PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION

Washington, D.C.

In the Matter of **CERTAIN GLASS SUBSTRATES FOR LIQUID CRYSTAL DISPLAYS, PRODUCTS CONTAINING THE SAME, AND METHODS FOR MANUFACTURING THE SAME II**	**Inv. No. 337-TA-1441**

INITIAL DETERMINATION ON VIOLATION OF SECTION 337 AND RECOMMENDED DETERMINATION ON REMEDY AND BOND

Administrative Law Judge Bryan F. Moore

(April 7, 2026)

Appearances:

For Complainant Corning Incorporated.:
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For Respondents Caihong Display Devices Co., Ltd. and Xianyang CaiHong Optoelectronics Technology Co., Ltd.:
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For Respondents TCL China Star Optoelectronics Technology Co., Ltd. and TTE Technology, Inc. d/b/a TCL North America:
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Table of Abbreviations

The following abbreviations may be used in this Initial Determination:

CDX	Corning's demonstrative exhibit
CPX	Corning's physical exhibit
CX	Corning's exhibit
CIB	Corning's initial post-hearing brief
CRB	Corning's reply post-hearing brief
CPHB	Corning's pre-hearing brief
JX	Joint Exhibit
RDX	Respondents' demonstrative exhibit
RPX	Respondents' physical exhibit
RX	Respondents' exhibit
RIB	Respondents' initial post-hearing brief
RRB	Respondents' reply post-hearing brief
RPHB	Respondents' pre-hearing brief
Tr.	Transcript

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Administrative Law Judge Bryan F. Moore

(April 7, 2026)

Pursuant to the Notice of Investigation, this is the final initial determination in the matter of *Certain Glass Substrates for Liquid Crystal Displays, Products Containing the Same, and Methods for Manufacturing the Same II,* Investigation No. 337-TA-1441.

For the reasons stated herein, I have determined that there is a violation of section 337 of the Tariff Act of 1930, as amended, in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain glass substrates for liquid crystal displays, products containing the same, and methods for manufacturing the same based on infringement of U.S. Patent Nos. 8,642,491 and 8,640,498.

I. INTRODUCTION

A. Procedural History

The Commission instituted the present investigation on March 7, 2025, based on a complaint filed by Complainant Corning Incorporated ("Corning"). 90 Fed. Reg. 11,549 (Mar. 7, 2025). The complaint, as supplemented, alleges violations of section 337 by the importation into the United States, sale for importation, or sale within the United States after importation of certain glass substrates for liquid crystal displays, products containing the same, and methods for manufacturing the same that purportedly infringe U.S. Patent Nos. 7,851,394 ("the '394 patent"), 8,642,491 ("the '491 patent"), and 8,640,498 ("the '498 patent"). *Id*. The complaint further alleges that a domestic industry exists. *Id*. The notice of institution named as respondents Caihong Display Devices Co., Ltd. ("Caihong Display" or "Caihong")[1]; Hisense USA Corporation ("Hisense"); HKC Corporation Ltd.; HKC Overseas Ltd.; LG Electronics U.S.A, Inc.; TCL China Star Optoelectronics Technology Co., Ltd. ("CSOT"); TTE Technology, Inc. d/b/a TCL North America ("TCL"); VIZIO, Inc.; and Xianyang CaiHong Optoelectronics Technology Co., Ltd. ("CHOT") *Id.* The Office of Unfair Import Investigations is not participating in the investigation.

A *Markman* hearing was held on June 25, 2025. *See* EDIS Doc. ID 855654 ("Markman Tr."). A *Markman* order issued on July 17, 2025, construing certain claim terms. Order No. 25.

[1] The NOI states that Caihong Display is doing business as "Irico Display Devices Co., Ltd." 90 Fed. Reg. 11,549 (Mar. 7, 2025). Caihong Display denies "that it is doing business as Irico Display Devices Co., Ltd. or any variation thereof, including 'Irico' or 'Irico Display.'" Response of Respondent Caihong Display Devices Co., Ltd. to the Complaint and Notice of Investigation at ¶ 18, EDIS Doc. ID 849753. Corning did not argue in either its pre-hearing or post-hearing briefs that Respondents conduct business as Irico. As such, I do not have the information necessary for me to determine whether Caihong operates as "Irico Display Devices Co." The parties noted, however, that this issue is one that will be determined in Investigation No. 337-TA-1433.

Over the course of the proceeding, I terminated several respondents from the Investigation. Specifically, on July 15, 2025, I issued an Initial Determination terminating the investigation as to Respondents HKC Corporation Ltd. and HKC Overseas Ltd. Order No. 24; *not reviewed*. On September 10, 2025, I issued an Initial Determination terminating the investigation as to Respondent VIZIO, Inc. Order No. 28; *not reviewed*, Comm'n Notice (Sept. 30, 2025). On September 30, 2025, I issued an Initial Determination terminating the investigation as to Respondent LG Electronics U.S.A., Inc. Order No. 29; *not reviewed*, Comm'n Notice (Dec. 8, 2025). On March 24, 2026, I issued an Initial Determination terminating the investigation as to Respondent Hisense. Order No. 57. The remaining respondents (Caihong Display, CHOT, CSOT, and TCL) are collectively referred to as "Respondents."

On December 2, 2025, I issued an Initial Determination terminating all asserted claims of the '394 patent and claim 2 of the '491 patent. Order No. 35, *not reviewed*, Comm'n Notice (Dec. 23, 2025).

An evidentiary hearing was held on January 6-8, 2026.

B. The Parties

1. Complainant Corning Incorporated

Corning is a corporation organized and existing under the laws of New York. Complaint at ¶ 16. Corning designs and manufactures glass and glass products. *Id.* at ¶ 17.

2. Respondents

a) Caihong Display Devices Co., Ltd.

Caihong Display is a Chinese corporation that has its principal place of business at No. 9 Xinghuo Avenue, High Tech Industrial Development Zone, Qindu District, Xianyang City, Shaanxi Province. China. Response of Respondent Caihong Display Devices Co., Ltd. to the Complaint and Notice of Investigation at ¶ 18, EDIS Doc. ID 849758. Caihong Display is "in the

business of manufacturing LCD glass for use in the manufacturing of televisions." *Id.* Caihong Display is the parent company of CHOT. *Id.*

b) Xianyang CaiHong Optoelectronics Technology Co., Ltd.

CHOT is a Chinese corporation that has its principal place of business at No. 1, Gaoke Yilu, Qindu District, Xianyang City, Shaanxi Province, 71200, China. Complaint at ¶ 19; Response of Respondent Xianyang Caihong Optoelectronics Technology Co., Ltd. to the Complaint and Notice of Investigation at ¶ 19. EDIS Doc. ID 849766. CHOT manufactures and sells for importation certain LCD panels containing glass substrates to be incorporated into TVs. *Id.*

c) TCL China Star Optoelectronics Technology Co., Ltd.

CSOT is a Chinese corporation with its principal place of business at 9-2 Tangming Avenue, Guangming New District, Shenzhen City, Guangdong Province, 518132, China. Respondent TCL China Star Optoelectronics Technology Co., Ltd.'s Response to the Complaint and Notice of Investigation at ¶ 24, EDIS Doc. ID 849752. CSOT manufactures LCD panels for incorporation into TVs. *Id*.

d) TTE Technology, Inc. d/b/a TCL North America

TCL is a Delaware corporation with its principal place of business at 189 Technology Drive, Irvine, California 92618. Respondent TTE Technology, Inc.'s Response to the Complaint and Notice of Investigation at ¶ 25, EDIS Doc. ID 849757. TCL sells for importation, imports, or sells after importation TVs that contain LCD glass. *Id*.

C. Technology Overview

The technology in this investigation concerns glass substrates for liquid crystal displays, products containing the same, and methods for manufacturing the same. 90 Fed. Reg. 11,549. The '491 patent is directed to a glass composition and the '498 patent is directed to a method to manufacture glass. JX-0002; JX-0003. Corning explains that, during the glass manufacturing

process, raw materials are melted at high temperatures and that this melting process can lead to the creation of gas bubbles. Complaint at ¶ 61. "If the gas bubbles are not removed, they will create defects, known as inclusions, in the final glass product." *Id.* "Anything more than a *de minimis* number of inclusions in a sheet of glass renders that sheet unsuitable for high-precision applications." *Id.* Previously, arsenic and antimony were used as fining agents to remove the glass bubbles, but both chemicals carry environmental and health risks. *Id.* at ¶ 62. According to Corning, the inventions of the patent solved this problem by manufacturing glass without the use of any detectable amounts of arsenic or antimony. *Id.* at ¶ 63. Corning explains that a "key innovation" was an "increase in the proportion of magnesium oxide (MgO) and the adjustment of the ratio of alkaline earth oxides (including MgO, calcium oxide (CaO), strontium oxide (SrO), and barium oxide (BaO)) to Al_2O_3 to be greater than or equal to 1." *Id.* at ¶ 64.

D. The Products At Issue

The plain language description of the accused products or category of accused products is "glass substrates for LCDs, display panels containing the same, and electronic devices containing the same, which are TVs, monitors, notebook and laptop computer, and tablets." 90 Fed. Reg. 11,549; *see also* 19 C.F.R. § 210.10(b)(1).

1. The Accused Products

The Accused Products consist of glass made with two different formulas. As described more fully below, this glass is manufactured by Caihong Display and then sold to Respondents CHOT and CSOT. CHOT and CSOT incorporate the glass into LCD panels and then sell these LCD panels to manufacturers, such as TCL. TCL incorporates the LCD panels into downstream products, such as televisions, which are then imported into the United States.

a) 615 Accused Products

The parties agree that the "615 Accused Products" means "glass substrates for LCDs made with what Respondent Caihong Display terms its '615 Formula,' display panels containing the same, and electronic devices containing the same, which are TVs, monitors, notebook and laptop computers, and tablets." Joint Stipulation Regarding Representative Accused Products and Domestic Industry Products at 2, EDIS Doc. ID 863830. The parties further agree that the "615 Formula" "refers to the 615 glass formula described, for example, in Caihong Display's Supplemental Responses to Complainant's Interrogatory No. 1, and used to make Caihong Display's 615 glass, which is also referred to by other identifiers including but not limited to CTGH615G, CTGX615G, and "电子玻璃05" (translated as "Electrical Glass 05")." *Id.* Finally, the parties agree that 615 Glass "is representative of all glass made with what Respondent Caihong Display terms its '615 Formula." *Id.* They also agree that "an adjudication whether 615 Glass infringes one or more claims of the Asserted Products applies to all 615 Accused Products as to whether 615 Accused Products infringe one or more claims of the Asserted Patents." *Id.* at 2-3.

b) 616 Glass

The parties agree that the "616 Accused Products" means "glass substrates for LCDs made with what Respondent Caihong Display terms its '616 Formula,' display panels containing the same, and electronic devices containing the same, which are TVs, monitors, notebook and laptop computers, and tablets." *Id.* at 2. The parties further agree that the "616 Formula" "refers to the 616 glass formula described, for example, in Caihong Display's Supplemental Responses to Complainant's Interrogatory No. 1, and used to make Caihong Display's 616 glass, which is also referred to by other identifiers including but not limited to CTGH616G, "彩虹 616" (translated as "Caihong 616"), "C79," "C79(2)," "C79-20240521," and "C79-20241016." *Id.* Finally, the parties

agree that 616 Glass "is representative of all glass made with what Respondent Caihong Display terms its 616 Formula." *Id.* at 3. They also agree that "an adjudication whether 616 Glass infringes one or more claims of the Asserted Products applies to all 616 Accused Products as to whether 616 Accused Products infringe one or more claims of the Asserted Patents." *Id.*

2. The Domestic Industry Products

The parties stipulated that Corning® EAGLE XG® Glass regardless of its size and thickness is representative of all Domestic Industry products in this Investigation. *Id.* at 3.

II. PRELIMINARY ISSUES

A. Statutory Authority

The Commission has statutory authority to investigate an alleged violation of section 337(a)(1)(A) by named respondents when such respondents have allegedly used unfair methods of competition and unfair acts in the importation of articles into the United States, the threat or effect of which is to destroy or substantially injure a domestic industry in the United States or prevent the establishment of an industry in the United States.[2] 19 U.S.C. § 1337(a)(1)(A). Here, Corning's complaint states that Respondents violated section 337 by importing, selling for importation, or selling within the United States after importation the Accused Products by reason of infringement of certain claims of the '491 and '498 patents. *See generall*y Complaint. The Commission thus has statutory authority to conduct this investigation.

[2] Prior Commission decisions have referred to terms such as "subject matter jurisdiction," "personal jurisdiction," and/or "in rem jurisdiction." *Certain Liquid Transfer Devices with an Integral Vial Adapter*, Inv. No. 337-TA-1362, Comm'n Op. at 9 (July 26, 2024). Although the Commission has used such terms in the past as a shorthand for statutory authority, the Commission has "endeavor[ed] to realign its terminology with the language of section 337" and has clarified that "it has 'statutory authority' to investigate the alleged violation, rather than 'subject matter jurisdiction,' 'personal jurisdiction,' and/or '*in rem* jurisdiction' under Article III" of the U.S. Constitution. *Id.*

Corning and Respondents have actively participated in this investigation. No party has contested the Commission's statutory authority. CIB at 3; RIB at 2 (not contesting statutory authority). I find that the Commission has statutory authority in accordance with the Commission's governing statutes. *See, e.g.*, 19 U.S.C. §§ 1333, 1337(e)-(f).

B. Importation

The statute defines a violation of section 337 as "[t]he importation into the United States, the sale for importation, or the sale within the United States after importation by the owner, importer, or consignee, of articles that . . . infringe a valid and enforceable United States patent." 19 U.S.C. § 1337(a)(1)(B). Accordingly, "[t]o prevail under section 337, a complainant must prove that a respondent actually imported or sold for [or after] importation the articles at issue." *Certain Carbon & Alloy Steel Prods.*, Inv. No. 337-TA-1002, Order No. 103 at 33, *unreviewed by* Comm'n Notice (Nov. 1, 2017).

Corning states that "Caihong sold 615 and 616 Glass to CSOT, CHOT, and HKC, . . . who then sold panels incorporating 615 and 616 Glass to TCL . . . , who imported devices containing 615 and 616 Glass into the U.S." CIB at 4. According to Corning, "[t]here is no meaningful dispute the importation requirement is satisfied." *Id.*

Respondents argue that "Corning has not identified any product containing 616 Glass that has been imported into the U.S." RIB at 2. Respondents further assert that "Corning's alleged evidence only identifies a single product of [CHOT, CSOT, and TCL] that has been imported with 615 Glass." *Id.*

1. Overview

Caihong Display sells its glass to CSOT, CHOT, and former Respondent HKC Corporation Ltd. ("HKC"). CX-0835C (Chen Dep. Tr.) at 193:12-24, 194:25-195:9, 196:15-22. CSOT, CHOT,

and HKC, in turn, sell display panels incorporating the glass to TCL. CX-0847C at ¶ 3. TCL then imports products containing the display panels into the United States. *Id*. at ¶ 2.

TCL stipulated that "it has imported into the United States, within the meaning of 19 U.S.C. § 1337(a)(1)(A) and (B), at least one unit of each of the TV models listed in Exhibit A." CX-0847C at ¶ 2. It further stipulated that LCD panels manufactured by CSOT, CHOT, HKC, and non-party Innolux Corporation are incorporated into these TV models and stated that "at least one each of the TCL TV models listed in Exhibit A incorporated LCD glass manufactured by [Caihong Display]." *Id.* at ¶ 3.

The record further shows that, from [redacted]. CX-1077C.10-11. Caihong Display began manufacturing [redacted]. CX-1080C at 16; Tr. (Zhao) at 314:3-5. It began selling [redacted]. CX-1080C at 15. Caihong Display [redacted]. Tr. (Zhao) at 313:22-314:2; CX-0835C.45 (Chen Dep. Tr.) at 177:7-9, 180:23-183:6. Thus, any product containing an LCD panel incorporating glass from Caihong Display prior to [redacted] necessarily contained 615 Glass. Additionally, any product containing an LCD panel incorporating glass from Caihong Display purchased [redacted] necessarily contained 616 Glass.

