

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

**ARCELORMITTAL ATLANTIQUE ET LORRAINE,
ARCELORMITTAL,
*Plaintiffs-Appellants***

v.

**AK STEEL CORPORATION,
*Defendant-Appellee***

2017-1637

Appeal from the United States District Court for the District of Delaware in No. 1:13-cv-00685-SLR, Judge Sue L. Robinson.

Decided: November 5, 2018

SEALED OPINION ISSUED: November 5, 2018

PUBLIC OPINION ISSUED: November 14, 2018*

CONSTANTINE L. TRELA, JR., Sidley Austin LLP, Chicago, IL, argued for plaintiffs-appellants. Also represented by HUGH ABRAMS, Shook Hardy & Bacon, LLP,

* This opinion was originally filed under seal and has been unsealed in full.

Chicago, IL; JEFFREY B. BOVE, Ratner Prestia, Wilmington, DE.

CHRISTOPHER NEIL SIPES, Covington & Burling LLP, Washington, DC, argued for defendant-appellee. Also represented by JEFFREY HOWARD LERNER.

Before REYNA, WALLACH, and HUGHES, *Circuit Judges*.

REYNA, *Circuit Judge*.

Appellants appeal from a grant of summary judgment of non-infringement. The U.S. District Court for the District of Delaware granted summary judgment as a matter of law after concluding Appellants' infringement action was collaterally estopped. Because evidence indicates a material difference in the accused products in this action, collateral estoppel does not apply and the entry of summary judgment was error. We vacate and remand.

BACKGROUND

Plaintiff-Appellants ArcelorMittal Atlantique et Lorraine and ArcelorMittal and Plaintiff-Appellants' predecessor in interest, ArcelorMittal France (collectively "ArcelorMittal") own U.S. Patent No. 6,296,805 (the "'805 patent") and two reissues of the '805 patent, U.S. Patent Nos. RE44,153 (the "RE153 patent") and RE44,940 (the "RE940 patent"). This appeal primarily involves the RE940 patent.

1. Hot-Stamped Boron Sheets

The asserted RE940 patent, issued June 10, 2014, relates to boron steel sheets with an aluminum-based coating that, when hot-stamped, become highly mechanically resistant. Mechanical resistance, or ultimate tensile strength ("UTS"), is measured in megapascals ("MPa").

Hot-stamping is a thermal treatment process where steel blanks are rapidly heated, inserted into a stamping machine that contains special dies, stamped into a particular shape, and then rapidly cooled, or quenched. *See ArcelorMittal Fr. v. AK Steel Corp.*, 700 F.3d 1314, 1317–18 (Fed. Cir. 2012) (“*ArcelorMittal I*”). The hot-stamping process alters the crystalline microstructure of the steel, and thereby its UTS, by transforming at least a portion of the steel’s microstructure to a form known as martensite. *Id.* Steel with a martensitic microstructure is capable of having a high UTS. *See id.* The hot-stamping process gives the steel significantly higher UTS than its pre-stamped state. *Id.* Thus, two steel sheets of the same composition can have significantly different UTSs depending on whether and how they have been thermally treated. The high UTS of the hot-stamped steel is desirable for use in the production of auto parts.

Independent claim 17 of the RE940 patent is representative of the asserted product-by-process claims and recites:

17. A hot-rolled coated steel sheet comprising a hot-rolled steel sheet coated with an aluminum or aluminum alloy coating, wherein said coated steel sheet is in the form of a delivery coil and the steel in the sheet comprises the following composition by weight:

0.15%<carbon<0.5%
0.5%<manganese<3%
0.1%<silicon<0.5%
0.01%<chromium<1%
titanium<0.2%
aluminum<0.1%
phosphorus<0.1%

sulfur<0.05%

0.0005%<boron<0.08%, the remainder being iron and impurities inherent in processing, and the steel sheet has a *very high mechanical resistance in excess of 1500 MPa* after *thermal treatment* and the aluminum or aluminum alloy coating provides a high resistance to corrosion of the steel sheet.

RE940 patent col. 6 ll. 20–39 (emphasis added).

