofore purchased . . . , or (2) pay a termination fee (representing the balance of the purchase price of the Equipment) to be invoiced by MCE, based on a percentage of the contract Butane quantities not lifted." J.A. 9065–66.

Sunoco's principal hook for asserting a primarily experimental purpose is a section of the agreement entitled "Equipment Testing." J.A. 9056–57. That section describes two sets of testing: pre-installation testing and post-installation testing. But neither persuades us that this sale was primarily experimental, rather than commercial. First, the contract describes the pre-installation testing as follows:

Prior to commencing installation of the Equipment, MCE shall conduct such testing of the Equipment as is necessary to determine whether the Equipment satisfies minimum operating standards established by MCE. In the event that MCE determines, as a result of such testing, for whatever reason, that the Equipment does not satisfy minimum operating standards established by MCE, then MCE shall have the right to unilaterally terminate this Agreement without any further obligation whatsoever, except that MCE shall be obligated to remove at its cost and expense any Equipment theretofore installed at the Terminal.

J.A. 9056. This provision does not necessarily evidence intent to experiment with the system's design. Rather, it states MCE's obligation to ensure that "the Equipment satisfies minimum operating standards," J.A. 9056—which indicates merely that the sale was conditioned upon testing to ensure satisfactory operation. Accordingly, this provision standing alone is inconclusive and insufficient to show a primarily experimental purpose.

The testing that actually happened pursuant to this provision, however, bears out that this pre-installation testing does not indicate a primarily experimental purpose. While Sunoco argues that MCE wanted "to experiment at an actual tank farm and determine whether their idea was capable of performing its intended purpose in its intended environment," *Summary Judgment Op.*, 339 F. Supp. 3d

at 817, and that it therefore entered the agreement “for access to Equilon’s facility to test under actual conditions,” Cross-Appellant’s Br. 28, the pre-installation testing that occurred did not need to be done at Equilon. Oral Arg. at 31:02–10, No. 20-1640, [https://oralarguments.cafc.uscourts.gov/default.aspx?fl=20-1640\\_07092021.mp3](https://oralarguments.cafc.uscourts.gov/default.aspx?fl=20-1640_07092021.mp3) (Sunoco’s Counsel: “[W]hen you’re talking about software and whether two pieces of equipment will communicate, there’s no reason that has to be done at Equilon.”). Indeed, the testing was not done at Equilon. Rather, the only pre-installation testing that occurred (which was done to determine whether the system could communicate with a component called a Grabner analyzer) was done by a third party, Wheatland Systems, in Kansas. *Summary Judgment Op.*, 339 F. Supp. 3d at 819. On top of that, it could have been done before or without the agreement. J.A. 6447–48 (Q: “[Y]ou could have done it at any time prior to you entering into the deal with Equilon in January of 2000, right?” A: “Right.”). The need to perform this testing, therefore, cannot have been the primary purpose for the Equilon sale.

And that is why Sunoco’s analogy to the Supreme Court’s seminal *City of Elizabeth* case falls flat. While “the nature of a street pavement,” the invention in that case, “is such that it cannot be experimented upon satisfactorily except on a highway, which is always public,” *City of Elizabeth*, 97 U.S. at 134, Sunoco does not dispute that MCE’s pre-installation testing was conducted at Wheatland, and could have been performed before offering to sell the system, Oral Arg. at 30:28–50 (Q: “Why was that testing necessary to a contract for sale? . . . Why couldn’t it be done before there was any kind of offer for sale? A: “There’s no

reason, I guess, that it couldn't have been—it was just part of the experimentation.”)<sup>3</sup>