2. 615 Glass

Respondents acknowledge that the 615 Glass has been imported but complain that Corning has shown only that a single product was imported by TCL.[3] RIB at 2. It is well established that a

[3] TCL stipulated that it imported TV Model No. 32S357 with serial number 2403GNC002520A02626 into the United States and that this particular TV was manufactured in March of 2024. CX-0847C at ¶ 14. It further stipulated that this model contained LCD panel model

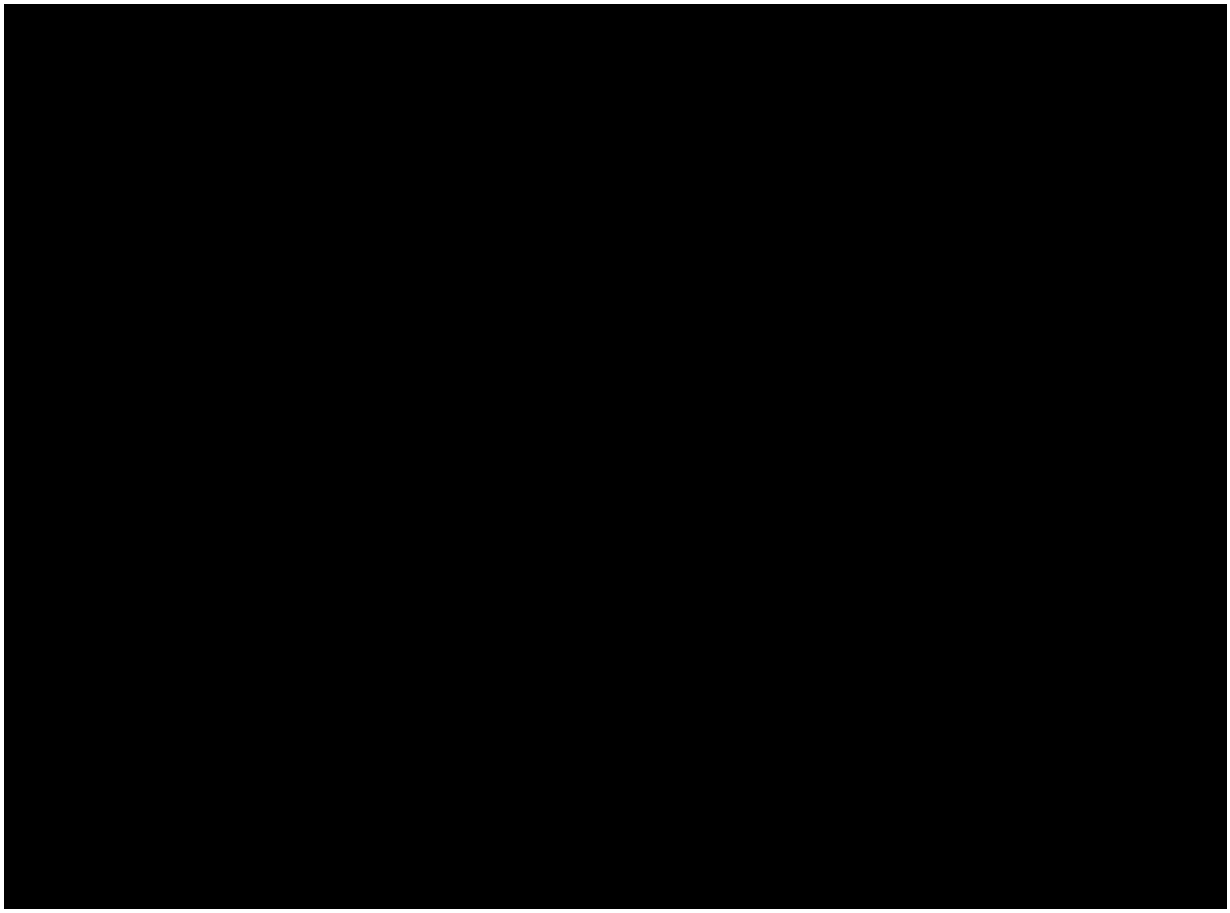
complainant need only prove importation of a single accused product to satisfy the importation element. *Certain Chemical Mechanical Planarization Slurries & Components Thereof*, Inv. No. 337-TA-1204, Comm'n Op. at 9 (Jan. 6, 2022). Thus, I find that the evidence shows that TCL imported products containing the 615 Glass into the United States. [4]

3. 616 Glass

With respect to the 616 Glass, the TCL stipulation lists models that were imported into the United States. An excerpt from the stipulation is as follows:

[redacted] bearing identification numbers [redacted] and [redacted] which was manufactured by [redacted]. *Id.* Finally, it stipulated that this LCD model incorporated glass manufactured by [redacted]. *Id.* at CX-0847C.10. Due to the fact that Caihong Display was only making 615 Glass at the time that the TV was manufactured, there is circumstantial evidence that TCL imported a TV containing the 615 Glass.

[4] I note that the stipulation contains evidence that other models with LCD panels containing the 615 Glass were also imported. *See* CX-0847C.



CX-0847C.9. TCL stipulated, for example, that it imported TV Model Name 55Q550F into the United States and that this TV model contained LCD Panel Model No. [redacted] supplied by [redacted]. *Id.* CSOT also stated in an interrogatory that [redacted]. CX-1102C at 12. TCL further stipulated that TV Model Name 55Q550F contained a panel [redacted] CX-0847C at ¶ 11; *see id.* at CX-0847C.9. Thus, the TV Model Name 55Q550F would necessarily contain 616 Glass. There is similar evidence for the other accused panels and downstream products. As such, I find that the evidence shows that TCL imported products containing the 616 Glass into the United States.

4. Knowledge of Importation

In cases where a "sale for importation" is at issue, a complainant needs to show that the respondent knew or should have known that the products it sold to third parties would be subsequently imported into the United States. *See Certain Wearable Monitoring Devices, Systems, and Components Thereof*, Inv. No. 337-TA-1190, Initial Determination at 11 (Feb. 4, 2021), *not mod'd in rel. part*, Comm'n Notice (April 12, 2021) ("The importation requirement may be satisfied, however, where a respondent knew or should have known that the articles it sold to third parties would subsequently be imported into the United States."); *Certain Inkjet Ink Cartridges with Printheads & Components Thereof*, Inv. No. 337-TA-723, Initial Determination at 8 (June 10, 2011), *aff'd in rel. part*, Comm'n Op. (Dec. 1, 2011). In this investigation, TCL is the entity that imports the products, while Caihong Display, CHOT, and CSOT sell the products for importation.

I find that there is evidence that Caihong Display, CHOT, and CSOT knew or should have known that products including the infringing glass would be imported or sold for importation. Caihong Display admitted it knowingly sold glass that was incorporated into products that were imported into the United States. EDIS Doc. ID 845343 ("Caihong . . . started to sell glass substrate to LCD glass panel manufacturers who then sold LCD glass panels to consumer electronics manufacturers who imported products with Caihong Display glass . . . into the United States"). In its response to the Complaint, CHOT admitted that it "sells for importation certain LCD panels containing glass substrates to be incorporated into TVs." Response of Respondent Xianyang Caihong Optoelectronics Technology Co., Ltd. to the Complaint and Notice of Investigation at ¶ 19. EDIS Doc. ID 849766. CHOT's corporate representative testified that CHOT's panel customers [redacted] CX-0842C (Zhou Dep. Tr.) at 155:9-13, 155:24-156:8. The representative further acknowledged that [redacted]

[redacted] *Id.* at 155:24-156:7. CSOT's corporate representative provided similar testimony. CX-0838C (Yang) at 161:7-17.

5. Conclusion

For these reasons, I find that the importation requirement has been satisfied. I note that this investigation involves the same parties as Investigation No. 337-TA-1433 (the "1433 Investigation"). In the 1433 Investigation, the ALJ granted a motion for summary determination that the importation requirement was met. EDIS Doc. ID 870458 ("the 1433 Order"). The Commission did not review this decision. Notice of Commission Determination Not to Review an Initial Determination Granting a Motion for Summary Determination on the Issue of Importation with Respect to the Remaining Respondents (Feb. 10, 2026), EDIS Doc. ID 874816. The above-captioned investigation involves many of the same issues as the 1433 Investigation regarding importation. With respect to TCL, the ALJ relied on the same stipulation and exhibits as in this investigation. 1433 Order at 6. The ALJ concluded that Caihong Display admitted that it sold products for importation. *Id.* at 6-7. Finally, the ALJ relied on the TCL stipulation as well as deposition testimony from CHOT and CSOT's corporate representatives as evidence that CHOT and CSOT knew that the LCD panels they sold to TCL would be incorporated into products imported into the United States. *Id.* at 7-10.

C. Ownership

Commission Rule 210.12 states in relevant part "[f]or every intellectual property based complaint (regardless of the type of intellectual property involved), [the complaint must] include a showing that at least one complainant is the owner or exclusive licensee of the subject intellectual property." 19 C.F.R. § 210.12(a)(7); *see also Certain Active Matrix Organic Light-Emitting Diode Display Panels & Modules for Mobile Devices, & Components Thereof*, Inv. No. 337-TA-1351, Comm'n Op. at 14 (May 15, 2024).

The record demonstrates that Corning has ownership of the '491 and '498 patents. JX-0009 (assignment of '498 patent); JX-0010 (assignment of '491 patent).

III. LEGAL PRINCIPLES

A. Infringement

In a section 337 investigation, the complainant bears the burden of proving infringement of the asserted patent claims by a preponderance of the evidence. *See Spansion, Inc. v. Int'l Trade Comm'n*, 629 F.3d 1331, 1349 (Fed. Cir. 2010). This standard "requires proving that infringement was more likely than not to have occurred." *Warner-Lambert Co. v. Teva Pharm. USA, Inc*., 418 F.3d 1326, 1341 n.15 (Fed. Cir. 2005).

Literal infringement is a question of fact. *Finisar Corp. v. DirecTV Grp., Inc.*, 523 F.3d 1323, 1332 (Fed. Cir. 2008). Literal infringement requires the patentee to prove that the accused device contains each limitation of the asserted claim(s). If any claim limitation is absent, there is no literal infringement of that claim as a matter of law. *Bayer AG v. Elan Pharm. Research Corp*., 212 F.3d 1241, 1247 (Fed. Cir. 2000).

B. Validity

A patent is presumed valid. *See* 35 U.S.C. § 282; *Microsoft Corp. v. i4i Ltd. P'ship*, 564 U.S. 91, 95 (2011). A respondent who has raised patent invalidity as an affirmative defense has the burden of overcoming this presumption by clear and convincing evidence. *See Microsoft*, 564 U.S. at 95.

1. 35 U.S.C. § 102 (Anticipation)

Under 35 U.S.C. § 102, a claim is anticipated and therefore invalid when "the four corners of a single, prior art document describe every element of the claimed invention, either expressly or inherently, such that a person of ordinary skill in the art could practice the invention without undue experimentation." *Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282

(Fed. Cir. 2000), *cert. denied*, 532 U.S. 904 (2001). To be considered anticipatory, the prior art reference must be enabling and describe the applicant's claimed invention sufficiently to have placed it in possession of a person of ordinary skill in the field of the invention. *Helifix Ltd. v. Blok-Lok, Ltd.*, 208 F.3d 1339, 1346 (Fed. Cir. 2000).

2. 35 U.S.C. § 103 (Obviousness)

Under 35 U.S.C. § 103, a patent may be found invalid as obvious if "the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains." 35 U.S.C. § 103. Because obviousness is determined at the time of invention, rather than the date of application or litigation, "[t]he great challenge of the obviousness judgment is proceeding without any hint of hindsight." *Star Scientific, Inc. v. R.J. Reynolds Tobacco Co*., 655 F.3d 1364, 1375 (Fed. Cir. 2011) ("*Star II*").

When a patent is challenged as obvious, the critical inquiry in determining the differences between the claimed invention and the prior art is whether there is a reason to combine the prior art references. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418-21 (2007). The Federal Circuit has since held that "the burden falls on the patent challenger to show by clear and convincing evidence that a person of ordinary skill in the art would have had reason to attempt to make the composition or device, or carry out the claimed process, and would have had a reasonable expectation of success in doing so." *PharmaStem Therapeutics, Inc. v. ViaCell, Inc.*, 491 F.3d 1342, 1360 (Fed. Cir. 2007) (citations omitted).

Obviousness is a determination of law based on underlying determinations of fact. *Star II*, 655 F.3d at 1374. The factual determinations behind a finding of obviousness include: (1) the scope and content of the prior art, (2) the level of ordinary skill in the art, (3) the differences

between the claimed invention and the prior art, and (4) secondary considerations of non-obviousness. *KSR*, 550 U.S. at 399 (citing *Graham v. John Deere Co*., 383 U.S. 1, 17 (1966)). These factual determinations are referred to collectively as the "*Graham* factors." Secondary considerations of non-obviousness include commercial success, long felt but unresolved need, and the failure of others. *Id.* When present, secondary considerations "give light to the circumstances surrounding the origin of the subject matter sought to be patented," but they are not dispositive on the issue of obviousness. *Geo. M. Martin Co. v. Alliance Mach. Sys. Int'l.*, 618 F.3d 1294, 1304-06 (Fed. Cir. 2010). A court must consider all the evidence from the *Graham* factors before reaching a decision on obviousness. For evidence of secondary considerations to be given substantial weight in the obviousness determination, its proponent must establish a nexus between the evidence and the merits of the claimed invention. *W. Union Co. v. MoneyGram Payment Sys. Inc.*, 626 F.3d 1361, 1372-73 (Fed. Cir. 2010) (citing *In re GPAC Inc.*, 57 F.3d 1573, 1580 (Fed. Cir. 1995)).

3. Written Description

The specification must provide a written description of the claimed invention that "reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (*en banc*). Determining whether the written description requirement has been satisfied "requires an objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art[]" to determine whether the specification "show[s] that the inventor actually invented the invention claimed." *Id.* Compliance with the written description requirement is a question of fact and "the level of detail required to satisfy the written description requirement varies depending on the nature and scope of the claims and on the complexity and predictability of the relevant technology." *Id.*

4. Enablement

Section 112 of the Patent Act requires that a patent specification "enable any person skilled in the art to which it pertains . . . to make and use" the claimed invention. 35 U.S.C. § 112, ¶ 1 (pre-AIA). "Claims are not enabled when, at the effective filing date of the patent, one of ordinary skill in the art could not practice their full scope without undue experimentation." *Wyeth & Cordis Corp. v. Abbott Lab'ys*, 720 F.3d 1380, 1384 (Fed. Cir. 2013). The enablement requirement "prevents . . . overbroad claiming that might otherwise attempt to cover more than was actually invented." *MagSil Corp. v. Hitachi Glob. Storage Techs., Inc.*, 687 F.3d 1377, 1381 (Fed. Cir. 2012). "The scope of the claims must be less than or equal to the scope of the enablement to ensure that the public knowledge is enriched by the patent specification to a degree at least commensurate with the scope of the claims." *Sitrick v. Dreamworks, LLC*, 516 F.3d 993, 999 (Fed. Cir. 2008).

Enablement is a question of law based on underlying facts. *Wyeth & Cordis Corp.*, 720 F.3d at 1384. In analyzing whether the full scope of a claim is enabled, the Federal Circuit has considered the following factors: "(1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims." *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988). However, the *Wands* factors "are illustrative, not mandatory." *Amgen, Inc. v. Chugai Pharm. Co., Ltd.,* 927 F.2d 1200, 1213 (Fed. Cir. 1991).

5. Indefiniteness

A claim must be definite. Pursuant to 35 U.S.C. § 112: "The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." 35 U.S.C. § 112, ¶ 2. In *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120 (2014), the Supreme Court held that § 112, ¶ 2 requires "that a patent's claims,

viewed in light of the specification and prosecution history inform those skilled in the art about the scope of the invention with reasonable certainty." (*Id.* at 2129.) A claim is required to "provide objective boundaries for those of skill in the art," and a claim term is indefinite if it "might mean several different things and no informed and confident choice is among the contending definitions." *Interval Licensing LLC v. AOL, Inc.*, 766 F.3d 1364, 1371 (Fed. Cir. 2014). A patent claim that is indefinite is invalid. 35 U.S.C. § 282(b)(3)(A).

6. Obviousness-Type Double Patenting

Obviousness-type double patenting "prohibits an inventor from obtaining a second patent for claims that are not patentably distinct from the claims of the first patent." *In re Lonardo*, 119 F.3d 960, 965 (Fed. Cir. 1997); *see also In re Hubbell*, 709 F.3d 1140, 1145 (Fed. Cir. 2013) (explaining that "[o]bviousness-type double patenting is a judicially-created doctrine designed to prevent claims in separate applications or patents that do not recite the same invention, but nonetheless claim inventions so alike that granting both exclusive rights would effectively extend the life of patent protection.") (internal quotations and citations omitted). A later patent claim "is not patentably distinct from an earlier claim if the later claim is obvious over, or anticipated by, the earlier claim." *Hubbell*, 709 F.3d at 1145 (quoting *Eli Lilly & Co. v. Barr Labs., Inc.*, 251 F.3d 955, 968 (Fed. Cir. 2001)). The analysis involves two steps:

> First, the court 'construes the claim[s] in the earlier patent and the claim[s] in the later patent and determines the differences.' Second, the court 'determines whether those differences render the claims patentably distinct.'" *Sun Pharm. Indus., Ltd. v. Eli Lilly & Co*., 611 F.3d 1381, 1385 (Fed. Cir. 2010) (alteration in original) (quoting *Pfizer, Inc. v. Teva Pharm. USA, Inc*., 518 F.3d 1353, 1363 (Fed. Cir. 2008)). "'A later claim that is not patentably distinct from,' i.e., 'is obvious over[ ] or anticipated by,' an earlier claim is invalid for obviousness-type double patenting." *Id.* at 1385 (alteration in original) (quoting *Eli Lilly*, 251 F.3d at 968).