The language of claim 17 in the RE940 patent is nearly identical to the language of claim 1 in the '805 patent. The difference is that claim 17 of the RE940 patent reflects the district court's prior claim construction that "very high mechanical resistance" in the '805 patent means "a mechanical resistance of 1500 MPa or greater," which was affirmed by this court on appeal as part of an earlier litigation in 2010. *See ArcelorMittal I*, 700 F.3d at 1321–22. The claimed "thermal treatment" inherently includes "hot-shaping the coated steel sheet" and cooling it to produce martensitic structures. Appellee Br. 19. This appeal focuses on the limitations "thermal treatment" and "a mechanical resistance in excess of 1500 MPa."

2. The 2010 Action

In January 2010, ArcelorMittal sued AK Steel Corporation ("AK Steel") for infringement of the '805 patent (the "2010 action").¹ The primary issue in the 2010 action was

¹ This is the fourth appeal involving these parties. The first three appeals arose from district court case No. 1:10-cv-00050-MN, filed in 2010 in the District of Delaware. The 2010 action was based on the '805 patent and the RE153 patent. This appeal arises from a distinct

whether steel sheets produced by AK Steel met the “a mechanical resistance of 1500 MPa or greater” limitation of the ’805 patent after thermal treatment.

The record indicates that when the 2010 action was filed, AK Steel manufactured steel sheets referred to as “AXN,” which denoted that the steel sheets were an experimental grade. *ArcelorMittal v. AK Steel Corp.*, No. 13–685–SLR, 2017 WL 239344, at *2 & n.6 (D. Del. Jan. 19, 2017). Evidence about the stamped AXN products indicated stamping by a single non-commercial “prototype shop” named Vehma. J.A. 1061–62. The evidence indicated that the stamped AXN product had a UTS that did not exceed 1,500 MPa. ArcelorMittal’s own expert testified that, after hot-stamping, the AXN product had a UTS of 1,442 MPa. *ArcelorMittal*, 2017 WL 239344, at *2 & n.6. ArcelorMittal’s expert further testified that a UTS of 1,442 MPa would be “equivalent to something that’s a little bit over 1,500 [MPa].” *Id.* at *2. Evidence also indicated that Ford Motor Company sought to order steel sheets from AK Steel that were to be hot-stamped by a commercial hot-stamper for production of automobile parts, but that those orders were never fulfilled. *Id.*

The 2010 action proceeded to trial and, in January 2011, resulted in a jury verdict of non-infringement under the doctrine of equivalents, “in part based on the lack of evidence of the hot-stamped steel sheet meeting the

district court case, No. 1:13-cv-00685-SLR, filed in 2013 and involving primarily the RE940 patent. A detailed summary of the 2010 action is set out in the opinions of this court in the prior appeals. See *ArcelorMittal I*, 700 F.3d at 1317–19; *ArcelorMittal Fr. v. AK Steel Corp.*, 786 F.3d 885, 887–88 (Fed. Cir. 2015); *ArcelorMittal v. AK Steel Corp.*, 856 F.3d 1365, 1367–68 (Fed. Cir. 2017). Only the history relevant to this appeal is recited in this opinion.

limitation requiring a [UTS] of 1500 MPa.” *Id.* at *3. ArcelorMittal appealed, and this court remanded after reversing in part on a separate issue.

3. The 2013 Litigation

In April 2013, while the 2010 case was on remand, ArcelorMittal filed the complaint related to this appeal. ArcelorMittal first asserted the RE153 patent and later amended the complaint to substitute the RE940 patent. AK Steel subsequently filed a motion to dismiss the case on the basis of collateral estoppel, arguing that the action was estopped by the verdict in the 2010 action. According to AK Steel, the accused products in this case—steel sheets marketed and sold under the trade name ULTRALUME—are the same as the AXN steel sheets in the 2010 case.

In response, ArcelorMittal argued that new evidence, obtained after the 2011 verdict, established that AK Steel’s ULTRALUME products were materially different from the AXN products because the ULTRALUME sheets were hot-stamped to achieve a UTS exceeding 1,500 MPa. In particular, ArcelorMittal relied on a declaration by its employee, Marc Millius. The declaration provided that Mr. Millius became aware, as of December 2012, that AK Steel was supplying the market with steel sheets that were hot-stamped by a commercial hot-stamper² to a UTS exceeding 1,500 MPa.