The district court recognized that the pre-installation testing did not take place at Equilon, but it reasoned nonetheless that this testing “reflect[ed] the inventors’ need to experiment with their invention to determine whether it would work as intended as of the moment they offered the system to Equilon.” *Summary Judgment Op.*, 339 F. Supp. 3d at 819. If the district court was reasoning that this testing sufficiently showed a primarily experimental purpose, we disagree, for the reasons articulated above. If the district court was instead considering “whether the invention was under development, subject to testing, or otherwise still in its experimental stage at the time of the asserted sale,” that is not the question *Pfaff* prong 1 asks. *Allen*, 299 F.3d at 1354. “Instead,” it is “whether the primary purpose of the inventor at the time of the sale, as determined from an objective evaluation of the facts surrounding the transaction, was to conduct experimentation.” *Id.* Although we have “recogniz[ed] an overlap of the experimental use negation” and the prong 2 “ready for patenting standard,” *Invitrogen Corp. v. Biocrest Mfg., L.P.*, 424 F.3d 1374, 1379–80 (Fed. Cir. 2005) (citing *EZ Dock, Inc. v. Schafer Sys., Inc.*, 276 F.3d 1347, 1352 (Fed. Cir. 2002)), here we think the district court’s “still under development” observation regarding the Wheatland testing is better considered at prong 2.

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<sup>3</sup> For similar reasons, this testing is distinguishable from *Honeywell International Inc. v. Universal Avionics Systems Corp.*, in which “Honeywell entered into . . . negotiations to facilitate its programs to test” its terrain warning system with “human pilots in a genuine cockpit setting.” 488 F.3d 982, 996 (Fed. Cir. 2007).

The post-installation testing provision fares no better than the pre-installation testing provision. It states:

Upon completion of installation of the Equipment, MCE shall provide Equilon with written notice of such completion. Within three (3) days of said notice, Equilon shall (i) make all necessary arrangements within the Terminal to enable MCE to test the Equipment to determine whether the Equipment is properly blending butane, and (ii) provide notification to MCE that said arrangements have been made. MCE shall test the Equipment according to parameters set forth in Schedule 1.10. MCE shall proceed with testing in a timely manner and have a period not to exceed ninety (90) days from the date of said notification by Equilon to complete its testing.

J.A. 9057. These tests are not experiments, but are acceptance tests to confirm that the equipment “is properly blending butane”—that is, that it is working as promised. *E.g.*, J.A. 9051 (“MCE represents and warrants that upon transfer of title to the Equipment, the Equipment . . . will at such time be fit for the purpose of blending Butane into gasoline products in compliance with all applicable laws.”).

That is borne out by Schedule 1.10, the cross-referenced portion of the agreement that contains the testing “parameters.” J.A. 9057. Starting from the top, Schedule 1.10 is entitled “System Site Acceptance Test (“SAT”) – Equipment Testing Parameters.” J.A. 9078 (capitalization normalized). It then states: “MCE shall test the Equipment according to the following parameters and *confirm* the Equipment is performing *in accordance with MCE’s representations, warranties, and guarantees.*” J.A. 9078 (emphases added). Next, it lists various parameters for MCE to “[v]erify” (e.g., “[v]erify communication cables are properly installed and functioning”), subdivided by headings like “Installation of Hardware,” “Electrical Wiring,”

and “Hardware Functionality.” J.A. 9078. At the end, Schedule 1.10 says: “Once verified, [the] system must run twelve consecutive loads with an accuracy within +/- 2% of the desired [Reid Vapor Pressure] with no system-related alarm conditions.” J.A. 9078. As Venture points out, MCE and Sunoco used the same set of tests in later commercial contracts.<sup>4</sup> Compare J.A. 9057, with J.A. 8392, and J.A. 11396. Simply put, these are “acceptance tests” to “[v]erify” and “confirm” that the installed system functioned as MCE warranted. J.A. 9057. They are not “experiments” in the way the experimental-use doctrine contemplates. Thus, neither of the agreement’s two “equipment testing” provisions undermines our conclusion that the Equilon agreement, on its face, memorializes a commercial, bargained-for sale.

Although Sunoco also relies on the inventors’ testimony that their intent was experimental, the district court properly recognized that “the inventors’ subjective intent is of minimal importance,” pivoting to “the objective evidence” of the contract. *Summary Judgment Op.*, 339 F. Supp. 3d at 818 (citing *Petrolite*, 96 F.3d at 1427). We, too, think this testimony carries little weight. See *Electromotive Div. of Gen. Motors Corp. v. Transp. Sys. Div. of Gen. Elec. Co.*, 417 F.3d 1203, 1212 (Fed. Cir. 2005) (“Certain things are settled. Significantly, an inventor’s subjective intent to experiment cannot establish that his activities are, in fact, experimental.”). Rather, we “have generally looked to objective evidence to show that a pre-critical date sale was primarily for experimentation.”<sup>5</sup> *Id.*

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<sup>4</sup> This point was not among the “key differences” the district court noted between the Equilon agreement and these later agreements. See *Post-Trial Op.*, 436 F. Supp. 3d at 1119–20.