Abbvie Inc. v. Mathilda and Terence Kenney Institute of Rheumatology Trust, 764 F.3d 1366, 1374 (Fed. Cir. 2014); *see id.* at 1378-79 ("the law of obviousness-type double patenting looks to the

law of obviousness generally"). Such analysis does not mandate express consideration of the factors outlined in *Graham v. John Deere Co*., 383 U.S. 1 (1966). *See In re Basell Poliolefine Italia S.P.A.*, 547 F.3d 1371, 1379 (Fed. Cir. 2008). This is because the analysis requires claim-to-claim comparison, rather than claim-to-disclosure comparison. *See In re Braat*, 937 F.2d 589, 592-93 (Fed. Cir. 1991).

C. Domestic Industry Requirement

For a patent-based complaint, a violation of section 337 can be found "only if an industry in the United States, relating to the articles protected by the patent . . . concerned, exists or is in the process of being established." 19 U.S.C. § 1337(a)(2). The complainant bears the burden of establishing that the domestic industry requirement is satisfied. *John Mezzalingua Assocs., Inc. v. Int'l Trade Comm'n*, 660 F.3d 1322, 1331 (Fed. Cir. 2011). This domestic industry requirement of section 337 is often described as having a "technical prong" and an "economic prong." *InterDigital Commc'ns, LLC v. Int'l Trade Comm'n*, 707 F.3d 1295, 1298 (Fed. Cir. 2013).

The "technical prong" is satisfied when the complainant in a patent-based section 337 investigation establishes that it is practicing or exploiting the patents at issue. *See* 19 U.S.C. § 1337(a)(2), (3); *Certain Microsphere Adhesives, Processes for Making Same, & Prods. Containing Same, Including Self-stick Repositionable Notes*, Inv. No. 337-TA-366 ("*Microsphere Adhesives*"), USITC Pub. No. 2949, Comm'n Op. at 24 (Jan. 16, 1996). "The test for satisfying the 'technical prong' of the industry requirement is essentially [the] same as that for infringement, *i.e*., a comparison of domestic products to the asserted claims." *Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1375 (Fed. Cir. 2003). To prevail, the patentee must establish by a preponderance of the evidence that the domestic product practices one or more valid claims of the patent. *See id.*; *Spansion*, 629 F.3d at 1349; *Certain Vision-Based Driver Assistance Sys. Cameras & Components Thereof*, Inv. No. 337-TA-907, Comm'n Op. at 36, USITC Pub. No. 4866 (Feb. 2019). It is

sufficient to show that the products practice any claim of that patent, not necessarily a claim of that patent asserted for infringement. *See Certain Male Prophylactic Devices*, Inv. No. 337-TA-546, Comm'n Op. at 38 (Aug. 1, 2007).

The "economic prong" requires, with respect to the products protected by a patent, either: (A) "significant investment in plant and equipment"; (B) "significant employment of labor or capital"; or (C) "substantial investment in [the patent's] exploitation, including engineering, research and development, or licensing." 19 U.S.C. § 1337(a)(3)(A)-(C). These activities must be related to the particular patent(s) at issue. *Certain Stringed Musical Instruments & Components Thereof*, Inv. No. 337-TA-586, Comm'n Op. at 13 (May 16, 2008). There is no minimum monetary expenditure required to show that an investment is "substantial" or "significant"; rather, this is a fact-dependent inquiry that will depend on the industry in question, the complainant's relative size, and other factors. *Id.* at 25-26.

IV. U.S. PATENT NO. 8,642,491

A. Overview

The '491 patent, titled "Fining of Boroalumino Silicate Glasses," issued on February 4, 2014, and name Adam J. G. Ellison as the inventor. JX-0002 at cover page. It is assigned to Corning. *Id.* The '491 patent issued from U.S. Application Serial No. 12/965,032, filed on December 10, 2010. *Id*. It is a continuation of Application No. 11/478,493 ("the '493 Application"), filed on June 28, 2006, which is now the '394 patent. It claims the benefit of Provisional Application No. 60/694,478, filed on June 28, 2005. *Id.* The '491 patent expires on October 7, 2026. JX-0005.105; RX-0015C (Ernst WS) at Q/A 372.

1. Asserted Claims

Corning asserts claims 3, 6, 8, and 12 against Respondents. CIB at 76, 80. Corning alleges that the domestic industry products practice these same claims. *Id.* at 85. Because the asserted claims depend on claims 1 and 4, claims 1 and 4 are also included below:

Claim	Claim Language
1[pre]	An alkali-free glass for a downdraw process comprising in mole percent on an oxide basis:
1[a]	SiO_2 64.0-71.0 Al_2O_3 9.0-12.0 B_2O_3 7.0-12.0 MgO 1.0-3.0 CaO 6.0-11.5 SrO 0-2.0 BaO 0-0.1
1[b]	wherein: (a) $1.00 \leq \Sigma [RO]/[Al_2O_3]$, where $[Al_2O_3]$is the mole percent of Al_2O_3 and $\Sigma[RO]$ equals the sum of the mole percents of MgO, CaO, SrO, and BaO;
1[c]	(b) the glass has the following compositional characteristics: (i) on an oxide basis, the glass comprises at most 0.05 mole percent As_2O_3; (ii) on an oxide basis, the glass comprises at most 0.05 mole percent Sb_2O_3; and (iii) on an oxide basis, the glass comprises at least 0.01 mole percent SnO_2; and
1[d]	(c) the glass has a liquidus viscosity that is greater than or equal to 100,000 poise.
3	The glass of claim 1 wherein, on an oxide basis, SrO is at most 1.0 mole percent.
4	The glass of claim 1, wherein the glass has at least one of the following properties:
	(a) a density that is less than or equal to 2.41 grams/cm^3,
	(b) a linear coefficient of thermal expansion (CTE) over the temperature range 0-300°C which satisfies the relationship: $28x10^{-7}$/° C.≤CTE≤ $34x10^{-7}$/° C.;
	(c) a liquidus temperature less than or equal to 1170°C.;
	(d) a strain point that is greater than or equal to 650°C.

6	The glass of claim 4 wherein the glass has properties (a) through (d).
8	The glass of claim 1 wherein, on an oxide basis, the glass comprises at most 0.15 mole percent SnO_2.
12	The glass of claim 1 wherein the downdraw process is a fusion process.

2. Level of Ordinary Skill in the Art

I previously determined that a person of ordinary skill in the art would have a bachelor's degree in materials science, geology, chemistry, or a comparable field of study, and at least two to three years of research or industrial experience with the design, manufacturing, characterization, and testing of glasses, including oxide glasses. I further found that more education (*e.g.* a Master's degree) or work experience in a relevant field may compensate for a deficit in one of the relevant qualifications stated above. Order No. 25 at 11 (July 17, 2025).

3. Claim Construction

During the *Markman* phase, the parties agreed on the construction of the following claim terms:

CLAIM TERM	RELEVANT CLAIMS	PARTIES' AGREED CONSTRUCTION
"alkali-free glass"	All Asserted Claims	"A glass having a total alkali concentration which is less than or equal to 0.1 mole percent, where the total alkali concentration is the sum of the Na_2O, K_2O, and Li_2O concentrations"
"oxide"	All Asserted Claims	Plain and ordinary meaning, i.e., "binary compound in which oxygen is chemically bonded to one other element"
"downdraw process"	All Asserted Claims of '491 and '498 patents	Plain and ordinary meaning, i.e., "a process in which molten glass is drawn vertically downward and forms a glass ribbon"

CLAIM TERM	RELEVANT CLAIMS	PARTIES' AGREED CONSTRUCTION
"fusion process"	'491 patent, claim 12	Plain and ordinary meaning, i.e., "a downdraw process in which separate streams of molten glass flow downward and combine into a single stream of molten glass that is drawn vertically downward and forms a glass ribbon," where "downdraw process" means "a process in which molten glass is drawn vertically downward and forms a glass ribbon"
"liquidus temperature"	'491 patent, claim 4	Plain and ordinary meaning, i.e., "the lowest temperature above which crystals cannot form in a glass as determined by standard methods"
"linear coefficient of thermal expansion"	'491 patent, claim 4	Plain and ordinary meaning, i.e., "the relative change in the length of a glass composition when the temperature of the glass composition changes over a specified range as determined by standard methods"
"strain point"	'491 patent, claim 4	Plain and ordinary meaning, i.e., "the temperature at which the internal stresses in a glass are substantially relieved as determined by standard methods"

Id. at 12-13. In the *Markman* order, I construed the following terms:

Claim Term	The Court's Construction
"[mole percent] on an oxide basis"	Plain and ordinary meaning, *i.e.*, "mole percent calculated using elements in their oxide form."
"[a]n alkali-free glass for a downdraw process comprising in mole percent on an oxide basis"	"a glass having a total alkali concentration which is less than or equal to 0.1 mole percent, where the total alkali concentration is the sum of the Na_2O, K_2O, and Li_2O concentrations, that can be formed using a process in which molten glass is drawn vertically downward and forms a glass ribbon comprising in mole percent calculated using element in their oxide form"

Claim Term	The Court's Construction
"liquidus viscosity"	Plain and ordinary meaning, which is "the viscosity of a glass composition at its liquidus temperature"

Id. at 20, 25, 32.

B. Infringement

Corning asserts that the 615 Glass and the 616 Glass infringe claims 3, 6, 8, and 12. CIB at 76, 80.

1. 616 Glass

a) Claim 1

Corning does not assert claim 1. Claim 1 is, however, an independent claim upon which the asserted claims depend. As such, it is necessary to analyze whether the 616 Glass meets the limitations of claim 1.

i) Undisputed Limitations

Limitations 1[pre], 1[c], and 1[d] recite: "An alkali-free glass for a downdraw process comprising in mole percent on an oxide basis . . . (b) the glass has the following compositional characteristics: (i) on an oxide basis, the glass comprises at most 0.05 mole percent As_2O_3; (ii) on an oxide basis, the glass comprises at most 0.05 mole percent Sb_2O_3; and (iii) on an oxide basis, the glass comprises at least 0.01 mole percent SnO_2; and (c) the glass has a liquidus viscosity that is greater than or equal to 100,000 poise." JX-0002 at cl. 1. Respondents do not dispute that the 616 Accused Products meet these limitations. Complainant's and Respondents' Identification of Undisputed Claim Limitations at 5, EDIS Doc. ID 868862 ("Undisputed Claim Limitations"). The evidence shows that these limitations are met. CX-0002C (Martin WS) at Q/As 382-395, 404-424.

ii) BaO Limitation

Limitation 1[a] recites ranges for different oxides:

SiO_2: 64.0-71.0
Al_2O_3: 9.0-12.0
B_2O_3: 7.0-12.0
MgO: 1.0-3.0
CaO: 6.0-11.5
SrO: 0-2.0
BaO: 0-0.1

JX-0002. Of relevance here, limitation 1[a] recites that BaO is in the range of 0-0.1. *Id.* This limitation is hereinafter referred to as "the BaO Limitation."

The parties dispute the scope of the BaO Limitation. As such, it is first necessary to construe the claim language.

(a) Construction

Respondents argue that "[t]he BaO Limitation should be interpreted according to its plain and ordinary meaning in view of the intrinsic record to require BaO of no more than exactly 0.1 mol% (i.e., 0.11 mol% would not infringe)." RIB at 3. Respondents contend that because the claim does not use language such as "about" or "approximately," "the express range of '0-0.1' cannot include values above 0.1." *Id.* at 4. Respondents also argue that "[i]nterpreting the clear range of 0-0.1 to include values that are above 0.1 and round to 0.1 would be inconsistent with the scope of the patent, given the claim's express range, the specification's preference of 'less than 0.05 mole percent' . . . and no disclosure of embodiments containing any BaO." *Id.* at 5. Finally, Respondents argue that their construction is "consistent with pertinent extrinsic evidence." *Id.* at 6.

Corning argues that Respondents' construction "contravenes the claim language's plain and ordinary meaning of '0-0.1,' which requires rounding to the nearest tenth under standard principles regarding significant figures and rounding." CIB at 80. Corning notes that "[t]here was no lexicography or disclaimer to support departing from the plain and ordinary meaning." *Id.* at 81. Corning also explains that "the patentee deliberately used different numbers of decimal places

for different levels of precision." *Id.* Here, "[t]he claims recite precisions to one decimal place." *Id.*[5]

"[T]he words of a claim are generally given their ordinary and customary meaning" as understood by a person of ordinary skill in the art at the time of the invention. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-1313 (Fed. Cir. 2005). The evidence shows a person of ordinary skill in the art would understand that it is standard scientific convention to round to the same number of decimal places as the claimed number. CX-0002C (Martin WS) at Q/As 130-136; RX-0019C (Carty WS) at Q/As 61-67.[6]

This does not end the inquiry, however. As the Federal Circuit explained in *AstraZeneca*, there is no bright line rule on rounding. *AstraZeneca AB v. Mylan Pharms. Inc.*, 19 F.4th 1325, 1329 (Fed. Cir. 2021) (noting that standard scientific convention would result in the term "0.001%" encompassing "a range from 0.0005% to 0.0014%" which would "necessitate adopting an acontextual construction of this disputed claim term."). Instead, "the ordinary meaning of a claim term is its meaning to the ordinary artisan after reading the entire patent." *Id.* at 1330 (internal quotations and citations omitted). Thus, it is necessary to review the intrinsic evidence to determine whether the specification supports following scientific conventions on rounding or whether the

[5] Corning also argues that Respondents' claim construction argument is "untimely and waived" pursuant to Ground Rule 7.1. CIB at 80; CRB at 42. I disagree. Ground Rule 7.1 does not prohibit parties from making arguments regarding a term's construction after the *Markman* phase of the investigation if the arguments are necessary in order to rule on issues such as infringement, technical prong, or invalidity. *See O2 Micro Intern. Ltd. v. Beyond Innovation Technology Co., Ltd.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008) ("When the parties present a fundamental dispute regarding the scope of a claim term, it is the court's duty to resolve it.").

[6] Respondents cite to *U.S. Philips Corp. v. Iwasaki Elec. Co.*, 505 F.3d 1371, 1376 (Fed. Cir. 2007) for the proposition that the standard conventions on rounding do not apply. *See* RIB at 3. I do not agree with Respondents' characterization of *U.S. Philips*. For example, the cited issue in *U.S. Phillips* was whether "the term 'between 10^{-6} and 10^{-4} μmol/mm ^{3}' expresses a range of orders of magnitude, not a range of more-precise numbers." 505 F.3d at 1376. The court did not decide the issue of whether rounding of the claimed values was permitted. *Id.* at 1377.

concentration of BaO is limited to no more than 0.1 mole percent such that rounding above 0.1 is not permitted.

I turn first to the claim language itself. Respondents argue that the lack of words such as "about" or "approximately" indicates that the express range of BaO cannot exceed 0.1. RIB at 4. They also state that "Corning knew how to use qualifying language that could have broadened the scope of the BaO Limitation," and note that claim 10 uses the phrase "substantially free of" in connection with BaO. *Id.* I disagree that the lack of approximation language is dispositive. As stated in *Actelion Pharms. Ltd. v. Mylan Pharms. Inc.*, the Federal Circuit has rejected "any invitation to create a bright-line rule – either that language like 'precisely' or 'exactly' is always needed to avoid rounding or that the lack of approximation language, even when it may be found elsewhere in the claims, dictates a precise value." 85 F.4th 1167, 1171 (Fed. Cir. 2023).

I further find that the specification does not compel a finding that the level of BaO cannot exceed 0.1 mole percent. The specification states a preference for low levels of BaO but it does not provide clear support for limiting BaO to 0.1 mole percent or less. For example, the specification explains:

> The remaining alkaline earth oxides – SrO and BaO – can both contribute to low liquidus temperatures (high liquidous viscosities) and thus the glasses of the invention will typically contain at least one of these oxides. However, both oxides increase CTE and density and lower modulus and strain point compared to MgO and CaO. Between SrO and BaO, BaO generally has more adverse effects on glass properties than SrO. Accordingly, the BaO concentration in the glasses of the invention is less than or equal to 0.1 mole percent (preferably less than 0.05 mole percent), while the SrO concentration is allowed to be greater, i.e., less than or equal to 2.0 mole percent, preferably less than or equal to 1.0 mole percent. Typically, the sum of the SrO and BaO concentrations will be greater than or equal to 0.4 mole percent, primarily to provide a sufficiently high liquidus viscosity so that the glass can be formed by a downdraw process.