On April 19, 2016, the district court denied AK Steel’s motion to dismiss. The court allowed discovery, but limited it to a single deposition of an AK Steel representative and the production of AK Steel’s manufacturing specifications for the period of 2010 to 2013. J.A. 538–39.

² The specific hot-stamper is referred to generically throughout this opinion to protect information designated by the parties as confidential.

The district court reasoned that limited discovery was necessary to resolve the question of whether the AK Steel products had changed since the 2010 case. *Id.* The district court cautioned that it was “reluctant to simply open the doors to discovery without *some modicum of proof* (more substantive than the [Millius] declaration already submitted) that the accused steel sheet products have changed.” *Id.* (emphasis added).

After limited discovery concluded, AK Steel moved for summary judgment based on collateral estoppel. J.A. 1–2. In support, AK Steel argued that there was no evidence that its pre-stamped steel sheets or its conduct had changed since 2010. *See* J.A. 8–9; 564–66; 582. AK Steel reasoned that because the accused products were the same products found not to infringe in the 2010 action, collateral estoppel applied, and it was entitled to summary judgment as a matter of law.

In opposition, ArcelorMittal argued that the evidence before the district court now showed that AK Steel commercially marketed and supplied steel sheets to various auto producers that were hot-stamped to a UTS exceeding 1,500 MPa. ArcelorMittal pointed to an AK Steel marketing brochure describing how ULTRALUME products underwent hot-stamping that converted the steel’s crystalline microstructure into martensite, and that hot-stamped steel sheets are sold as auto parts with a UTS of “1,400 MPa and higher.” J.A. 1095–1100. ArcelorMittal also submitted a supplemental declaration from Mr. Millius that provided detail on his observations that AK Steel’s sheets were hot-stamped to exceed a UTS of 1,500 MPa (and supplied to a major auto manufacturer³ in December 2012). The supplemental Millius declaration

³ As with the hot-stamper referred to above, the specific auto manufacturer is referred to generically herein.

included an exhibit consisting of a slide from a webinar conducted by the auto manufacturer that he personally attended, which includes a bar graph that shows the auto manufacturer's various suppliers of 1,500 MPa UTS steel sheets, including AK Steel and ArcelorMittal. J.A. 1362–66. According to the declaration and as shown on the slide, the bar on the graph representing steel supplied by AK Steel indicated a tensile strength exceeding 1,500 MPa.

Based on the evidence, ArcelorMittal requested additional discovery under Federal Rule of Civil Procedure 56(d). J.A. 1354–60. ArcelorMittal argued that additional discovery was necessary to present additional facts related to the accused products and business conduct subsequent to the verdict in the 2010 action. *Id.* The district court denied the requested additional discovery and granted AK Steel's motion for summary judgment of non-infringement.

The district court agreed that ArcelorMittal's infringement claims with respect to the RE940 patent were barred by collateral estoppel. *ArcelorMittal*, 2017 WL 239344, at *3–4. The district court found that “the product at issue is the same and cannot—prior to hot stamping—be infringing as the steel sheets have a tensile strength of about 600 MPa.” *Id.* at *3. The district court noted a lack of evidence in the 2010 case that AK Steel's steel sheets were hot-stamped to achieve a UTS exceeding 1,500 MPa. According to the district court, “[t]hat [AK Steel] may ship the steel sheets to a third party hot stamper on behalf of its purchaser is of no consequence to the infringement analysis.” *Id.* The district court further noted that neither the chemistry of the steel sheets nor the tensile strength of the sheets as shipped by AK Steel were in dispute. *Id.* The district court concluded that these facts foreclosed the possibility of direct infringement. *Id.* The district court also concluded that with no direct infringement, there could be no indirect infringe-

ment. *Id.* at *4 (citing *Limelight Networks, Inc. v. Akamai Techs., Inc.*, 134 S. Ct. 2111, 2115 (2014)).