<sup>5</sup> For example, we previously have set forth a list of objective factors relevant to deciding whether a public use

Here, particularly in view of the agreement's provisions discussed above, the record contains little to no objective evidence indicating such a purpose.

Thwarting “an inventor’s attempt to commercialize his invention beyond the statutory term” is the “overriding concern of the on-sale bar.” *Atlanta Attachment Co. v. Leggett & Platt, Inc.*, 516 F.3d 1361, 1365 (Fed. Cir. 2008). Here, the testing described in the Equilon agreement occurred to effectuate the sale, rather than the sale occurring to occasion the testing. Therefore, we conclude that the Equilon agreement was an offer for sale made to commercially exploit the invention rather than primarily for experimental purposes. On that basis, we reverse the district court’s experimental-use determination and vacate its infringement determination with respect to ’629 patent claim 2 and ’302 patent claims 2, 3, and 16.

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or sale was “primarily experimental and not commercial”: (1) “the necessity for public testing,” (2) “the amount of control over the experiment retained by the inventor,” (3) “the nature of the invention,” (4) “the length of the test period,” (5) “whether payment was made,” (6) “whether there was a secrecy obligation,” (7) “whether records of the experiment were kept,” (8) “who conducted the experiment,” (9) “the degree of commercial exploitation during testing,” (10) “whether the invention reasonably requires evaluation under actual conditions of use,” (11) “whether testing was systematically performed,” (12) “whether the inventor continually monitored the invention during testing,” and (13) “the nature of the contacts made with potential customers.” *Electromotive*, 417 F.3d at 1213. “This list is not exhaustive, and all of the experimentation factors may not apply in a particular case.” *Id.*

### B. Ready for Patenting

As prefaced above, our conclusion on experimental use does not necessarily render any asserted claims invalid. Venture still must show that the system sold anticipated or rendered obvious the claimed invention and that it was ready for patenting. *Allen*, 299 F.3d at 1352. The latter showing can be made in “at least two ways: by proof of reduction to practice before the critical date[,] or by proof that prior to the critical date the inventor had prepared drawings or other descriptions of the invention that were sufficiently specific to enable a person skilled in the art to practice the invention.” *Pfaff*, 525 U.S. at 67–68. Accordingly, we remand for the district court to assess these disputed questions in the first instance.

### II. Invalid Patent Claims

The district court also held that Venture infringed ’948 patent claim 7 and ’548 patent claims 1–3 and 6. *Post-Trial Op.*, 436 F. Supp. 3d at 1121–24. But the Patent Trial and Appeal Board subsequently determined that those claims (indeed, all claims of those patents) were unpatentable—a decision we later affirmed. *Sunoco Partners Mktg. & Terminals L.P. v. Magellan Midstream Partners L.P.*, 853 F. App’x 668 (Fed. Cir. 2021). Given that Sunoco was “afforded the opportunity to exhaust [its] remedy of appeal,” Venture “should not have to continue defending a suit for infringement of an adjudged invalid patent.” *See XY, LLC v. Trans Ova Genetics*, 890 F.3d 1282, 1294 (Fed. Cir. 2018) (cleaned up). Therefore, we vacate the infringement judgment as to those invalid claims.

### III. Claim Construction

We now consider Venture’s claim-construction challenges for ’302 patent claims 16–17 and ’629 patent claim 31. Although we vacate the infringement judgment with respect to ’302 patent claim 16 based on the on-sale-bar issue, Venture represents that ’302 patent claim 17

and '629 patent claim 31 are “unaffected” by that issue. Appellants’ Br. 43. We therefore turn to Venture’s arguments that the district court’s infringement determinations regarding those claims rest on claim-construction errors. “Claim terms are generally accorded their ordinary meaning—that is, their meaning to a skilled artisan at the time of the invention.” *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 784, 791 (Fed. Cir. 2021). “This approach ‘provides an objective baseline’ for our inquiry.” *Id.* (quoting *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc)). “We review claim construction based on intrinsic evidence de novo and review any findings of fact regarding extrinsic evidence for clear error.” *SpeedTrack, Inc. v. Amazon.com, Inc.*, 998 F.3d 1373, 1378 (Fed. Cir. 2021) (citing *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 331–32 (2015)). For the reasons set forth below, we affirm with respect to both patent claims.