JX-0002 at 11:12-27. Thus, while the specification indicates a preference for the BaO concentration to be less than 0.05 mole percent, the specification does not specifically indicate that

a concentration of BaO exceeding 0.1 mole percent (but within the rounding range) would be detrimental to the glass composition.

Respondents also point to the portion of the specification which states: "Preferably, the glass making up the sheet is also substantially free of BaO (i.e., the concentration of BaO is less than or equal to 0.05 mole percent)." RIB at 4 (citing JX-0002 at 5:4-6). It is settled law, however, that an invention is not limited to the preferred embodiment. *GE Lighting Sols., Inc. v. AgiLight, Inc.*, 750 F.3d 1304, 1309 (Fed. Cir. 2014) ("[I]t is improper to read limitations from a preferred embodiment described in the specification – even if it is the only embodiment – into the claims absent a clear indication in the intrinsic record that the patentee intended the claims to be so limited."). Thus, I am not persuaded that the specification's preference that the composition be substantially free of BaO is proof that the BaO concentration cannot exceed 0.1 mole percent. [7]

My conclusion is supported by an implication of the Federal Circuit's decision in *AstraZeneca*. There, the issue was "whether the concentration of PVP being '0.001%' means 0.001% within one significant figure . . . or if it has a narrower meaning . . . – precisely 0.001%." 19 F.4th at 1329. The court held that 0.001% is a "precise number, with only minor variations, i.e., 0.00095% to 0.00104%." *Id.* The court explained that "both the written description and prosecution history place[d] considerable emphasis on the stability of the claimed formulations, i.e. formulations with 0.001% w/w PVP, compared to formulations with slightly higher or slightly lower concentrations of PVP, including for example, 0.0005%." *Id.* at 1330. Specifically, the court

[7] Respondents also argue that "[v]alues that round down to 0.1 could be almost 50% higher than the upper limit of the express range provided in the claims (e.g., 0.149), and interpreting the claims to include such values would contradict the express preferences and embodiments of the specification." RIB at 5. While it is true that a BaO concentration of 0.149 would be 50% higher than the recited range, as explained herein, the specification does not clearly indicate that standard rounding conventions must not apply.

noted that "testing evidence" in the intrinsic record showed that "very minor differences in the concentration of PVP – down to the ten-thousandth of a percentage (fourth decimal place) – impact stability." *Id.* The court therefore concluded that "the written description suggests that the claimed formulations with 0.001% w/w PVP were intended to be more exact." *Id.* at 1332. Additionally, the court found that the prosecution history confirmed a more precise construction. *Id.* at 1332-1334. Thus, the evidence that the term should be construed as a precise number (rather than applying the scientific convention of rounding) was stronger in *AstraZeneca* than in the present investigation. Yet, the court characterized the outcome as a "close call." *Id.* at 1329. Given that there is even less support for an outcome here (essentially the contrapositive situation), I find that the specification does not support construing the BaO Limitation such that the concentration of BaO cannot exceed 0.1 mole percent.

Finally, Respondents argue that their construction is "consistent with pertinent extrinsic evidence." RIB at 6. Respondents cite to the testimony of their expert Dr. William Carty, as well as Corning's experts, Dr. Richard Brow and Dr. Steve Martin. *Id*. None of this cited testimony provides information outside of the intrinsic record which would aid me in understanding how one of skill in the art would view the BaO Limitation. Rather, both Dr. Carty and Dr. Brow merely confirm what the specification says, while Dr. Martin's testimony is not relevant to the issue at hand. *See* RX-0019C (Carty WS) at Q/A 402-404 (opining that the specification supports Respondents' construction); Tr. (Carty) at 516:19-23 (same); Tr. (Brow) at 602:7-603:17 (confirming what the specification states); Tr. (Martin) at 136:14-23 (testifying that he did not study whether BaO generally has more adverse effects than SrO).

Because the intrinsic evidence does not indicate that one of skill in the art would limit the BaO range, I apply the plain and ordinary meaning and find that the scientific convention of rounding applies.

(b) Application of Claim

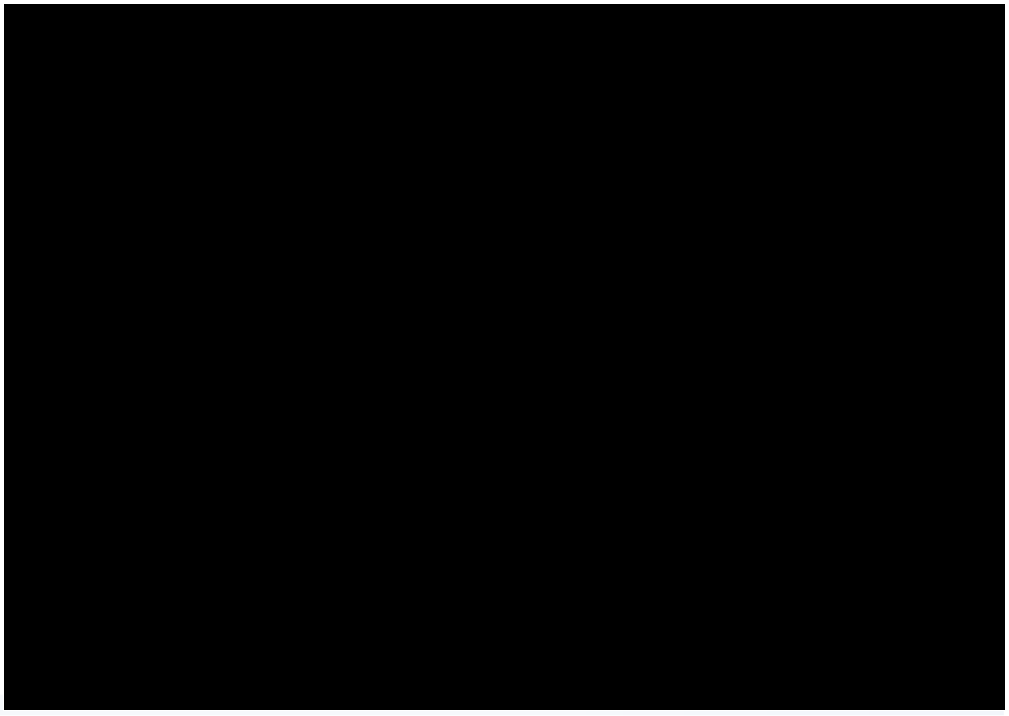
Corning asserts that Dr. Martin's testing shows that the 616 Glass meets this limitation. CIB at 81. Corning states that the 616 Glass samples that Dr. Martin tested contain [redacted] BaO and that "[Respondents' expert's] Drs. [Grant] Henderson and [Edgar] Zanotto . . . also measured concentrations of BaO for particular samples of 616 Glass that round to [redacted] *Id.* at 82. Corning argues: "[T]o the extent Caihong's experts measured different values for the different samples they tested, that does not negate the testing showing infringement by other samples of 616 Glass, which reflect glass sold by Caihong as 616 Glass." *Id.*

Respondents assert that the test results from Caihong Display all show an average BaO level [redacted] RIB at 7. Respondents also argue that Dr. Martin's testing methodology is unreliable and thus his finding that the 616 Glass has [] mole percent should be disregarded. *Id.* at 11-15.

I first note that it is undisputed that the 616 Glass meets this limitation for oxides other than BaO. The evidence shows that Dr. Martin tested the 616 Glass and the average results are as follows:

CX-0002C (Martin WS) at Q/A 397 (excerpted). Each of these results are within the recited range for the respective oxide. JX-0002 at cl. 1.

With respect to BaO, the parties introduced several different testing results, as shown below.



RDX-9998C. Dr. Martin measured an average BaO concentration of [redacted]. *Id.* The batch calculations conducted by Dr. Carty found a BaO concentration of [redacted] and the compositional testing resulted in findings of BaO concentrations ranging from [redacted], with an average of

[redacted]. *Id.* Thus, if I were to find that Dr. Martin's test results are the most accurate, the 616 Glass would infringe the BaO Limitation. If, in turn, I find that any of Caihong's responses are more accurate, the 616 Glass would not infringe.

I find that Dr. Martin's test results for the BaO Limitation are unreliable. First, the manner in which Dr. Martin disclosed his opinion obscures the fact that one of his testing methods would result in noninfringement. Dr. Martin performed two different types of testing of the 616 Glass: SEM-EDS and ICP testing.[8] CX-0002C (Martin WS) at Q/A 398. The average BaO value of Dr. Martin's SEM-EDS testing was [redacted] mole percent. RX-0019C (Carty WS) at Q/A 226 (explaining that "Dr. Martin's [SEM-]EDS testing data . . . shows an average BaO value of [redacted] mole percent"); *see also* RPX-0529; RDX-0006C.0044 (showing individual results ranging from [redacted] to [redacted]). Thus, the 616 Glass would not infringe using only the results of Dr. Martin's SEM-EDS testing. *See* Tr. (Martin) at 133:8-134:16 (agreeing that his SEM-EDS test results for BaO would round to [redacted]).

Dr. Martin did not disclose this fact in his testimony, as he did not report the SEM-EDS testing results. *See* CX-0002C (Martin WS) at Q/As 397-401. Instead, Dr. Martin "took the average of (i) the average measured value of BaO from six SEM-EDS tests and [(ii)] the average measured value of BaO from twelve ICP tests." *Id.* at Q/A 398. Even to the extent that it is scientifically valid to average the results of the SEM-EDS and ICP tests, doing so here obscures the reality that the 616 Glass did not infringe under the SEM-EDS testing. The failure to be direct and forthcoming about the SEM-EDS results impacts Dr. Martin's credibility.

[8] SEM-EDS stands for "scanning electron microscopy with energy-dispersive spectroscopy." ICP stands for "inductively-coupled plasma spectrometry." CX-0002C (Martin WS) at Q/A 70. Dr. Martin provided an overview of the process for both types of tests in his witness statement. *Id.* at Q/As 71-81. He also specified that "[t]wo types of ICP techniques were used": ICP-MS and ICP-OES. *Id.* at Q/A 77.

Most importantly, however, Dr. Martin did not provide convincing testimony that the results of his ICP testing were more accurate. Dr. Martin testified that the ICP testing resulted in an average BaO concentration of [redacted] CX-0002C (Martin WS) at Q/A 399. As can be seen in the above chart, these tests results are an outlier. Despite this fact, Dr. Martin did not adequately explain why his ICP results differ from every other test result in the investigation. He did testify that ICP tests are "more accurate than the SEM-EDS" testing and that SEM-EDS testing had a "larger error that the ICP numbers." *See* Tr. (Martin) at 170:9-171:16. This testimony does not address why the ICP tests differed from the other types of tests performed in this investigation, such as XRF, EPMA, and wet chemistry tests. Nor did Dr. Martin address why his ICP results differed from the ICP tests performed by Dr. Zanotto. Without such an explanation, I find that Corning has failed to meet its burden to show that Dr. Martin's tests results were reliable.

Compounding this issue, Dr. Martin did not sufficiently disclose the underlying data for the ICP testing.[9] It is therefore unclear if there was one extreme outlier that skewed the average. Further, understanding the underlying data is particularly important here, where Corning itself repeatedly notes that there was great variability in Dr. Zanotto's ICP testing. *See* CIB at 30 (explaining that Dr. Zanotto "obtained ICP measurements with a spread of [redacted] in Al_2O_3 concentrations – a variance of over [redacted]"); *id.* at 70 (noting that Dr. Zanotto's ICP tests include "differences in results [that] vary more within a single test method that between methods"); *see*

[9] In its reply brief, Corning claims that the raw ICP data is disclosed at CPX-0250C, CPX-0292, and RX-0521. CRB at 45. It is unclear where the ICP data is in these documents, if it is included at all. Dr. Martin's testimony does not cite to RX-0521 or otherwise provide context for this document. Neither CPX-0250C nor CPX-0292 appear to contain the individual ICP results, although both documents do appear to contain the individual SEM-EDS test results. Thus, to the extent that the underlying ICP data is contained within the documents, the evidentiary record lacks the necessary context to identify the data.

also CRB at 38. Without this underlying data, I am unable to assess the reliability of Dr. Martin's test results.

For all of these reasons, I find Dr. Martin's tests are entitled to no weight. As every other test shows a BaO that rounds up to [redacted] mole percent, I find that Corning has not established that the BaO Limitation has been met.[10]

iii) Ratio Limitation

Claim 1[b] recites: "wherein: (a) $1.00 \leq \Sigma [RO]/[Al_2O_3]$, where $[Al_2O_3]$ is the mole percent of Al_2O_3 and $\Sigma[RO]$ equals the sum of the mole percents of MgO, CaO, SrO, and BaO." JX-0002 at cl. 1. This limitation is hereinafter referred to as "the '491 Ratio Limitation."

Corning asserts that Dr. Martin's testing shows that the 616 Glass samples have a ratio of [redacted]. CIB at 83. Corning states that Dr. Martin's data is "consistent with Respondents' expert testing, which showed concentrations of Σ [RO] and $[Al_2O_3]$ for samples of 616 Glass that, if found in the same sample, result in a Σ [RO]/$[Al_2O_3]$ ratio ≥ 1.00." *Id.*

Respondents argue that "Dr. Martin's calculated average ratio of [redacted] for the 616 Glass . . . is an outlier based on unreliable testing and unreported tests results that are not in evidence." RIB

[10] Corning argues that "Drs. Henderson and Zanotto . . also measured concentrations of BaO for particular samples of 616 Glass that round to [redacted]." CIB at 82. I am not persuaded by this argument. Dr. Zanotto explained why one needs several datasets to be accurate and why it would be improper to rely upon a single measurement. Tr. (Zanotto) at 351:8- 353:5; *see also* CX-0002C (Martin WS) at Q/A 103 (testifying that, for each product, he "measured them six times per technique"). According to Dr. Zanotto, "one result has no meaning." Tr. (Zanotto) at 352:16-19. Additionally, according to Dr. Zanotto, to have a "scientifically accepted method . . . [y]ou need a minimum size of a dataset, especially for ICP analysis." *Id.* at 353:17-20. I credit Dr. Zanotto's testimony as reliable. Thus, the fact that individual measurements show a BaO concentration that rounds to 0.1 does not demonstrate infringement, when the averages demonstrate a BaO concentration that does not round to 0.1. *See Certain Magnetic Data Storage Tapes & Cartridges Containing the Same (II)*, Inv. No. 337-TA-1076, Comm'n Op. at 36 (June 20, 2019) (finding infringement when an average showed infringement (not a single sample) because "[a]veraging test results . . . [was] a common practice in the art.").

at 16. Respondents also argue that "[t]he plain and ordinary meaning of '1.00,' with three significant figures, requires a value of .995 or higher." *Id.* at 15. Respondents assert that Caihong Display's test results show that the 616 Glass has a Σ [RO]/[Al_2O_3] below this range. *Id.* Finally, Respondents contend that "[e]ven taking Dr. Martin's flawed results into consideration, Dr. Carty performed a statistical analysis to show that the ratio of Caihong's 616 Glass still falls below 1.00." *Id.* at 16.

As with the BaO Limitation, Dr. Martin's testing of the 616 Glass shows infringement, while Caihong Display's experts' testing shows that the glass does not infringe. Specifically, Dr. Martin's testing showed a ratio of [redacted], which would meet the requirements of the '491 Ratio Limitation. The testing by Respondents' experts, on the other hand, each show a ratio of less than 1.00.

[redacted]

RDX-0006C.0042. The batch calculations conducted by Dr. Carty found a ratio of [redacted]. *Id.* The compositional testing resulted in a ratio ranging from [redacted], with an average of [redacted]. *Id.*

For the reasons set forth above with respect to the BaO Limitation, I find that Dr. Martin's results are entitled to no weight. Because Dr. Martin's test results were the only test results that demonstrated infringement of the '491 Ratio Limitation, I find that Corning has not met its burden to show infringement.

Corning argues that there is still infringement because some samples tested by Respondents had a ratio above 1.00. CRB at 8 (asserting that "the majority of values are above 0.96 and five values [are] between 0.98 and 1.00"). For the reasons stated above, I find that it is improper in this context to rely solely on individual tests results to show infringement. *See* Tr. (Zanotto) at 351:8-353:5. Additionally, as Respondents note, Corning has not proven that any sample meets both the BaO Limitation and the '491 Ratio Limitation. RIB at 14. This is particularly important given that Corning alleges that there is variability within the 616 Glass.[11] *See* CIB at 82-83 (arguing that there is "compositional variability across 616 Glass samples" such that "different samples had different amounts of particular oxides"); *see also* CRB at 9.

iv) Conclusion

For these reasons, I find that Corning has not demonstrated that the 616 Glass meets the limitations of claim 1. As such, I find that the 616 Accused Products do not infringe claim 1.

b) Claims 3, 6, 8, and 12

Because claims 3, 6, 8, and 12 each depend on claim 1, I find that the 616 Glass does not infringe these claims. If, however, the Commission disagrees as to claim 1, I note that Respondents

[11] If Corning is correct that there is compositional variability in the 616 Glass, it is improper to view the 616 Glass as one product. Rather, there would be different variations of the 616 Glass (similar to different model numbers) such that Corning would need to show infringement of each variation to exclude the 616 Glass as a whole. *See* RRB at 7 (arguing that, if the 616 Glass did vary, "then every piece of 616 Glass is a separate accused product"). Corning has not made any effort to do so and would not be able to meet its burden under this theory.

do not dispute that the additional limitation of claims 3, 6, 8, and 12 are met. Undisputed Claim Limitations at 5.