In denying ArcelorMittal’s request for additional discovery under Rule 56(d), the district court reasoned that discovery was unnecessary because, in its view, the evidence showed that auto manufacturers bought the steel sheets from AK Steel and shipped them to the hot-stampers or had AK Steel ship them on their behalf. *Id.* at *3 & n.9. The district court also rejected ArcelorMittal’s arguments that its divided or indirect infringement theories could justify discovery. *Id.* at *4.

DISCUSSION

We review summary judgment rulings under the law of the relevant regional circuit, in this case the Third Circuit. *See Intellectual Ventures I LLC v. Capital One Fin. Corp.*, 850 F.3d 1332, 1337 (Fed. Cir. 2017). The Third Circuit reviews the grant of summary judgment de novo. *Gonzalez v. Sec’y of Dep’t of Homeland Sec.*, 678 F.3d 254, 257 (3d Cir. 2012). “When reviewing a grant of summary judgment, the court must view the facts in the light most favorable to the nonmoving party and draw all inferences in that party’s favor.” *Id.* (internal quotation marks omitted). Similarly, whether collateral estoppel applies is a question of law, reviewed de novo. *See Jean Alexander Cosmetics, Inc. v. L’Oreal USA, Inc.*, 458 F.3d 244, 248 (3d Cir. 2006).

1. Collateral Estoppel of Non-infringement

A primary issue in a collateral estoppel analysis with respect to non-infringement is whether the accused product is the same—i.e., the issue sought to be precluded is the same as that involved in the prior action—or whether the accused products have materially changed. The question on appeal, then, is whether changes, if any, in the accused products are “material” for the purpose of collateral estoppel application. We conclude that the

evidence in this case supports that the products are not materially the same.

Under Third Circuit law, collateral estoppel applies when “(1) the issue sought to be precluded [is] the same as that involved in the prior action; (2) that issue [was] actually litigated; (3) it [was] determined by a final and valid judgment; and (4) the determination [was] essential to the prior judgment.” *Anderson v. Comm’r*, 698 F.3d 160, 164 (3d Cir. 2012) (quoting *In re Graham*, 973 F.2d 1089, 1097 (3d Cir. 1992)). Unless circumstances have materially changed such that they constitute controlling facts, “collateral estoppel remains applicable.” See *Scooper Dooper, Inc. v. Kraftco Corp.*, 494 F.2d 840, 846 (3d Cir. 1974). Where aspects of collateral estoppel involve substantive issues of patent law, we apply Federal Circuit precedent. *Aspex Eyewear, Inc. v. Zenni Optical Inc.*, 713 F.3d 1377, 1380 (Fed. Cir. 2013).

In the patent context, the Federal Circuit has followed Supreme Court precedent and held that defensive collateral estoppel applies with respect to a patent’s validity if (1) the patent was found invalid in a prior case that proceeded to final judgment where all procedural opportunities were available to the patentee; (2) the issues litigated were identical; and (3) the party against whom estoppel is applied had a full and fair opportunity to litigate. See *Abbott Labs. v. Andrx Pharm., Inc.*, 473 F.3d 1196, 1203 (Fed. Cir. 2007) (summarizing *Blonder-Tongue Labs., Inc. v. Univ. of Ill. Found.*, 402 U.S. 313, 330–33 (1971)). The court should determine “whether a patentee has had a full and fair chance to litigate the validity of his patent” by considering “whether without fault of his own the patentee was deprived of crucial evidence or witnesses in the first litigation.” *Id.* at 333. Collateral estoppel may bar litigation in cases with different but related patents when there are common issues. See *Amgen, Inc. v. Genetics Inst., Inc.*, 98 F.3d 1328, 1332 (Fed. Cir. 1996).

With respect to non-infringement, where an alleged infringer prevails, the accused products gain non-infringing status and the alleged infringer acquires the status of a non-infringer to the extent that the accused products remain the same. *Young Eng'rs, Inc. v. U.S. Int'l Trade Comm'n*, 721 F.2d 1305, 1316 (Fed. Cir. 1983). If accused devices in a second suit remain “unchanged with respect to the corresponding claim limitations at issue in the first suit,” then the patentee is precluded from pursuing her claims a second time. *Nystrom v. Trex Co.*, 580 F.3d 1281, 1285 (Fed. Cir. 2009). However, “conduct of a different nature from that involved in the prior litigation” will not be given preclusive effect. *Young Eng'rs*, 721 F.2d at 1316.