#### A. '302 Patent Claim 17

The disputed claim phrase of the '302 patent appears in claim 14, on which claim 17 depends. We reproduce the relevant claim language below, including claims 12 and 13 for context. Independent claim 12 recites:

12. A method for blending gasoline and butane at a tank farm comprising:
  - a) drawing a gasoline stream from a tank of gasoline;
  - b) drawing a butane stream from a tank of butane;
  - c) blending the butane and gasoline streams, at the tank farm, to form a blend; and
  - d) dispensing the blend to gasoline transport vehicles using a dispensing unit located at a rack.

Dependent claim 13, in turn, adds that this method further comprises the following two steps:

- a) determining a blend ratio of butane and gasoline in the butane and gasoline streams that will yield a desired vapor pressure, and
- b) blending the gasoline and butane streams at the blend ratio.

Claim 14 then adds the disputed phrase (emphasis added):

14. The method of claim 13, wherein the blend ratio is determined from a vapor pressure of the gasoline stream and *a vapor pressure of the butane stream*.

Claims 16 and 17 add further limitations.

During *Markman* proceedings, Venture argued that the phrase “a vapor pressure of the butane stream” means “vapor pressure determined by a measurement taken from the butane stream.” *Claim Construction Op.*, 2017 WL 1550188, at \*16. Sunoco, for its part, argued that the phrase did not need construction—proposing instead that it be construed according to its plain and ordinary meaning. *Id.* At the time, Venture focused on arguing that various “vapor pressure” measurements of the gasoline and butane streams must be taken at particular locations in the process. *Id.* at \*16–17. The district court concluded that the phrase needed no construction and observed that “the parties do not appear to dispute the meaning of ‘a vapor pressure’ as a property of the stream.” *Id.* at \*17.

Later, at summary judgment, Venture argued that certain of the accused systems did not infringe claim 16 “because they used only an ‘assumed’ butane vapor pressure rather than ‘an actual butane vapor pressure.’” *Summary Judgment Op.*, 339 F. Supp. 3d at 832. The district court disagreed, concluding that “[c]laim 16 does not expressly require the determination of such an ‘actual’ butane vapor pressure.” *Id.* The court added also that Venture’s construction “makes little sense in light of claim 15, which recites steps for determining butane vapor pressure by

‘drawing a sample of butane from the butane stream’ and ‘measuring the vapor pressure of the sample of butane.’” *Id.* (quoting ’302 patent claim 15). In the district court’s view, Venture’s construction “would make claim 15 redundant.” *Id.*

After trial, the district court determined that Venture infringed the disputed claim phrase because it “used a value for butane vapor pressure—either determined from a sampling of the butane stream or through the use of an assumed value.” *Post-Trial Op.*, 436 F. Supp. 3d at 1124. The court acknowledged Venture’s contention that the accused systems “did not infringe if they used only a butane vapor pressure value that was assumed or added to the programs by a human operator.” *Id.* at 1125. But it again reasoned that “[t]he plain language . . . does not require that butane vapor pressure be determined by sampling the butane stream, as Venture’s own invalidity expert interpreted the claim.” *Id.* (citing J.A. 7881). It also reiterated that “such an interpretation would render other claims superfluous.” *Id.*

Now, on appeal, the parties once again disagree whether the phrase “vapor pressure of the butane stream” requires an actual vapor-pressure measurement, as Venture argued, or also covers an assumed vapor-pressure value, as Sunoco contends. We agree with the district court. The plain language of “a vapor pressure of the butane stream” does not expressly require an actual measurement. Thus, the plain claim language strongly suggests that there is no measurement requirement. This is bolstered by the construction of Venture’s invalidity expert. Indeed, as the district court observed, that is how Venture’s invalidity expert interpreted the phrase. J.A. 7881 (Q: “So in your invalidity analysis, determining a blend ratio from a vapor pressure of the gasoline stream and a vapor pressure of the butane stream can be done using known or assumed vapor pressure for the gasoline and the butane?” A: “Yes, that could be done.”).