2. 615 Glass

Corning asserts that the 615 Glass infringes claims 3, 6, 8, and 12 of the '491 patent. CIB at 76. Corning notes that "[m]ultiple independent sources of evidence establish infringement," such as Caihong Display's internal and outsourced testing, testimony from Caihong Display witnesses, and Caihong Display manufacturing documents. *Id.* Corning states that "Dr. Martin's independent testing on Caihong-produced samples provides additional confirmation." *Id.*

Respondents do not dispute that the 615 Glass meets the limitations of the asserted claims. Undisputed Limitations at 5. Respondents argue, however, that, because "Dr. Martin used the same flawed testing methodology" as for the 616 Glass, "Corning has failed to show infringement of the '491 patent by Caihong's 615 Glass." RIB at 17; *see also* Undisputed Limitations at 4 n. 5.[12]

As explained above, I assign no weight to Dr. Martin's testing. Nevertheless, I find that the Asserted Claims are met because Caihong itself conducted internal testing of the 615 Glass that demonstrates that the claim limitations are met. CX-0002C (Martin WS) at Q/As 139, 188, 194, 205, 208, 213-214, 218-219, 223, 226-227, 232, 237, 242-243, 247, 251, 255, 257-258 (testifying that the Caihong internal tests demonstrated that the Asserted Claims are infringed); CPX-0248C (compiling CX-0028C; CX-0196C-CX-0292C). Tests results from [redacted] and [redacted] also confirm infringement. CX-0002C (Martin WS) at Q/As 139, 188, 193, 207, 212, 217, 222, 231, 236 (testifying that the [redacted] tests results demonstrate that the Asserted Claims are infringed); CX-

[12] Respondents also argue that the internal and outsourced testing occurred in China on glass sold in China. RRB at 15. Respondents did not make this argument in either their pre-hearing or opening brief and thus it is waived under Ground Rules 11.2 and 14.3.

0030C-CX0033C; CX-0194C; CX-0293C-CX-0308C. Finally, testimony from Caihong's corporate witnesses and Caihong's manufacturing documents support a finding of infringement. CX-0002C (Martin WS) at Q/As 195, 197-201, 260-261; *see also* CX-0100C; CX-0180C; CX-0182C; CX-0183C; CX-0184C. [13]

Accordingly, I find that Corning has established that the 615 Products meet the limitations of claims 3, 6, 8, and 12 of the '491 patent. As such, I find that Corning has shown that the 615 Accused Products meet the limitations of claims 3, 6, 8, and 12 of the '491 patent.

C. Technical Prong

Corning asserts that the DI Products practice claims 3, 6, 8, and 12 of the '491 patent. CIB at 85. Corning explains that "[m]ultiple independent sources of evidence establish" infringement, such as Corning documents and testing by Respondents' experts. *Id.*

Respondents do not dispute that the DI Products meet the limitations of the asserted claims. Undisputed Limitations at 5. Respondents instead argue that "there is no evidence Dr. Martin tested EAGLE XG Glass, because his test results show a chemical composition [redacted] for EAGLE XG." RIB at 56-57; *see also* Undisputed Limitations at 5 n. 6.

I assign no weight to Dr. Martin's testing. Nevertheless, I find that Corning has shown that the DI Products practice claims 3, 6, 8, and 12. Dr. Martin testified that internal Corning documents and his knowledge of Corning's manufacturing process demonstrate that the DI Products meet claims 3, 6, 8, and 12. CX-0002C (Martin WS) at Q/As 601-608; 610-613, 616-623, 627, 631-633,

[13] I note that this evidence demonstrates a ratio above 1.0. *See, e.g.*, CX-0002C (Martin WS) at Q/A 207 (explaining that the [redacted].); *id.* at Q/A 208 (explaining that [redacted]).

636-639; *id.* at Q/As 553-554, 561-563, 567-568, 577-579, 583-585; *see also* CPX-0078C; CPX-0084C; CPX-0085C; CPX-0086; CPX-0087C, CPX-0088C; CX-0026C; CX-0311; CX-0378; CX-0382C; CX-0384C; CX-0385C; CX-0378. For limitations 1[a], 1[b], part of 1[c]. and claim 8, Dr Martin also explained that test results from Respondents' experts, Dr. Henderson and Dr. Zanotto, demonstrated that these limitations are met. *See id.* at Q/A 560 (testifying that Dr. Henderson and Dr. Zanotto "found an average concentration [of] SiO_2, Al_2O_3, B_2O_3, MgO, CaO, SrO, and BaO in the samples they tested that fall within the ranges described in limitation 1[a]"); *id.* at Q/A 565 (testifying that "[t]he testing results from Dr. Henderson and Dr. Zanotto indicate that the [RO]/[Al_2O_3] ratio of the DI Products is between 1.00 and 1.25"); *id.* at Q/A 570 (testifying that "[t]he testing results from Dr. Henderson and Dr. Zanotto indicate that the DI Products have an SnO_2 concentration of at least 0.01 mol%"); *id.* at Q/A 637 (testifying that Dr. Henderson's testing showed that the DI Products had an average SnO_2 concentration of [redacted] and Dr. Zanotto's testing showed that the DI Products had an average SnO_2 concentration of [redacted] (XRF testing) and [redacted] (ICP testing)); CPX-0064C; CPX-0067C. Respondents do not dispute this evidence. Thus, even without the results of Dr. Martin's testing, I find that Corning has shown that the DI Products practice the asserted claims.

For these reasons, I find that the technical prong is met for the '491 patent.

D. Invalidity

Respondent asserts that the '491 patent is invalid because: (1) the asserted claims are indefinite; (2) the asserted claims are invalid for lack of written description; (3) the '491 patent does not comply with the enablement requirement; and (4) the asserted claims are obvious in view of Japanese Patent Application Publication No. 2004-189535 ("Miwa '535") in combination with U.S. Patent Application Publication No. 2005/0101469A1 ("Peuchert '469"). RIB at 17, 23, 33, 36.

1. Indefiniteness

Respondents argue that "[t]he language '[m]ole percent on an oxide basis' . . . is indefinite, at least because a [person of ordinary skill in the art ("POSA")] would not know how to measure or calculate a value for the claimed $\Sigma[RO]/[Al_2O_3]$ ratio with reasonable certainty." RIB at 17. Respondents assert that: (1) "[t]he specification discloses different ways to determine the compositions of glasses,"; (2) "[a] determination of infringement would turn on which way a POSA chose"; and (3)"[a] POSA could not assess whether a glass meets the claimed mol% values or ratios with reasonable certainty based on what is disclosed in the intrinsic record and the knowledge of a POSA." *Id.* at 18-19.

Corning argues that "Respondents have not shown indefiniteness." CIB at 64; *see also id.* at 103. First, Corning asserts that "Respondents' indefiniteness theories are fundamentally inconsistent with established law." *Id.* at 64. Specifically, Corning explains that "[w]here a party, like Respondents, disputes the application of a particular test to assess asserted claims, that raises a dispute of infringement, not indefiniteness." *Id.* at 66. Second, Corning argues that, even if Respondents' indefiniteness argument is not legally flawed, it fails on the merits. Corning asserts that "Respondents have not shown . . . that properly-conducted batch calculations and chemical testing of finished glass samples routinely produce results with meaningful differences that would have a material effect on a POSA's understanding of infringement." *Id.* Third, Corning asserts that "Respondents have . . . not shown . . . that testing of the same glass sample with different chemical measurement techniques routinely produces results with meaningful differences that would have a material effect on a POSA's understanding of infringement." *Id.* at 68-69. [14]

[14] Corning argues that Respondents waived their indefiniteness defense under my Ground Rules by failing to raise it during claim construction. CIB at 64. I disagree. *See* Order No. 25 at 17-18, 20.

Respondents essentially set forth two different indefiniteness arguments. First, Respondents argue that "[t]he specification does not specify any method that is a 'standard chemical method.'" RIB at 18. They note that Dr. Martin's testing led to infringement, while the testing from Respondents' experts resulted in noninfringement. *Id.* at 19-20. Because Respondents assert that a determination of infringement depends on which testing method is used, they contend that the term is indefinite. *Id.*; *see also* RRB at 19 (noting that Caihong's experts and [redacted] collectively performed nine XRF tests, nine ICP tests, nine EPMA, tests, and four wet chemistry tests). Second, Respondents argue that one of skill in the art could obtain different results depending on whether the glass composition was calculated based on batch ingredients (a "batch calculation") or whether it was determined from measuring the finished glass ("glass measurement"). RIB at 18. Respondents contend that, because Respondents' batch calculation leads to different results that Dr. Martin's glass measurement, the claim term is indefinite. *Id.*

I find that Respondents have not shown that the term is indefinite. Specifically, I note that both of Respondents' indefiniteness arguments rely on the results of Dr. Martin's testing. As noted above, I previously found that Dr. Martin's test results are not reliable. As such, Respondents have not shown, in this investigation, a situation in which one type of testing results in infringement, while the other type of testing results in noninfringement.

Accordingly, I find that Respondent has not shown that "[mole percent] on an oxide basis" is indefinite.

2. Written Description

Respondents argue that "[t]he '491 patent's asserted claims are invalid for lack of written description because the common specification does not include sufficient disclosure to show possession of the claimed inventions by the sole named inventor, Dr. Ellison." RIB at 23. According to Respondents, "[t]he full scope of the claimed glasses include billions of possible

compositions, far beyond those disclosed, such that a POSA would recognize that Dr. Ellison did not possess the full scope of the claimed invention." *Id.* Respondents specifically assert that: (1) "[t]he specification lacks written description for glass compositions that include up to 10.99 mol% of unrecited 'other oxides' and/or 'contaminants'"; (2) "[the] asserted claims lack written description for full claim scope of the recited amount of SnO_2"; and (3) "[t]he asserted claims lack written description for the full claim scope of the recited amount of BaO." *Id.* at 25, 32, 33.

Corning disagrees and argues that "[t]he Asserted Claims have adequate written description." CIB at 101.

a) Other Oxides and/or Contaminants

Respondents acknowledge that the asserted claims specify ranges for certain oxides, including SiO_2, Al_2O_3, B_2O_3, MgO, CaO, SrO, BaO, SnO_2, As_2O_3, and Sb_2O_3. RIB at 23. Respondents argue however, that, based on the claimed ranges for these oxides, glass compositions could theoretically "have up to 10.99 mol% of oxides . . . in the form of 'various other oxides.'" *Id.* at 24. This is shown in the demonstrative below, in which the hypothetical sample "Ex-Comp-1" includes oxides in the claimed ranges but contains 10.99 mole percent of other oxides:

'491 patent: Required Mole Percent Values by Oxide				
Oxide	**claims (1), 6, 12**	**claim 3**	**claim 8**	**Ex-Comp-1**
SiO_2	64.0-71.0	64.0-71.0	64.0-71.0	64.0
Al_2O_3	9.0-12.0	9.0-12.0	9.0-12.0	9.0
B_2O_3	7.0-12.0	7.0-12.0	7.0-12.0	7.0
MgO	1.0-3.0	1.0-3.0	1.0-3.0	2.0
CaO	6.0-11.5	6.0-11.5	6.0-11.5	7.0
SrO	0-2.0	0-1.0	0-2.0	0.0
BaO	0-0.1	0-0.1	0-0.1	0.0
SnO_2	$\geqslant$ 0.01	$\geqslant$ 0.01	0.01-0.15	0.01
As_2O_3	$\leqslant$ 0.05	$\leqslant$ 0.05	$\leqslant$ 0.05	0.00
Sb_2O_3	$\leqslant$ 0.05	$\leqslant$ 0.05	$\leqslant$ 0.05	0.00
total mol%	N/A	N/A	N/A	**89.01**
Unaccounted for mol% (100 – total mol%)	N/A	N/A	N/A	**10.99**
$\Sigma[RO]/[Al_2O_3]$	$\geqslant$1.00			1.00

RDX-0001C.21 (annotated). According to Respondents, the specification lacks written description for glass compositions such as Ex-Comp-1. [15] RIB at 25.

Corning argues that "[t]he Asserted Claims have adequate written description, and Respondents have not shown clear and convincing evidence otherwise." CIB at 56. Corning notes

[15] Respondents acknowledge that the specification indicates that the amount of each individual oxide "should be less than or equal to 2.0 mole percent," while the "total combined concentration should be less than or equal to 5.0 mole percent." RIB at 26 (quoting JX-0002 at 11:31-36). Respondents assert that, even accepting that the specification teaches these limits, there is still "5.99 mol% unaccounted for." *Id.*

that the evidence shows "that a POSA would have understood the inventor was in possession of the full scope of the claimed inventions based on the specifications' disclosures." *Id.* Corning also asserts that Respondents "misappl[y] the written description requirement." *Id.* at 58.

The written description requirement ensures that the patentee "reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date." *Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (*en banc*). Here, Respondents do not contend that Corning lacked possession of the ranges for the oxides specified in the claims.[16] Rather, Respondents' argument is essentially that Corning did not have possession of what is *not* included in the claims, but that *could* be encompassed in the invention (*i.e.*, the "other oxides" and "contaminants"). *See, e.g.*, RX-0014C (Carty WS) at Q/A 229 ("In my opinion, a POSA would find the lack of any disclosure relating to the 'various other oxides' as proof that the inventor did not possess . . . any claimed compositions that permissibly, as recited, contain up to 10.99 mole percent of such 'other oxides.'").

I find that this does not constitute a lack of written description. The purpose of the written description requirement is to "ensure that the scope of the right to exclude, ***as set forth in the claims***, does not overreach the scope of the inventor's contribution to the field of art as described in the patent specification." *Univ. of Rochester v. G.D. Searle & Co.*, 358 F.3d 916, 920 (Fed. Cir.

[16] Respondents' expert, Dr. Carty, does not dispute that the challenged claim language is found in the original claims and that the claim language matches the description in the summary of the invention. *See, e.g.*, Tr. (Carty) at 381:24-389:1 (agreeing that specification's Summary of Invention and preferred embodiments match the compositional and other limitations of the Asserted Claims). Nor do Respondents challenge the specifications' description of the recited oxides, the roles of the oxides, the preferred amounts of each oxides, etc. *See id.* at 392:21-393:9 (agreeing that "the specification provides a description of the role of each of the different oxides in the glass composition," "describes ranges for each of [the oxides] in their concentrations," "gives reasons why there's a lower end and upper end of that range," and "explains that the glasses of the invention will normally contain some contaminants").

2004) (emphasis added); *see also Regents of the Univ. of Minn. v. Gilead Scis., Inc.*, 61 F.4th 1350 (Fed. Cir. 2023) ("The purpose of the written description requirement is to prevent an applicant from later asserting that he invented that which he did not."). Thus, to satisfy the written description requirement, the patentee must show that there is support in the specification for what is included in the claims. The written description requirement does not mandate that there must be disclosure of how unclaimed features may impact the claimed features. *See, e.g.*, *Crown Packaging Tech., Inc. v. Ball Metal Beverage Container Corp.*, 635 F.3d 1373, 1383 (Fed. Cir. 2011) ("A patentee need only describe the product as claimed, and need not describe an unclaimed method of making the claimed product."); *see also Cordis Corp. v. Medtronic AVE, Inc.*, 339 F.3d 1352, 1365 (Fed. Cir. 2003) (holding that, to satisfy the written description requirement, "an applicant is not required to describe in the specification every conceivable and possible future embodiment of the invention").

Respondents do not cite to any precedent that states otherwise. Respondents first cite to a Commission opinion which addresses the written description requirement in the context of composition limitations. RIB at 25. In that investigation, the patent claims were "directed to a broad genera of coating compositions that exhibit certain physical attributes." *Certain UV Curable Coatings for Optical Fibers, Coated Optical Fibers, & Prods. Containing Same*, Inv. No. 337-TA-1031, Comm'n Op. at 13 (Jun. 7, 2018). I will discuss this contention below but, as an initial matter, I find this situation more akin to the Federal Circuit's decision in *Allergan USA, Inc. v. MSN Labs. Private Ltd.*, 111 F.4th 1358 (Fed. Cir. 2024).