Defensive collateral estoppel of non-infringement, therefore, may apply in the “limited circumstances[] where it is shown that a close identity exists between the relevant features of the accused device and the device previously determined to be [non-]infringing” such that they are “essentially the same.” *See Yingbin-Nature (Guangdong) Wood Indus. Co. v. Int'l Trade Comm'n*, 535 F.3d 1322, 1333 (Fed. Cir. 2008). “Accused devices are ‘essentially the same’ where the differences between them are merely ‘colorable’ or ‘unrelated to the limitations in the claim of the patent.’” *Acumed LLC v. Stryker Corp.*, 525 F.3d 1319, 1324 (Fed. Cir. 2008) (quoting *Foster v. Hallco Mfg. Co.*, 947 F.2d 469, 480 (Fed. Cir. 1991)); *see also Brain Life, LLC v. Elekta Inc.*, 746 F.3d 1045, 1055 (Fed. Cir. 2014) (observing that products that were not “materially different” from products at issue in prior litigation would bar the subsequent assertion of the same claims). The proponent of claim or issue preclusion bears the burden of showing that the accused devices are essentially the same as those in the prior litigation. *See Young Eng'rs*, 721 F.2d at 1316 (claim preclusion); *In re Katz Interactive Call Processing Patent Litig.*, 639 F.3d 1303, 1311 (Fed. Cir. 2011) (issue preclusion).

2. Evidence of Material Differences

We conclude that AK Steel failed to meet its burden that the ULTRALUME products in the present action are materially the same as the AXN products in the 2010 action, especially when the facts are viewed in the light most favorable to the non-movant, ArcelorMittal. In the 2010 action, there was no evidence that the AK Steel AXN products met the “in excess of 1,500 MPa” UTS limitation or that any AXN products were commercially stamped and supplied to an auto manufacturer at all. In this action, there is evidence that AK Steel is a supplier of such products to at least one major auto manufacturer.

The September 2016 supplemental Millius declaration supports the allegation that AK Steel is a supplier of steel sheets that have a UTS exceeding 1,500 MPa to the auto-producing industry. J.A. 1362–66. The declaration was supported by an exhibit of a presentation slide taken from a December 2012 auto manufacturer-hosted webinar that provided tensile test information for hot-stamped steel from several of the auto manufacturer’s suppliers. *Id.* The auto manufacturer’s webinar slide, entitled “Tensile Strength Comparison by Supplier,” includes a bar graph representing tensile strengths of steel sheets that, according to the declaration, correspond to each supplier, including ArcelorMittal and AK Steel. *Id.* For both ArcelorMittal and AK Steel, the graph indicates a UTS in excess of 1,500 MPa. *Id.* Although the parties dispute the significance of the auto manufacturer’s tensile test data, it is significant that the auto manufacturer’s own 2012 test data shows that AK Steel’s products were thermally treated to achieve a UTS in excess of 1,500 MPa. J.A. 1364 ¶ 5, 1366. This evidence, when viewed in the light most favorable to ArcelorMittal as the non-movant, reflects a material difference in the accused product and AK Steel’s conduct since the 2011 verdict. *See Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 255 (1986).