Venture argues that actual measurement is required because of the following passage in the patent specification:

To calculate the blend ratio one must first have knowledge of the respective vapor pressures of the gasoline and butane streams. Therefore, the vapor pressures of the gasoline and butane streams are preferably measured in order to generate the data used in the blending ratio calculation. The measurement can be carried out in a number of ways. Because of the variability in [ ]vapor pressure of gasoline (due to the varying composition of gasoline delivered through pipelines) and butane (due to the difference in vapor pressure of n-butane and isobutane), the vapor pressure is preferably measured directly, by a unit specifically designed to make such measurements from samples of gasoline and butane.

'302 patent col. 7 ll. 19–30. But this passage says merely that the vapor pressures “are *preferably* measured,” expressing a preference but not a mandatory requirement for how to obtain “knowledge of the respective vapor pressures.” *Id.* at col. 7 ll. 19–20 (emphasis added). Ultimately, we see nothing in this specification passage (or anywhere else) that justifies limiting the claim to actual measurements. We therefore adopt the district court’s claim construction and affirm its judgment that Venture infringed '302 patent claim 17.

#### B. '629 Patent Claim 31

The parties also dispute the proper construction of '629 patent claim 31, which recites (emphasis added):

31. A computer-implemented method for blending a butane stream and a gasoline stream comprising the steps of:

*receiving a first measurement indicating a vapor pressure of the gasoline stream;*

*calculating a blend rate at which the butane stream can be blended with the gasoline stream;*

transmitting an instruction to a programmable logic controller for adjusting the butane stream to the calculated blend rate for blending with the gasoline stream and distributing at a rack; and

receiving a second measurement indicating a vapor pressure of the blended gasoline stream and butane stream.

Specifically, the parties disagree on whether the received “first measurement” must be used in “calculating” the blend rate. Venture maintained that certain of its systems do not infringe because “they collected the vapor pressure of unblended gasoline only for recordkeeping purposes” rather than using the measurement in the step of calculating a blend rate. *Post-Trial Op.*, 436 F. Supp. 3d at 1126. The district court, however, concluded that “claim 31 does not require that the measurement actually be used to calculate the ratio.” *Id.* And although Venture argued that interpreting the preamble as limiting, as the district court did, “requires the court to conclude that the measurement must be used as part of the blending,” the court observed that “merely using the value for recordkeeping purposes is consistent with” the limiting preamble. *Id.*

We agree with the district court’s ultimate conclusion. First, the plain language of the “receiving” step does not state that the first measurement must be used in the blend-rate calculation. Rather, it just requires “receiving a first measurement indicating a vapor pressure of the gasoline stream” without specifying the measurement’s ultimate purpose. Similarly, the “calculating” step does not specify that the calculation is based on the received first measurement. Simply put, the claim language does not tie these two steps together. Although it is true, as Venture notes, that the claim recites “no other means to calculate how much butane to add,” Appellants’ Br. 48, Sunoco correctly

notes that this is a “comprising” claim and therefore may cover unclaimed elements, *e.g.*, *Invitrogen Corp. v. Biocrest Mfg., L.P.*, 327 F.3d 1364, 1368 (Fed. Cir. 2003). Additionally, even if the preamble is limiting, it does not require a different result because using the measurement for record-keeping purposes can, in the context of this patent, be considered part of the method described in the preamble. As the district court noted, this follows from dependent claims 32 and 33, which incorporate the preamble and specify a recordkeeping step: “generating a report that includes the ‘first measurement.’” *Post-Trial Op.*, 436 F. Supp. 3d at 1126 (quoting ’629 patent claims 32 & 33). Accordingly, we adopt the district court’s claim construction and affirm its judgment that Venture infringed ’629 patent claim 31.

#### IV. Enhanced Damages

Venture also challenges the district court’s decision to enhance damages. District courts enjoy discretion to “increase the damages up to three times the amount found or assessed.” 35 U.S.C. § 284. As the Supreme Court explained, “[t]he sort of conduct warranting enhanced damages has been variously described . . . as willful, wanton, malicious, bad-faith, deliberate, consciously wrongful, flagrant, or—indeed—characteristic of a pirate.” *Halo Elecs., Inc. v. Pulse Elecs., Inc.*, 579 U.S. 93, 103–04 (2016). Stated differently, “such damages are generally reserved for egregious cases of culpable behavior.” *Id.* at 104.