In *Allergan*, the Federal Circuit was considering whether there was adequate written description for an optional feature called a glidant. 111 F.4th at 1372; *see also id.* at 1364 (noting that independent claim 1 recited "about 5-15% by weight mannitol; and optionally, a glidant and/or

lubricant"). The *Allergan* court noted that "this is not a case where the disclosure provides only a 'broad outline of a genus's perimeter,' and claims a species within that broad outline." *Id.* at 1374.[17] The court explained that the claims, as here, were narrow in that they cited specific amounts of ingredients[18] and specific ingredients such as "silicified microcrystalline cellulose, crospovidone, mannitol, and magnesium stearate – not classes of ingredients, *e.g.*, filler, disintegrant, preservative etc." *Id.* at 1372. Thus, according to the court,

> The issue before us, then, is not whether the inventors had possession of the formulation that is expressly claimed. That question answers itself. Rather, the issue is whether the inventors had possession of a formulation that lacked a component that is *not* claimed, or only optional

Id. That is the situation raised in this investigation.

The court went on to note that, if Allergan had obtained a patent on the original claim – which did not require a glidant – Allergan "would undoubtedly have satisfied the written description requirement of § 112 . . . because [the claim] would be directly supported *in haec verba* by the disclosure." *Id.* at 1374. The court noted that "it is undisputed that . . . each of the expressly recited ingredients and its recited amount, is adequately disclosed in the specification." *Id.* at 1372. The court stated that patents satisfy the written description requirement when "the written description generally matches the scope of the claims." *Id*.

Nevertheless, in case the Commission determines that this case should be analyzed similar to the genus/ species line of cases, I will discuss the *Optical Fibers* case. In that case, the Commission stated that "the record indicates that the compositional limitations are so broad that

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[17] "[W]ritten description of a broad genus requires description not only of the outer limits of the genus but also of either a representative number of members of the genus or structural features common to the members of the genus, in either case with enough precision that a relevant artisan can visualize or recognize the members of the genus." *Regents*, 61 F.4th at 1356.

[18] Although the court focused on "specific amounts," it acknowledged the claim at issue in that case also included some ranges, which is similar to the claims in this investigation.

they fail to place any meaningful limit on the scope of the claims." *Id.* It explained that one asserted claim "includes wide weight-percentage ranges for the four chemical families," while another asserted claim "does not even limit the weight percentage of oligomer (or any chemical type)." *Id.* The Commission further explained that "each of these generic chemical compositional limitation[s] can be met by a wide variety of different chemical species." *Id.* The Commission noted that, "[d]espite the breadth of the claims, the specification fails to provide guidance on how to choose from among all the possible chemical components to form a primary coating that will meet the physical properties claimed." *Id.* at 14; *see also id.* at 25, 28-29 (finding that other claims were invalid for lack of written description for similar reasons). Thus, the issue before the Commission was whether the specification provided sufficient support to demonstrate that the inventor was in possession of the invention as described *in the claims* – not whether the inventor was in possession of some unclaimed feature.

Respondents also cite to *Duke University v. Sandoz Inc.*, 160 F.4th 1305 (Fed. Cir. 2025) for the proposition that the claims were "invalid for lack of written description because [the] 'specification fail[ed] to provide the relevant artisan with sufficient blaze marks or structural commonalities among the claimed compounds to lead her to conclude that the inventor actually possessed the claimed invention.'" RIB at 27-28. In that case, the patent was directed to "a method for growing hair by topically applying a chemical compound known as prostaglandin." *Duke Univ.*, 160 F.4th at 1308. The type of prostaglandin at issue was called PGF and "[w]ithin the general category of PGF are many variants." *Id.* The court explained the asserted claim used a specific subgenus of PGF and that the relevant question was whether the inventors were in possession of the full subgenus. *Id.* at 1310-1311. The court noted that, in cases involving a genus of a chemical compound, the written description "requires description not only of the outer limits

of the genus but also of either a representative number of members of the genus or structural features common to the members of the genus." *Id.* at 1311 (quoting *Regents.*, 61 F.4th at 1356). The court further stated: "[T]o meet the written description requirement [on the basis that the specification disclosed features common to all members of the claimed subgenus], the patent must 'provide sufficient blaze marks' to direct a skilled artisan to the claimed subgenus." *Id.* (quoting *Regents*, 61 F.4th at 1356-1358).

The situation in *Duke University* is distinguishable in two ways: First, it involves a generic chemical compound with "many variants" and a test that has been developed to assess written description of such patents. As noted above, Respondents do not explain why the same considerations in reviewing chemical compound patents, such as the genus/species concern, should apply in this case. *See Allergan*, 111 F.4th at 1372 (distinguishing a patent which claims a tablet with certain ranges of ingredients from "blaze mark" cases "in which the claims recite a species where the specification describes only a genus"). Second, the *Duke University* case involved a challenge to the written description support of the claimed compound itself – not unclaimed additional components. As noted above, Respondents are not challenging the written description of the claimed ranges.

Further, to the extent that Respondents' argument is that there are compositions that meet the claim but that would not work, this is an enablement issue – not one of written description. *See Allergan*, 111 F.4th at 1376 ("Whether a claimed invention would 'work,' or whether it is operable,

goes more directly to the utility requirement or the enablement requirement, not the written description requirement.").[19]

For these reasons, I find that Respondents have not established that the specification lacks written description for glass compositions that include up to 10.99 mol% of unrecited "other oxides" and/or "contaminants."

b) SnO_2

Respondents argue that "[t]he asserted claims of the '491 patent require at least 0.01 mol% of tin oxide (SnO_2) but do not set an upper limit on the allowable amount (except for claim 8, which sets an unsupported upper limit of 0.15 mol% discussed further below)." RIB at 32. Respondents explain that Dr. Ellison testified that "the maximum amount of SnO_2 that could be included within the glass compositions of his alleged inventions is limited by a solubility limit, which is about 0.08 mol%." *Id.* Thus, "it would not be possible to get a greater amount of SnO_2 than 0.08 mol% into a glass composition within the scope of Dr. Ellison's alleged inventions." *Id.*

Corning disagrees that there is a "lack of written description for the amount of SnO_2." CIB at 60. Corning explains that the specification "teaches SnO_2 concentrations . . . matching the claimed concentrations." *Id.* They also argue that Respondents' reliance on Dr. Ellison's testimony is misplaced both "because Respondents mischaracterize his testimony" and "because the written

[19] I note that although the doctrines of written description and enablement are distinct, determining if there is sufficient written description support for a broadly claimed invention can be "analogous to enablement of a genus under § 112, ¶ 1, by showing the enablement of a representative number of species within the genus." *Regents of the Univ. of California v. Eli Lilly & Co.*, 119 F.3d 1559, 1569 (Fed. Cir. 1997). But, as noted above, this case, when properly framed, does not raise a genus/species issue. Additionally, the Federal Circuit has states that "[p]erhaps there is little difference in some fields between describing an invention and enabling one to make and use it, but that is not always true of certain inventions, including chemical and chemical-like inventions." *Ariad Pharms.*, 598 F.3d at 1352.

description inquiry is an objective inquiry limited to the 'four corners of the specification form the perspective of a POSA.'" *Id.* at 60-61.

I find that Respondents have not established, by clear and convincing evidence, that the specification fails to reasonably convey to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date. In support of their argument, Respondents cite to the testimony of Dr. Carty. *See* RIB at 32-33. According to Dr. Carty, "[b]ecause the claims permit there to be up to 10.99 mol% of 'other oxides' or 'contaminants,' the amount of SnO_2 on a mole percent basis could include amounts up to 10.99 mole percent while still satisfying all of the recited limitations . . . [of] claims 2, 3, 6, and 12 of the '491 patent." RX-0014C (Carty WS) at Q/A 261. From this, Dr. Carty concluded that "[a] POSA, however, would not believe that the inventors had possession of or had enabled claimed to glass compositions containing an effectively unbounded amount of SnO_2." *Id.*

I find that Dr. Carty's opinion does not adequately address the specification's teachings with respect to SnO_2. The specification explains that SnO_2 is used in the fining of glass and states that SnO_2 can be present in the glass "either as a result of Joule melting using tin-oxide electrodes and/or through the batching of tin containing materials, e.g., SnO_2, SnO, $SnCO_3$, SnC_2O_4, etc.". JX-0002 at 11:40-43. The specification cautions against large amounts of SnO_2. It states:

> The presence of SnO_2 in AMLCD glasses has not resulted in any known adverse effects in the use of these glasses in the manufacture of liquid crystal displays. SnO_2, however, can form crystalline defects in AMLCD glasses when used at high concentrations. Accordingly, the concentration of SnO_2 in the finished glass is preferably less than or equal to 0.15 mole percent.

Id. at 12:32-38. Dr. Carty does not explain why, given these disclosures, one of skill would make the glass composition with amounts far exceeding 0.15 mole percent (e.g., 10.99 mole percent) of SnO_2.

I am also not persuaded by Respondents' argument that the patentee was not in possession of SnO_2 more than 0.8 mol%. RIB at 32. Respondents assert that "Dr. Ellison testified [that] the maximum amount of SnO_2 that could be included within the glass compositions of his alleged invention is limited by a solubility limit, which is about 0.08 mol%." *Id.* Dr. Ellison's testimony addresses whether the invention could work with more than 0.08 mole percent of SnO_2. This is a question of enablement – not written description. *See Allergan*, 111 F.4th at 1376. Further, for the reasons discussed below in Section IV.D.3.b), I am not persuaded that the premise which underlies Respondents' position (that SnO_2 has a strict solubility limit of 0.08 mole percent) is correct.

For these reasons, I find that Respondents have not established that the specification lacks written description for the full claim scope of the recited amount of SnO_2.

c) BaO

Respondents argue that "[t]he asserted claims of the '491 patent . . . lack written description for the full scope of 0-0.1 mol% of BaO." RIB at 33. Respondents state that "[t]here are no examples in the specification, or in the documentation produced by Corning, showing possession of ***any*** glass composition containing ***any*** BaO." *Id.*

Respondents did not assert this theory in their pre-hearing brief and it is thus waived.[20] Ground Rule 11.2. Accordingly, Respondents cannot establish that the asserted claims are invalid on this ground.

[20] Respondents pre-hearing brief does state that "[t]he Asserted Patents are also invalid for lack of written description because the specification expressly states that the inventor did not have possession of glasses including . . . BaO amounts greater than 0.1 mole percent." RPHB at 108. This is a different argument than the one made here.

3. Enablement

Respondents argue that "the '491 patent's claims cover broader ranges of glass compositions than are disclosed in the specification." RIB at 33. According to Respondents, "[t]he specification would not have enabled a POSA to practice the full scope of the inventions without undue experimentation." *Id.* Respondents state that the *Wands* factors support their argument. *Id.* at 33-36.

Corning argues that "[t]he Asserted Claims are enabled, and Respondents have not shown clear and convincing evidence otherwise." CIB at 61. Corning notes that "Dr. Carty's opinions are based almost entirely on hypotheticals that are inconsistent with the specification's teachings, have not been demonstrated to be within the claims, which he never attempted to form, and he ignores the specification's extensive guidance." CRB at 32.

After analyzing the *Wands* factors,[21] I find that Respondents have not established a lack of enablement.

a) Quantity of Experimentation Necessary

Respondents argue that one of skill would not be able to arrive at various hypothetical compositions within the claimed ranges without undue experimentation. RIB at 33. Respondents also argue "[a] POSA would not have been enabled to make or use the full scope of the claimed inventions because the specification includes misrepresented information about the examples in Table 1." *Id.* at 35.

Corning notes that Dr. Carty admitted that he "did not attempt to replicate any of the examples in the Asserted Patent" and "did not form any glass or have any glass formed in

[21] Some of the facts could fall under more than one factor. For brevity's sake, I analyze each fact only once.

connection with this Investigation." CIB at 62. Corning also argues that any "alleged discrepancies between the inventor's raw data and reported experiments in the specification . . . would not have had any effect on a POSA's ability to make and use the claimed inventions." *Id.* at 63.

i) Hypothetical Compositions

Dr. Carty opined that there are "billions of possible compositions" based on the claimed ranges and that one of skill would not necessarily understand which compositions would work. *See* RX-0014C (Carty WS) at Q/A 207. He noted, in particular, if the bottom ranges of the claimed oxides were used, there would be "over 10 mole percent" that was "unaccounted for" and could be filled with "other oxides" and "contaminants." *Id.* at Q/A 301.

I find that there is not clear and convincing evidence that undue experimentation would be required to arrive at compositions within the claimed ranges that meet the limitations. In providing an opinion that there is lack of enablement for glass compositions that include up to 10.99 mol% of unrecited "other oxides" and/or contaminants, Dr. Carty testifies that the inclusion of "other oxides" could impact the ratio of the '491 Ratio Limitation or the liquidus viscosity of the glass. RX-0014C (Carty WS) at Q/A 230-233. He also indicates that some combinations of other oxides would result in a "non-glass, or a glass with crystalline precipitates (defects)" or a glass that would not be "suitable for use in a downdraw or fusion process." *Id.* at Q/A 235. Dr. Carty does not, however, explain sufficiently why one of skill would ignore what they know from either the specification or prior art to arrive at these combinations of oxides in the first place.[22] For example,

[22] The record includes testimony from Dr. Brow that indicates that one of skill would *not* attempt to form the hypothetical compositions. Dr. Brow explains that Dr. Carty is incorrect that "a POSA would have selected the minimum values of the claimed compositional concentrations, then would have filled this void of his own making with either the 'various other oxides' or 'contaminants' discussed in the common specification." CX-1471C (Brow WS) at Q/A 434. He explained that the

Dr. Carty states that "other oxides" such as MnO and ZnO could be used, but that these oxides "function the same as MgO, CaO, SrO, and BaO in the generally chemistry sense," which would impact the $\Sigma[RO]/[Al_2O_3]$ ratio. *Id.* at Q/A 231. Dr. Carty fails to address sufficiently why one of skill would add non-trivial amounts of MnO and ZnO to the composition *knowing* that it would impact the ratio. Dr. Carty also fails to address sufficiently the specification's expressed preference to keep "other oxides" less than or equal to 5.0 mole percent or the understanding that contaminants should be minimized.[23] JX-0002 at 11:33-36; Finally, Dr. Carty fails to explain sufficiently why one of skill would purposely choose the lower ranges of each oxides such that there would be 10.99 mole percent unaccounted for, particularly since one would be aware that "small changes in the glass composition can lead to big changes in the physical properties of the glass." RX-0014C (Carty WS) at Q/A 257. Without sufficient testimony addressing these concerns, I find that there is not clear and convincing evidence that undue experimentation would be required.

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common specification indicates that the "unclaimed oxides, if used at all, should be used sparingly." *Id.* He also opines that Dr. Carty's hypotheticals ignore that one of skill would understand that "the relative concentration of each component is selected based on the complete composition" and that "viable glasses would require certain minimum levels of . . . basic, building-block compounds" such as SiO_2, Al_2O_3, and B_2O_3." *Id.* at Q/A 433. Finally, Dr. Brow explains that "a POSA would identify the beneficial physical properties and melting, fining, and forming characteristics for a given use . . . and, based on the disclosures of the common specification, select one or more compositions that would be expected to yield the desired physical properties then verify the results through testing." *Id.* at Q/A 441.

[23] Dr. Carty states that "the common specification does not explain the amount of 'contaminants' that are appropriate or allowable or acceptable." RX-0014C (Carty WS) at Q/A 239. He further opines that "a POSA would not know what amount of 'contaminants' can [be] tolerated such that the compositions remain operable." *Id.* He does not address, however, the fact that the specification calls these substances "contaminants." One of skill – or even a layperson – would understand that something called a "contaminant" should be minimized. *See* CX-1471C (Brow WS) at Q/A 438 (explaining that he disagrees that "a POSA would attempt to practice the claimed inventions by purposefully introducing contaminants . . . in glass compositions" and stating that one of skill would not "attempt to practice a glass composition with such high levels of contaminants").

Additionally, even if one of skill were so inclined to make these hypothetical compositions, Respondents have not shown that *undue* experimentation would be required. As Dr. Brow explains: "[I]f a POSA were inclined to attempt to make these hypothetical, fringe compositions that contained meaningful amounts of unclaimed oxides, a POSA could do so and test that composition without undue experimentation." CX.1471C (Brow) at Q/A 437. He further explained that the testing of hypothetical compositions "would merely involve well-known testing and/or calculations frequently conducted in the field." *Id.* at Q/A 443. As the Federal Circuit has noted: "A claim is sufficiently enabled even if 'a considerable amount of experimentation' is necessary, so long as the experimentation 'is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed." *Vasudevan Software Inc. v. MicroStrategy, Inc.*, 782 F.3d 671, 684 (Fed. Cir. 2015) (quoting *Wands*, 858 F.2d at 737).

ii) Misrepresentations

The specification sets forth forty-three exemplary embodiments and includes nine comparative glass compositions. JX-0002 at Table 1. Respondents contend that there are three misrepresentations within these examples. Specifically, Respondents contend that: (1) the patentee represented that certain SiO_2 values reported in Table 1 were measured when they were calculated by difference"[24]; (2) the patentee represented that SnO_2 in Table 1 was either measured or calculated, but it was instead estimated based on knowledge of the solubility limit and the fact that the inventor observed that the amount of SnO_2 was close to the solubility limit; and (3) SnO_2 is listed as a batch ingredient in the specification when it was not used as a batch ingredient, but was

[24] "Calculation by difference" is "a method of determining the [oxide] content by measuring all other constituents, then subtracting those other constituents from 100." CX-1471C (Brow WS) at Q/A 469.

added using a tin oxide electrode. RIB at 35. For the reasons set forth below, I find that Respondents do not explain adequately how any such misrepresentations would impact one of skill's ability to make or use the invention.