We disagree with AK Steel’s argument that this slide is “identical to the testing introduced in the [2010] [c]ase.” Appellee Br. 46. AK Steel points to testimony from ArcelorMittal’s expert in the 2010 action who heat treated and tested several steel sheets from various suppliers, using what he called a “conservative heat treatment” that resulted in a UTS of 1,442 MPa. J.A. 705. But the auto manufacturer’s test data shows strengths of steel hot-stamped by a commercial hot-stamper (as named in the first Millius declaration) to meet the auto manufacturer’s commercial specifications. AK Steel in attorney argument characterizes the auto manufacturer’s test data as “experimental,” but there is no evidence supporting such a characterization. *Compare* Appellee Br. 46, *with* J.A. 1364 ¶ 4. AK Steel’s attorney argument is not sufficient to rebut ArcelorMittal’s evidence. *See Icon Health & Fitness, Inc. v. Strava, Inc.*, 849 F.3d 1034, 1043 (Fed. Cir. 2017). In addition, that the auto manufacturer’s test data was prior to the RE940 patent’s issue date is not material. In the 2010 action, the evidence was that the AXN products were of “experimental grade,” i.e., not for sale, and were thermally treated by the Vehma “prototype shop,” i.e., non-commercial hot-stamper; there was no evidence that those products were supplied to an auto manufacturer. *See ArcelorMittal*, 2017 WL 239344, at *2, 1061–63; *see also, e.g.*, J.A. 1065 (“The Vehma trial was rudimentary. . . . [It] should not, by any means, be used as a mass production trial.”). The evidence in this case indicates that the production process is no longer “rudimentary,” that commercial stampers are utilized, and that the stamped steel is being commercialized. This crucial evidence represents a material difference in the accused products and did not exist during the 2010 action.

Finally, AK Steel’s own product brochure, made after the verdict in the 2010 action, lends further support to ArcelorMittal’s contention that AK Steel’s conduct and the accused products have changed. The brochure ex-

plains that blanks produced from ULTRALUME are hot-stamped to undergo “a phase transformation” to its microstructure that results in “a high strength phase – martensite.” J.A. 1089. The brochure advertises that this process “increases the tensile strength of the steel from approximately 600 MPa to 1,400 MPa *and higher.*” *Id.* (emphasis added). AK Steel’s brochure is evidence in this action that supports an allegation that AK Steel is commercially marketing and supplying steel sheets to auto manufacturers that may exceed 1,500 MPa UTS after hot-stamping.

At minimum, this evidence contravenes the undisputed evidence in the 2010 action that AXN steel sheets hot-stamped by Vehma did not exceed 1,500 MPa UTS, and that none of the stamped AXN sheets were supplied to, or used by, auto manufacturers. In aggregate, this evidence constitutes, as the district court put it, more than a modicum of proof that the accused products materially differ from those in the 2010 action with respect to claimed limitations. Differences with respect to the claimed limitations constitute changes in controlling facts, such that collateral estoppel does not apply. *See Scooper Dooper*, 494 F.2d at 846. For this reason, the district court erred in finding that the accused products cannot as a matter of law infringe and granting summary judgment of non-infringement on the basis of collateral estoppel. We express no opinion on whether the RE940 patent is actually infringed or who might infringe it, only that there is now evidence that the accused products, the stamped steel sheets originating from AK Steel and supplied to auto manufacturers, are materially different from the products in the 2010 action.

3. The Relevance of Hot-Stamping

The parties dispute the extent to which there may be differences in the chemical composition between the AXN and ULTRALUME products and the effect of those differ-

ences, but those are not the only facts relevant to the claim limitations at issue. Consistent with the claim language of the patent, the mechanical resistance of the accused products after the claimed thermal treatment, i.e., hot-stamping, which transforms the crystalline microstructure of the steel (as opposed to its chemical composition), is also relevant to the claim limitations at issue.

The district court erred when it focused solely on the pre-stamped product and stated “[t]hat [AK Steel] may ship the steel sheets to a third party hot stamper on behalf of its purchaser is of no consequence to the infringement analysis.” *ArcelorMittal*, 2017 WL 239344, at *3. The asserted product-by-process claims are not directed to unstamped blanks that have not yet been subject to the claimed thermal treatment process step. It is well established that “[e]ach element contained in a patent claim is deemed material to defining the scope of the patented invention.” *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 29 (1997). As we have previously affirmed, “process terms in product-by-process claims serve as limitations in determining infringement.” *Abbott Labs. v. Sandoz, Inc.*, 566 F.3d 1282, 1293 (Fed. Cir. 2009) (en banc) (quoting *Atl. Thermoplastics Co. v. Faytex Corp.*, 970 F.2d 834, 846–47 (Fed. Cir. 1992)). An “inventor is absolutely free to use process steps to define [a] product” and “will not be denied protection.” *Id.* at 1294. The court cannot ignore the inventor’s definition of her product. *Id.* In view of the claim language, the claimed thermal treatment process step, i.e., hot-stamping, and resulting UTS, is of significant consequence to the infringement analysis.