We have set forth the following factors to guide the enhancement analysis: (1) whether the infringer deliberately copied the ideas or design of another, (2) whether the infringer investigated the scope of the patent and formed a good-faith belief that it was invalid or that it was not infringed, (3) the infringer’s behavior as a party to the litigation, (4) the defendant’s size and financial condition, (5) the closeness of the case, (6) the duration of defendant’s misconduct, (7) remedial action by the defendant, (8) the

defendant's motivation for harm, and (9) whether the defendant attempted to conceal its misconduct. *Read Corp. v. Portec, Inc.*, 970 F.2d 816, 827 (Fed. Cir. 1992), *abrogated in part on other grounds* by *Markman v. Westview Instruments, Inc.*, 517 U.S. 370 (1996). These factors are nonexclusive, and district courts are not required to discuss them. *Presidio Components, Inc. v. Am. Tech. Ceramics Corp.*, 875 F.3d 1369, 1382–83 (Fed. Cir. 2017). Rather, they must “consider the particular circumstances of the case.” *Id.* at 1383. We review “whether enhanced damages are appropriate” for abuse of discretion. *Halo*, 579 U.S. at 107.

Although the district court noted that “several” of the factors “weigh in Venture’s favor,” *Post-Trial Op.*, 436 F. Supp. 3d at 1131, it nonetheless enhanced damages—for four reasons. First, the court noted “it appears that Venture effectively copied the [patented] system.” *Id.* at 1132. Second, the court concluded that an “opinion letter provided to Venture by attorney John Manion [‘Manion Opinion’],” on which Venture relied, “does not show that Venture had a good-faith belief that it was not infringing the patents.” *Id.* at 1133. Third, the court determined that “Venture’s litigation conduct,” which it described as “less-than-ideal,” “favors enhanced damages.” *Id.* at 1134–35. Last, the court expressed that “Venture’s expansion of its butane[-]blending business after this litigation began is troublesome.” *Id.* at 1135. We conclude that the district court abused its discretion in enhancing damages, based on a clear factual error in the district court’s treatment of the Manion Opinion—a ground that impacts its other enhancement grounds.

“[A]n accused infringer’s reliance on an opinion of counsel regarding noninfringement or invalidity of the asserted patent remains relevant to the infringer’s state of mind post-*Halo*.” *Omega Pats., LLC v. CalAmp Corp.*, 920 F.3d 1337, 1353 (Fed. Cir. 2019). But an opinion of counsel like the Manion Opinion “must be competent or it is of little

value in showing the good faith belief of the infringer.” *Commark Commc’ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1191 (Fed. Cir. 1998) (internal quotation marks omitted). Thus, before considering “the exculpatory value of an opinion of counsel, the legal advice contained therein must be found on the totality of the circumstances to be competent such that the client was reasonable in relying upon it.” *Id.* Here, although the district court concluded that the Manion Opinion “does not show that Venture had a good-faith belief that it was not infringing the patents” and that Sunoco “established that critical premises of the [opinion] letter were flawed,” *Post-Trial Op.*, 436 F. Supp. 3d at 1133, the court made a clear factual error along the way, as explained below.

Manion’s noninfringement opinion relied on the fact that Venture’s system inserted an intermediate tank between the blending unit and the rack (i.e., the location where gas is dispensed to trucks). *Id.* Noting that the patent examiner described the patented invention as “blending and dispensing . . . at a rack,” Manion opined that “[b]ecause the unblended gasoline in [Venture’s] system does not come from a tank and because the blended gasoline is dispensed to a tank, these claims are not infringed.” J.A. 8273. A key reason the court discounted that opinion was its view that Manion did not know the blended gasoline in Venture’s system could still flow immediately from the intermediate tank to the rack where it would be dispensed. *Post-Trial Op.*, 436 F. Supp. 3d at 1133 (“At trial, Manion testified that he was unaware of Venture’s design for the blend to flow immediately from a tank to a truck rack.”). But as Venture demonstrates, Manion’s testimony makes clear that he did indeed understand this point. *E.g.*, J.A. 7467 (“As an engineer, I realized that there was product flowing in to the tank and there’s product flowing out of the tank, and it’s conceivable that that could be happening simultaneously.”); J.A. 7473 (“[A]gain, the proposed system was blending to a tank; and as we talked about