Respondents first argue that these misrepresentations "would have misled a POSA trying to replicate the examples in Table 1." *Id.* Respondents do not, however, cite to evidence that adequately supports this assertion. Respondents cite to the testimony of Dr. Ellison and Dr. Carty, but nowhere in the cited testimony do either Dr. Ellison or Dr. Carty state that one of skill would be misled by any of the examples. *Id.* Instead, the cited testimony relates to the solubility of tin oxide. RX-1326C (Ellison Dep. Tr.) at 329:19-23, 327:2-14; RX-0014C (Carty WS) at Q/A 268-270. By Respondents' own admission, all the examples in the specification are below the solubility limit of tin oxide. RIB at 32. Thus, whether or not tin oxide is soluble in higher amounts is irrelevant to the question of whether one of skill would be misled by the examples.

Respondents also argue that "a POSA would have likely obtained different results when trying to recreate the glass samples in Table 1 and would have needed to engage in undue experimentation to reproduce the results." RIB at 36. Dr. Carty's testimony states the same. RX-0014C (Carty WS) at Q/A 337. But neither Dr. Carty nor Respondents explain *why* one of skill would obtain different results or need to engage in undue experimentation due to any of the alleged misrepresentations. It is insufficient under the clear and convincing evidence standard for an expert to simply state that something is so without any support for the opinion. *See, e.g.*, *Acoustic Tech, Inc. v. Itron Networked Sols., Inc.*, 949 F.3d 1366, 1375 (Fed. Cir. 2020) (explaining that conclusory expert testimony and attorney argument cannot constitute substantial evidence in an invalidity analysis).

In fact, the record contains evidence that any purported misrepresentations would not result in undue experimentation. With respect to the first purported misrepresentation, Dr. Brow explained that "Corning's data shows that the variation between measurement of SiO_2 and 'SiO_2 by difference' generates substantially similar results, with difference of less than approximately 1 mol%." CX-1471C (Brow WS) at Q/A 469. Thus, Dr. Brow concluded that "even accounting for what Dr. Carty alleges is a 'misrepresentation,' a POSA would have been enabled to practice the claimed inventions with little, if any, experimentation." *Id.* With respect to the second purported misrepresentation, Dr. Brow explains that "by following the guidance provided in the common specification, a POSA would have been enabled to achieve a glass composition containing SnO_2 within the claimed concentration." *Id.* at Q/A 471. Finally, with respect to third purported misrepresentation, Dr. Brow opines that Dr. Carty's understanding of "batch ingredient" is too narrow. *See id.* at Q/A 520. Dr. Brow also opined that "in light of the common specification's clear disclosures that are consistent with Dr. Ellison's testimony, there would not have been any change in a POSA's understanding regarding the introduction of SnO_2 via Joule melting." *Id.* at Q/A 524. I credit Dr. Brow's testimony as reliable. Additionally, although I give weight to the testimony of Dr. Carty, as explained above, he does not explain adequately how any such misrepresentation would impact one of skill's ability to make or use the invention. Accordingly, I find that Respondents had not demonstrated that one of skill would have been unable to make the full scope of the claimed inventions because of misrepresented information about the examples in Table 1.

iii) Conclusion

For these reasons, I find that Respondents have not demonstrated that this factor weighs in favor of a lack of enablement.

b) Amount of Direction or Guidance Presented

Respondents argue that "[a] POSA would not have understood how to practice the full scope of the Asserted Claims for the reasons discussed" in relation to written description." RIB at 34. Respondents further assert that the specification "disclose[s] nothing about SnO_2 amounts above 0.07 mol% or BaO in any amount." *Id.*

Corning states that "Respondents' experts concede the specification describes the oxides in the inventive glasses as well as their roles in the compositions and the applicable concentration ranges." CIB at 61. Corning contends that "Respondents ignore the specification." CRB at 32.

Respondents have not established that this factor weighs in favor of a finding of a lack of enablement. As Corning notes, Dr. Carty agreed that the specification's Summary of Invention and preferred embodiments match the compositional and other limitations of the Asserted Claims, agreed that "the specification provides a description of the role of each of the different oxides in the glass composition," agreed that the specification "describes ranges for each of [the oxides] in their concentrations," agreed that the specification "gives reasons why there's a lower end and upper end of that range," and agreed that the specification "explains that the glasses of the invention will normally contain some contaminants." Tr. (Carty) at 392:21-393:9. Yet, Dr. Carty mostly ignores the specific guidance in the specification and fails to address the impact it would have on whether one of skill would even attempt to create the hypothetical compositions Dr. Carty discusses.

With respect to SnO_2 in particular, Respondents argue that the specification "disclose[s] nothing about SnO_2 amounts over 0.07 mol%." RIB at 34. According to Respondents, "the maximum amount of SnO_2 that could be included within the glass compositions of [the] inventions is limited by a solubility limit, which is about 0.08 mol%." *Id.* at 32. Respondents conclude that "it would not be possible to get a greater amount of SnO_2 than 0.08 mol% into a glass composition

within the scope of Dr. Ellison's alleged inventions." *Id.* They note: "At the very least, a POSA would require undue experimentation to achieve amounts above 0.08 mol%." *Id.* Respondents further state that "[t]he specification provides no guidance as to how such experimentation could be conducted." *Id.*

The premise on which Respondents' argument relies is not as clear as they present. Respondents present the solubility limit of tin oxide as 0.08 mole percent as an unrefuted fact. Dr. Ellison's testimony on this point is not precise, however. When questioned about a document entitled [redacted] Dr. Ellison testified that the solubility of tin oxide is around 0.08 mole percent. RX-1326C (Ellison Dep. Tr.) at 325:20-327:14. The surrounding context of Dr. Ellison's testimony indicates this solubility is based on specific temperature. The document that Dr. Ellison was shown stated that [redacted] *Id.* at 326:22-25. Dr. Ellison was then asked: [redacted] *Id.* at 327:2-4. Thus, Dr. Ellison's testimony about solubility confirms that the tin oxide's solubility is 0.08 mole percent at a particular temperature. His testimony does not clearly indicate the solubility level of tin oxide at different temperatures.[25] I cannot, therefore, find that there is clear and convincing evidence that the maximum amount of tin oxide in a composition is 0.08 mole percent. Without such testimony, Respondents' enablement argument about SnO_2 is unpersuasive.

Finally, Respondents assert that the specification does not disclose anything about BaO "in any amount." RIB at 34. This is not accurate. The specification states: "Preferably, the glass

[25] As Corning notes, prior art references disclose tin oxide ranges above 0.08 mole percent. *See* CRB at 33. For example, the Peuchert '469 reference, upon which Respondents rely in their obviousness analysis, discloses 0.16-0.29 mol% of SnO_2. RX-0193 at Table 1; *see also* CX-1471C (Brow WS) at Q/A 183. We must presume that patents are valid and thus I have no reason to doubt that glass compositions can include tin oxide at amounts greater than 0.08 mole percent.

making up the sheet is also substantially free of BaO (i.e., the concentration of BaO is less than or equal to 0.05 mole percent)." JX-0002 at 5:4-6. The specification further provides:

> The remaining alkaline earth oxides- SrO and BaO – can both contribute to low liquidus temperature (high liquidus viscosities) and thus the glasses of the invention will typically contain at least one of these oxides. However, both oxides increase CTE and density and lower modulus and strain point compared to MgO and CaO. Between SrO and BaO, BaO generally has more adverse effects on glass properties than SrO. Accordingly, the BaO concentration in the glasses of the invention is less than or equal to 0.1 mole percent (preferably less than 0.05 mole percent), while the SrO concentration is allowed to be greater, i.e., less than or equal to 2.0 mole percent, preferably less than of equal to 1.0 mole percent. Typically, the sum of the of the SrO and BaO concentrations will be greater than or equal to 0.4 mole percent, primarily to provide a sufficiently high liquidus viscosity so that the glass can be formed by a downdraw process.

JX-0002 at 11:12-27. Finally, claim 1 specifies a range for BaO of 0-0.1 mole percent. *Id.* at cl. 1; *see also* CX-1471C (Brow WS) at Q/A 412 (explaining the specification's disclosures related to BaO). Thus, I do not agree with Respondents that the specification fails to provide any guidance with respect to BaO.

For these reasons, I find that Respondents have not demonstrated that this factor weighs in favor of a lack of enablement.

c) Presence or Absence of Working Examples

Respondents assert that the examples set forth in the specification "cover only a narrow range of the much broader claimed ranges of oxides, disclose nothing about SnO_2 amounts above 0.07 mol% or BaO in any amount." RIB at 34.

Corning notes that "the specification provides significant guidance about the claimed methods including dozens of exemplary glasses." CIB at 61. According to Corning, "[t]he specification's 43 working examples demonstrate how various oxides affect key glass properties." CRB at 32.

The fact that the specification includes forty-three exemplary embodiments and nine comparative glass compositions weighs in favor of enablement. *See Wands*, 858 F.2d at 740 (finding that the fact that the specification presented working examples weighed against a conclusion of lack of enablement). As Dr. Brow explained: "[A] POSA would have been able to start from one of the numerous examples listed in Table 1 to create an embodiment of the claimed inventive compositions." CX-1471C (Brow WS) at Q/A 432. Accordingly, I find that this factor weighs in favor of enablement.

d) Nature of the Invention

Respondents state that "[t]he field of the invention is alkali-free compositions for glasses, glass sheets, and methods for making the same." RIB at 34. According to Respondents, "the field of invention is indisputably unpredictable." RRB at 24.

Corning asserts that "the nature of the invention, state of the prior art, and relative skill of a POSA confirm a POSA would have been familiar with the underlying chemistry, glass properties, characterization of glasses, and how to achieve desired properties by adjusting glass composition based on the specification's teachings." CIB at 61; *see also id.* at 102.

Both parties rely only on conclusory sentences with respect to this factor.[26] Neither side explains how the nature of the invention affects the enablement analysis. As such, I find that this factor is neutral.

[26] Likewise, Dr. Carty simply states only that "[t]he field of the invention is alkali-free compositions for glasses, glass sheets, and methods for making the same," without explaining why this matters. RX-0014C (Carty WS) at Q/A 302. Nor did Dr. Carty opine that this field is "indisputably unpredictable" with respect to this factor. *Id.*

e) State of the Prior Art

Respondents assert that "[a] POSA would have been aware of alkali-free glass compositions and methods for making the same." RIB at 34.

Corning argues that "[a] POSA would have been aware of boroaluminosilicate glasses and their uses, as well as the physical properties desirable for such uses and the relevant manufacturing methods." CRB at 32. It also states that "[a] POSA would have benefitted from the prior art's knowledge[,] which Dr. Carty failed to consider. . . about boroaluminosilicate glass, including that glasses may comprise, for example, BaO or >0.07 mol% SnO_2." *Id.* at 32-33.

I find that Respondents have not demonstrated that this factor weighs in favor of a lack of enablement. Dr. Carty did not address the state of the prior art, other than to represent that "[a] POSA would have been aware of various different alkali-free glass compositions, and methods for making the same, designed for use in flat panel display devices." RX-0014C (Carty WS) at Q/A 303. Thus, Respondents' analysis lacks any specific discussion of the prior art and what one of skill would understand from the teachings.[27] Dr. Carty does not explain, for example, why one of skill would review references such as Miwa '535 or Peuchert '469 and not gain any useful information about the combinations of the different oxides. I find Dr. Carty's opinion on this point too conclusory, particularly when the burden is *clear and convincing* evidence.

Nor did Dr. Carty consider the common industry practice of claiming ranges in oxides. Dr. Brow explained that "a POSA would have understood that claiming glasses using compositional ranges is common in the industry." CX-1471 (Brow WS) at Q/A 443. He stated:

[27] As Corning notes, Dr. Carty admitted that, outside of the file history, he did not consider other patents directed to boroaluminosilicate glasses or look at other boroaluminosilicate glasses that were formed prior to 2005 or 2006. Tr. (Carty) at 389:11-17.

> Many patents and patent applications directed to glass compositions claim concentrations in ranges. For example, several U.S. patents that Caihong alleges are prior art are directed to glass compositions and recite ranges of oxide components from industry players such as Schott, Nippon Electric Glass, and Asahi Glass Company. Specific examples include "Brix" – U.S. Patent No. 5,908,703 (CX-0629), which was assigned to Schott Glasswerke and recites ranges of oxide components in, for example, claim 1, and "Lautenschlager" – U.S. Patent No. 6,465,381 (CX-0632), which was assigned to Schott Glas and recites ranges of oxide components in claim 1. "Miwa '361" – U.S. Patent No. 5,811,361 (CX-0627) is another example that recites ranges of oxide components in claim 1 and was assigned to Nippon Electric Glass. Two examples assigned to Asahi Glass Company are "Nishizawa '914" – U.S. Patent No. 5885914 (CX-0628) and "Nishizawa '937" – U.S. Patent No. 6,537,937 (CX-0722), both of which recite ranges of oxide components in their respective first claims. "Peuchert '124" – U.S. Patent No. 6,417,124 (CX-0631) and "Peuchert '310" – U.S. Patent No. 6,329,310 (CX-0630) also recite ranges of oxide components and were both assigned to Schott Glas.

Id. at Q/A 444. Such testimony provides useful context for how a person of ordinary skill in the art would approach the '491 patent.

For the above reasons, I find that Respondents have not demonstrated that this factor weighs in favor of a lack of enablement.

f) Relative Skill of Those in the Art

Respondents argue that "a POSA would not have known the required limits for the amounts of oxides or contaminants that may have been allowable based on the state of the art without undue experimentation, including for SnO_2 and BaO." RIB at 34.

Corning asserts that the "relative skill of a POSA confirm[s] a POSA would have been familiar with the underlying chemistry, glass properties, characterization of glasses, and how to achieve desired properties by adjusting glass composition based on the specification's teachings." CIB at 61; *see also id.* at 102.

Once again, Dr. Carty mostly provides conclusory testimony on this point. He states:

> It is my opinion that, under this definition for the level of ordinary skill in the art, a POSA would not have known the required limits for the amounts of oxides or contaminants that may have been allowable based on the state of the art without

> undue experimentation, which would have been necessary to attempt to make glasses within the full scope of the Asserted Claims, for the reasons I discussed previously.

RX-0014C (Carty WS) at Q/A 303. While Dr. Carty references prior testimony, nowhere does he specifically address *how* the level of skill in the art would impact one's ability to make and use the invention without undue experimentation. The record also contains contradictory testimony from Dr. Brow, who explains that "[a] POSA would not look to create hypothetical compositions on the fringes of the recited ranges and with unclaimed impurities and oxides that no POSA would intentionally add to practice the claimed invention." CX-1471C (Brow WS) at Q/A 442. Dr. Brow also explains:

> [A] POSA would have been familiar with the underlying chemistry of the glasses of the invention, the physical properties of the glasses, and how to achieve the desired properties by adjusting the glass composition, and the testing and characterization of such glasses.

Id. at Q/A 473. Thus, the evidence in the record suggests that one of skill would be able to make and use the invention without undue experimentation.[28]

For these reasons, I find that Respondents have not demonstrated that this factor weighs in favor of a lack of enablement.

[28] With respect to SnO_2 specifically, Dr. Carty states: "[A] POSA would not have understood how to get a SnO_2 value above the solubility limit of approximately 0.07 or 0.08 mole percent, for the reasons I explained previously. Because the solubility limit is an upper limit on the amount of a given oxide that can be included in a glass, no amount of experimentation from a POSA would enable a POSA to practice the full scope of the invention as claimed." RX-0014C (Carty WS) at Q/A 303. As explained above with respect to the second *Wands* factor, Respondents have not established that the premise on which their argument is based is correct.

g) Predictability or Unpredictability of the Art

Respondents assert that "[t]he development and testing of new glass compositions is an unpredictable field that demands significant experimentation." RIB at 34. They explain that "[t]he process for developing new glass compositions is complex as different oxides in different concentrations are introduced into a base glass composition to see how different oxides affect physical properties." *Id.* at 34-35.

Corning argues that "[t]he predictability of the art and the targeted breadth of the claims . . . do not suggest undue experimentation." CIB at 61-62; *id.* at 102. Corning explains that "[a] POSA could use standard chemical methods to characterize a glass' composition and physical properties – as the specification teaches and Dr. Brow explains." *Id.* at 62. Corning also argues that "Dr. Carty's lack of knowledge of the prior art and lack of experience forming boroaluminosilicate glasses belies his opinion concerning predictability." CRB at 33.