The district court recognized that the jury verdict was based on a lack of evidence that AK Steel’s 2010 hot-stamped steel sheet met the claimed thermal treatment limitation requiring a UTS of 1,500 MPa. Yet in concluding that the product now at issue cannot infringe, the district court instead focused on the accused product prior

to hot-stamping, having the same composition as the 2010 products and a tensile strength of about 600 MPa. By simply focusing on the composition and mechanical resistance of the pre-processed, blank steel sheets, and by ignoring the claimed thermal treatment process step conducted by hot-stampers and the resulting UTS, the district court erred in determining whether a material claimed element in the patent as defined by the inventor had changed in the accused products. *See ArcelorMittal*, 2017 WL 239344, at *3–4. Indeed, it is the thermal treatment and resulting UTS claim elements that ArcelorMittal contends have changed since the 2011 jury verdict, making the now-accused products materially different from the products in the 2010 action.

Contrary to the district court’s finding, that the thermal treatment is performed by a third party hot-stamper does not foreclose the possibility of direct infringement here. *See id.* If the third party hot-stampers produce steel sheets with a UTS exceeding 1,500 MPa after thermal treatment, as ArcelorMittal alleges, the hot-stampers might very well directly infringe the RE940 patent. Therefore, the district court erred in dismissing ArcelorMittal’s potential indirect infringement claims due to a lack of direct infringement. *See id.* at *4 (citing *Limelight Networks*, 134 S. Ct. at 2115).

4. Additional Discovery Is Warranted

In granting summary judgment, the district court denied ArcelorMittal’s request for additional discovery to oppose AK Steel’s motion for summary judgment under Rule 56(d). The district court based its decision on its finding that “the product at issue [in this case] is the same [as the product at issue in the 2010 case] and cannot—prior to hot stamping—be infringing as the steel sheets have a tensile strength of about 600 MPa.” *ArcelorMittal*, 2017 WL 239344, at *3.

The standard of review for the district court's decisions related to discovery under Rule 56(d) in the Third Circuit is abuse of discretion. *Renchenski v. Williams*, 622 F.3d 315, 339 (3d Cir. 2010). To disturb such a decision, "[a]ppellants must demonstrate that the district court's action made it impossible to obtain crucial evidence." *Wisniewski v. Johns-Manville Corp.*, 812 F.2d 81, 90 (3d Cir. 1987) (internal quotation marks omitted). Additionally, "[a]n abuse of discretion may be established under Federal Circuit law by showing that the court made a clear error of judgment in weighing the relevant factors or exercised its discretion based on an error of law or clearly erroneous fact finding." *Wind Tower Trade Coal. v. United States*, 741 F.3d 89, 95 (Fed. Cir. 2014) (quoting *Qingdao Taifa Grp. Co. v. United States*, 581 F.3d 1375, 1379 (Fed. Cir. 2009)).

As explained above, we conclude that new evidence of material differences in the accused products exists. This means that the district court erred in limiting discovery on the basis of the issues presented in the 2010 action. The denial of ArcelorMittal's requested discovery kept it from obtaining crucial evidence. *See Wisniewski*, 812 F.2d at 90.

Discovery is necessary to determine whether and to what extent AK Steel supplied auto manufacturers with steel sheets with a UTS in excess of 1,500 MPa after thermal treatment, its knowledge and intent in doing so, and the nature of the relationships between AK Steel, the hot-stampers, and the auto manufacturers during the relevant timeframe. On remand, we direct the district court to allow discovery as requested by ArcelorMittal under Rule 56(d) in its opposition to summary judgment.

CONCLUSION

Because evidence shows material differences between the accused product in this action and the product in

earlier litigation, the district court erred in applying collateral estoppel. We vacate and remand.

VACATED AND REMANDED

COSTS

No costs.