before, you know, it's very common for you to be filling a tank and emptying a tank at the same time. There's nothing that says you can't drain a tank while you're filling a tank. . . . So, it's very normal to be filling and dispensing at the same time." The district court disregarded that testimony because of other testimony that it saw as indicating that Manion "had never heard of the type of tank that Venture used between the blending instrument and rack." *Post-Trial Op.*, 436 F. Supp. 3d at 1134. But the record shows that Manion was merely confused by an unfamiliar term—"online rack tank"—that Sunoco's attorney was using. *E.g.*, J.A. 7459 ("I'm sorry, you said an online rack tank? . . . I don't know what an online rack tank is. . . . I would have to figure out what that means."); J.A. 7468 ("Like I said previously, I'd never heard of an online rack tank.").

This error also undermines other grounds the district court relied on for enhancement. Specifically, Venture's culpability (if any) for copying, as well as for its business expansion, depends in part on whether it had a good-faith belief that it was not infringing, which relates to the competence of the Manion Opinion. And although the district court's finding regarding litigation conduct is not similarly tied to its Manion-Opinion findings, acts of litigation misconduct standing alone "are not sufficient for an increased damages award . . . because they are not related to the underlying act of infringement and say nothing about the culpability of the infringer." *Jurgens v. CBK, Ltd.*, 80 F.3d 1566, 1570–71 (Fed. Cir. 1996) ("Only a culpable infringer can be held liable for increased damages, not an innocent one."); *see also i4i Ltd. P'ship v. Microsoft Corp.*, 598 F.3d 831, 859 (Fed. Cir. 2010) ("[I]t would have been improper to enhance damages based solely on litigation misconduct . . ."), *aff'd*, 564 U.S. 91 (2011). As the Supreme Court explained in *Halo*, "[a]wards of enhanced damages . . . are not to be meted out in a typical infringement case, but are instead designed as a 'punitive' or 'vindictive'

sanction for egregious *infringement* behavior.” 579 U.S. at 103 (emphasis added). Accordingly, because the district court’s enhancement “is based on clearly erroneous findings of fact,” it amounts to an abuse of discretion. *Cybor Corp. v. FAS Techs., Inc.*, 138 F.3d 1448, 1460 (Fed. Cir. 1998) (en banc), *abrogated on other grounds by Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 789 F.3d 1335 (Fed. Cir. 2015). We therefore vacate the district court’s enhancement determination and remand for the district court to reassess enhancement.

## V. Cross-Appeal

On cross-appeal, Sunoco challenges (A) the district court’s decision to deny lost-profits damages and (B) its reasonable-royalty award. We review the damages award, including the decision whether to grant lost profits, for clear error. *Golden Blount, Inc. v. Robert H. Peterson Co.*, 438 F.3d 1354, 1372 (Fed. Cir. 2006). Because we discern no clear error in the district court’s decision to deny lost profits or its reasonable-royalty calculation, we affirm those aspects of the judgment.

### A. Lost-Profits Damages

First, we address Sunoco’s argument that the district court should have granted lost-profits damages. “When a patentee proves it would have made additional sales but for a defendant’s infringement, the patentee is entitled to be made whole for the profits it proves it lost.” *Mentor Graphics Corp. v. EVE-USA, Inc.*, 851 F.3d 1275, 1284 (Fed. Cir. 2017). More specifically, “a patentee is entitled to lost[-]profit damages if it can establish four things: (1) demand for the patented product; (2) absence of acceptable non-infringing alternatives; (3) manufacturing and marketing capability to exploit the demand; and (4) the amount of profit it would have made.” *Id.* at 1285 (citing *Panduit Corp. v. Stahl Bros. Fibre Works*, 575 F.2d 1152, 1156 (6th Cir. 1978)).

At the district court, the parties focused on factor (2), contesting whether Venture’s accused system, if modified to be manually operated, was an available and acceptable non-infringing alternative. *Post-Trial Op.*, 436 F. Supp. 3d at 1127–28. Although the court answered in the negative, it nonetheless declined to award lost profits—concluding that Sunoco had failed to prove factor (4), the amount of profit it would have made. On this factor, Sunoco had argued it was entitled to \$31.585 million, “the amount that Sunoco would have received, had Venture signed a butane[-]supply agreement with Sunoco and the two parties split the resulting profits fifty-fifty.” *Id.* at 1128. The district court rejected this theory on the ground that butane-supply agreements do not accurately reflect the value of the patented invention—since “neither butane nor blended gasoline is the patented invention.” *Id.*

That was not clear error. As Venture points out, the butane-supply agreements reflect a bundle of goods and services beyond just the patented invention—e.g., the purchase and sale of butane, equipment maintenance and monitoring, and a license to more than just the patented technology. Appellants’ Reply Br. 11–13 (discussing the particulars of agreements appearing at J.A. 11217–500). This means Sunoco’s “\$31.585 million figure represents more than just the damage Sunoco incurred from Venture’s infringement” and “do[es] not translate into the value of the patent.” *Post-Trial Op.*, 436 F. Supp. 3d at 1128. None of Sunoco’s arguments to the contrary leave us with “the definite and firm conviction that a mistake has been committed.” *United States v. U.S. Gypsum Co.*, 333 U.S. 364, 395 (1948). Rather, the reasons articulated by the district court satisfy us that it did not clearly err in denying lost profits. Accordingly, we decline to disturb the court’s decision to deny lost-profits damages.

### B. Reasonable Royalty

Last, we turn to Sunoco's challenge to the district court's reasonable-royalty calculation. "The amount of damages determined by a district court is a question of fact that is reviewed for clear error on appeal, while the method used by a district court in reaching that determination is reviewed for an abuse of discretion." *Cybor*, 138 F.3d at 1461. We discern no clear error or abuse of discretion in the reasonable-royalty award, as the district court rejected Sunoco's reasonable-royalty analysis because it "suffers from the same flaw as [Sunoco's] lost profits analysis: it relies in large part on a comparison with Sunoco's butane supply agreements, which cover services beyond simply the value of the patents." *Post-Trial Op.*, 436 F. Supp. 3d at 1129. Venture's reasonable-royalty analysis, in contrast, was based on the difference between using a manual blending system and using Sunoco's automated system to blend butane—calculating a \$5.6 million royalty as the maximum royalty the parties would have hypothetically agreed upon. *Id.* The district court then credited the opinion of Venture's expert that a more likely royalty would be a \$2 million lump sum, and it checked that figure against a \$1.714 million figure calculated from a prior license Sunoco granted to the previous owner of its patents, Texon, after buying Texon's blending business. *Id.* at 1129–30. Because we see no clear error or abuse of discretion, we affirm the reasonable-royalty award.<sup>6</sup>

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<sup>6</sup> Venture represents that damages would not need to be recalculated if we reject Sunoco's arguments on cross-appeal (we do) and if Venture does not prevail on every appealed issue regarding infringement and invalidity (it doesn't). Oral Arg. at 1:40–2:53.

## CONCLUSION

We have considered the parties' remaining arguments but find them unpersuasive. We vacate the district court's infringement judgment with respect to '629 patent claim 2 and '302 patent claims 2, 3, and 16, vacate its infringement judgment with respect to the '948 and '548 patents, adopt its claim constructions and affirm its infringement judgment with respect to '302 patent claim 17 and '629 patent claim 31, affirm its denial of lost-profits damages, and affirm its reasonable-royalty analysis. Since we here affirm the judgment of infringement as to '302 patent claim 17 and '629 patent claim 31, we affirm the \$2 million royalty. The \$2 million royalty is not subject to increase if the district court finds infringement of other claims. We remand for the district court to assess the ready-for-patenting prong of the on-sale-bar analysis and reassess enhancement for the reasons stated above and in light of the now restricted scope of infringement. The permanent injunction entered by the district court is now expired due to the expiration of the patents and in any event should be vacated except as to '302 patent claim 17 and '629 patent claim 31.

**AFFIRMED-IN-PART, REVERSED-IN-PART,  
VACATED-IN-PART, AND REMANDED**

## COSTS

The parties shall bear their own costs.