The evidence shows that the field is unpredictable. Dr. Carty testifies that "[t]he development and testing of new glass compositions is an unpredictable field that demands significant experimentation and testing to confirm the physical properties of the glass." RX-0014C (Carty WS) at Q/A 305. Dr. Brow does not disagree that the art is unpredictable. He explained:

> The development of new compositions and the manufacture of glass sheets can be relatively more unpredictable than other fields. Thus, I do not disagree that the 'development and testing of new glass compositions' can be unpredictable, and that testing is helpful to understand and confirm the physical properties of a particular glass."

CX-1471C (Brow WS) at Q/A 476.

For these reasons, I find that the unpredictability of glass compositions weighs against a finding that the claims are enabled. I note, however, that context is important here. As discussed above with respect to the fifth favor (state of the prior art), there is no testimony as to how one of skill would view the unpredictability in light of the teachings of the prior art. As Dr. Brow explains:

> [T]he inherent need for testing to confirm a particular glass composition and its physical properties does not render the need for undue experimentation, as Dr. Carty appears to suggest. . . Moreover, when a new glass composition and its physical properties have been characterized and documented, particularly through molar ratios and based on standard chemical methods, such compositions are amendable to repeatability across various manufacturing techniques.

Id. Thus, while the art may be unpredictable, Respondents have not demonstrated that undue experimentation would actually be required.

h) Breadth of the Claims

Respondents assert that "[t]he '491 patent's asserted claims are overly broad" for the same reasons it asserted there is a lack of written description. RIB at 34.

Corning notes that Respondents "improperly rely on Dr. Carty's posited hypothetical glass compositions that disregard the Asserted Claims' . . . property limitations, including the liquidus viscosity required by all Asserted Claims." CIB at 62; *see also id.* at 103 (arguing that "Dr. Carty's positing of hypothetical-compositions is flawed . . . because his hypothetical glasses . . . have not even been shown to fall within the claims").

I find that Respondents have not demonstrated that the claims are overly broad. While Respondents represent that there are "billions" of possible compositions, this fact alone does not mean that one of skill would not be able to make or use the invention. Respondents do not examine whether the specification's teachings, the knowledge of one of skill in the art, and the guidance of the prior art would narrow the possible combinations of oxides. Thus, even if the breadth of the claims would weigh in favor of a lack of enablement, I find that Respondents have not shown a lack of enablement on this ground.

i) Conclusion

For these reasons, I find that Respondents have not established that the asserted claims of the '491 patent are invalid due to lack of enablement.

4. Obviousness

Respondents argue that "[t]he Asserted Claims would have been obvious in view of Miwa '535 in combination with Peuchert '469." RIB at 36.

a) Overview of Miwa '535

Miwa '535 is a Japanese patent application filed on December 11, 2002 and published on July 8, 2004. RX-0224.002. The Summary of the Invention states: "The objective of the invention is to provide an alkaline-free glass substrate with high transmittance without increasing costs and which meets all required characteristics for liquid crystal displays." *Id.*

Miwa '535 teaches various embodiments. Respondents rely on Embodiment 15 in their analysis. This embodiment is shown in the farthest right column in the below chart:

	Embodiment				
	11	12	13	14	15
Composition (mass percent)					
SiO_2	61.0	62.0	63.0	62.0	62.0
Al_2O_3	16.0	15.0	16.0	16.0	16.0
B_2O_3	12.0	9.4	12.0	11.0	11.0
MgO	–	0.5	–	–	1.3
Cao	7.0	7.0	7.0	8.0	8.0
SrO	1.9	4.0	1.0	0.5	1.0
BaO	1.0	0.05	0.3	1.5	0.5
ZnO	0.5	0.5	–	0.5	–
ZrO_2	–	0.4	–	0.15	–
SnO_2	0.1	0.25	0.15	0.15	0.1
AS_2O_3	–	0.1	–	–	–
Sb_2O_3	0.5	0.7	0.5	–	0.1
Cl	–	0.1	0.05	0.2	–
All Fe_2O_3	0.015	0.015	0.015	0.010	0.010
Transmittance (%) 300 nm	65	72	70	74	70
400 nm	91	91	91	92	91
600 nm	92	92	92	92	92
800 nm	92	92	92	92	92
Density (g/cm^3)	2.40	2.44	2.35	2.40	2.39
Coefficient of thermal expansion [30-380°C] ($\times 10^{-7}$/°C)	34	33	31	33	34
Strain point (°C)	665	671	668	669	673
Logn at $10^{2.5}$ (°C)	1555	1560	1605	1565	1560
Liquid phase temperature (°C)	1105	1055	1090	1085	1120
Acid resistance	○	○	○	○	○
Buffered hydrofluoric acid resistance	○	○	○	○	○

Id. at RX-0224.0010. The compositions in Embodiment 15 are reported in mass percent. These same values when converted to mol% are as follows:

Oxide	Miwa '535 Embodiment 15 (mol%)	'491 Patent Limitation 1[a] (mol%)
SiO_2:	67.2	64.0-71.0
Al_2O_3:	10.2	9.0-12.0
B_2O_3:	10.3	7.0-12.0
MgO:	2.1	1.0-3.0
CaO:	9.3	6.0-11.5
SrO:	0.63	0-2.0
BaO	0.21	0-0.1
SnO_2	0.04	0.01-0.15
As_2O_3	0.00	0.00
Sb_2O_3	0.02	0.00
Fe_2O_3	0.00	0.00

RDX-0002C.017.

b) Overview of Peuchert '469

Peuchert '469 is a U.S. Patent Application filed on March 6, 2002 and published on May 12, 2005. RX-0193. Peuchert '469 "relates to an aluminoborosilicate glass devoid of alkali, which has the following composition (in wt% relative to the oxide content): SiO_2 >58-70; B_2O_3 0.5-<9; Al_2O_3 10-25; MgO>8-15; CaO 0-<10; SrO-<3; BaO 0-<2; with MgO+CaO+SrO+BaO>8-18; ZnO 0-<2." *Id.* at Abstract. Peuchert '469 is directed to compositions primarily suitable for applications as a substrate for TFT-LCD flat-panel displays. *See id.* at [0014].

c) Analysis

Corning disputes that Peuchert '469 qualifies as prior art. CIB at 90-95. Corning also disputes that Miwa '535 and Peuchert '469 disclose each limitation of the asserted claims. *Id.* at 98-100. Corning further argues that Respondent's expert, Dr. Frank Ernst, selected Embodiment

15 based solely on hindsight bias. *Id.* at 95. Even assuming Corning is incorrect about each of these points, I find that Respondents have not demonstrated that Miwa '535 and Peuchert '469 render the asserted claims obvious.

Respondents' invalidity theory relies on one of skill modifying Embodiment 15 of Miwa '535. As seen in the above chart, Miwa '535 indicates that Embodiment 15 contains 0.21 mol% of BaO and 0.63 mol% of SrO. In order to meet the BaO concentration of claim limitation 1[a] (0-0.1 mol%), Respondents assert that one of skill would have been motivated to reduce the BaO to 0.00 mole percent and replace BaO with SrO, increasing the amount of SrO to 0.94 mole percent.[29] RIB at 40; *id.* at 41 (explaining that the modified embodiment would have 0.94 mol% of SrO).

I find that Respondents have not established, by clear and convincing evidence, that one of skill would be motivated to modify Embodiment 15 in this manner. As indicated above, Respondents' theory relies on two steps: decreasing BaO and replacing BaO with SrO.[30] I find that Respondents have established that Peuchert '469 provides motivation for the first step. RIB at 40. Peuchert '469 states:

> The glass may further contain BaO, which has a positive effect on its devitrification stability. The maximum content is restricted to <2% by weight to keep the density of the glass low. The BaO content of the glass is particularly preferable between 0

[29] Respondents also argue that Miwa '535's disclosed value of 0.21 mole percent is "functionally equivalent" to 0.1 mol% based on Corning's infringement theories related to rounding of BaO amounts. RIB at 39. I disagree. I further note that Respondents do not cite to any testimony supporting the assertion that one of skill would consider 0.21 mole percent to be "functionally equivalent" to 0.1 mol%. *Id.* As such, they cannot meet their burden to show that Miwa '535 discloses the claimed amount of BaO. *See Enzo Biochem, Inc. v. Gen-Probe, Inc.*, 424 F.3d 1276, 1284 (Fed. Cir. 2005) ("Attorney argument is no substitute for evidence.")

[30] Embodiment 15 discloses 0.63 SrO, which is within the claimed range. Thus, Respondents would not necessarily need to demonstrate that one of skill would specifically replace BaO with SrO in order to show that the modified Embodiment meets the claim. Respondents do, however, need to demonstrate that the BaO is replaced with *something*. The theory on which Respondents rely is that BaO is replaced with SrO. Accordingly, to prevail on the invalidity theory presented here, they must show that there is motivation to replace BaO with SrO.

> and 0.5% by weight. When a very lightweight glass is required, the glass is most preferably free of BaO.
>
> The glass may furthermore contain SrO. Its presence likewise has a positive effect on the devitrification stability. The maximum SrO content is restricted to <3% by weight to keep the density of the glass low. The glass contains particularly preferably between 0 and 1% by weight and most preferably between 0 and 0.5% by weight.
>
> The sum of the two heavy alkaline earth metal oxides SrO and BaO is preferably limited to a maximum of 4% by weight.

RX-0193 at [024] – [0026] (cited in RX-0015C (Ernst WS) at Q/A 209). Based on this passage, Dr. Ernst opines that "a POSA reading Peuchert '469 (RX-0193) would have been motivated to modify Embodiment 15 . . . [due to their] desire to create relatively thin and lightweight glass for displays . . . and to further reduce density or fine-tune glass properties without increasing density." RX-0015C (Ernst WS) at Q/A 209.

Respondents have not established, however, that one of skill would replace the BaO with SrO. Dr. Ernst does not opine on this point in his testimony with respect to this limitation. *See id.* at Q/As 208-211 (discussing motivation to decrease BaO but not via an increase of SrO).[31] Dr. Brow, on the other hand, explained that Peuchert '469 would teach away from making this modification. Dr. Brow explained that "a POSA would understand Peuchert '469 to be instructing that ***both*** BaO and SrO be kept to a minimum." CX-1471 (Brow WS) at Q/A 208. He further explained:

[31] Dr. Ernst does extensively discuss why Miwa '535 would motivate one of skill to replace BaO with SrO. *See* RX-0015C (Ernst WS) at Q/As 149-186. This testimony is in the context of the '394 patent, however. Additionally, as noted below, I granted a motion *in limine* excluding evidence that Miwa '535 alone renders the claims of the '491 patent obvious, as Respondents did not assert such a theory in their Invalidity Contentions. *See* Ground Rule 6.4.3 ("A party may not introduce evidence at the hearing that it outside of the scope of its responses to contention interrogatories."). Thus, Respondents cannot rely on Dr. Ernst's testimony for the '394 patent in the context of the '491 patent.

> [A] POSA reviewing Peuchert '469 would not have been motivated to increase the concentration of SrO in Embodiment 15 of Miwa '535. As noted in Table 3, Embodiment 15 has an SrO concentration of 1.0 wt%. Thus, increasing the concentration of SrO would further have been discouraged by Peuchert '469, which stated that the 'most preferabl[e]' concentration of SrO is no more than 0.5 wt%. *See* CX-0371 (Peuchert '469 at [0025].

CX-1471C (Brow WS) at Q/A 207. Respondents ignore this testimony and the teachings of Peuchert '469 with respect to SrO. *See* RIB at 40-43 (failing to cite Peuchert '469 in support of the theory that one of skill would have chosen to use SrO to replace BaO).

Respondents instead argue that one of skill would have been motivated to replace all 0.21 mol% of BaO with an SrO based on the disclosures in Miwa '535. RIB at 40. According to Respondents, "Miwa '535 teaches that BaO and SrO have similar roles," such that one of skill would understand that the addition of SrO "would have reduced glass density with minimal changes to other glass properties given Sr's lighter weight and identical crystalline structure, and it would have achieved better durability/resistance." *Id.* Not only does Dr. Ernst not provide such testimony with respect to this limitation (*see* RX-0015C (Ernst WS) at Q/As 208-211), I struck the theory that Miwa '535 alone renders limitation 1[a] obvious because Respondents failed to disclose it during discovery. *See* Order No. 42 (Dec. 23, 2025). Respondents' reliance on Miwa '535 for motivation also ignores the teachings of Peuchert '469. Neither Respondents nor Dr. Ernst explain, for example, why one of skill would look to Peuchert '469 in deciding to decrease BaO but would ignore the teachings of this reference in order to increase SrO.[32]

Respondents also argue that one of skill would be motivated by his knowledge of the art to replace the BaO of Embodiment 15 with SrO. For example, Respondents argue that "[a] POSA would have been further motivated to [replace BaO with SrO] because Sr and Ba can be adjusted

[32] Additionally, Dr. Ernst admitted that "Miwa '535 itself does not indicate that barium oxide should be eliminated in favor of strontium oxide." Tr. (Ernst) at 569:23 -570:1.

interchangeably without altering the glass network properties due to their similar roles as network modifiers and their nearly identical field strengths . . . . when bonded to oxygen." RIB at 40. They also argue that "[b]ecause Miwa '535 presents the components of the glass in mass fractions, a POSA would default to replacing BaO with SrO 'mass wide.'" *Id.* at 41. Dr. Ernst did not provide such testimony with respect to this limitation. RX-0015C (Ernst WS) at Q/As 208-211. Additionally, in the same order as above, I specifically struck testimony in which Dr. Ernst opined that references other than Peuchert '469 provided motivation. *See* Order No. 42.

Furthermore, Respondents' argument once again fails to address the teachings of Peuchert '469. Dr. Ernst does not explain why one of skill would specifically increase the SrO concentration of Embodiment 15 of 1.0 wt%, when that amount is already double that of Peuchert 469's "most preferabl[e] maximum SrO concentration (0.5 wt%)." *See* CX-1471C (Brow WS) at Q/A 207 (explaining that Peuchert '469 would have discouraged increasing SrO to 1.0 wt%).

Accordingly, I find that Respondents have not established that one of skill would have been motivated to combine Miwa '535 and Peuchert '469 to arrive at the claimed BaO limitation of 1[a]. Because the Asserted Claims depend on claim 1, I find that Respondents have failed to show that the Asserted Claims are obvious in view of Miwa '535 in combination with Peuchert '469.

d) Secondary Considerations

Secondary considerations of nonobviousness may rebut a prima facie case of obviousness. Here, where Respondents have not made out a prima facie case of obviousness, there is no showing to rebut. Accordingly, I need not consider any secondary considerations of nonobviousness.

E. Inequitable Conduct

Respondents argue that "[t]he Asserted Claims are unenforceable due to inequitable conduct." RIB at 54. According to Respondents, Corning "withheld material information from the USPTO" and "made numerous misrepresentations that collectively amount to inequitable

conduct." *Id.* Respondent specifically allege that "Corning did not provide a complete translation of Miwa '535 and provided mischaracterization of its experiments during the prosecution of the '394 patent." *Id.*

Corning states that "[t]here was no inequitable conduct." CIB at 71. Corning argues that "Respondents fail to show 'but-for' materiality for any issue, much less by clear and convincing evidence." *Id.* Corning further asserts that "[t]here was no intent to deceive, which is independently fatal to Respondents' claim." *Id.*

Inequitable conduct is a judicially-created equitable defense to patent infringement that derives from the equitable doctrine of unclean hands. *Therasense, Inc. v. Becton, Dickinson & Co.*, 649 F.3d 1276, 1285 (Fed. Cir. 2011) (en banc). When a court determines that inequitable conduct has occurred as to one or more claims of a patent, the entire patent is rendered unenforceable. *Id.* at 1287; *Kingsdown Med. Consultants, Ltd. v. Hollister Inc.*, 863 F.2d 867, 877 (Fed. Cir. 1988). Inequitable conduct generally requires a showing of (1) specific intent to deceive the Patent Office and (2) "but-for materiality," meaning that the patent would not have issued but for the misrepresentation or omission. *Therasense*, 649 F.3d at 1287.

1. Mischaracterizations of Experiments

Respondents argue that, during prosecution of the '394 patent, Corning misrepresented: (1) "that the SiO_2 concentrations [identified in the examples] were 'determined from measurements on the finished glass" when they were not measured"; (2) the "SnO_2 concentrations for certain examples in Table 1"; (3) "batch sizes for certain examples"; (4) "CaBr not being a batch ingredient for certain example glasses"; and (5) "SnO_2 being a batch ingredient for certain glasses in Table 1." RIB at 55-56. Respondents state that "[f]or the same reasons discussed in §III.D.5 regarding lack of enablement, the asserted patents are unenforceable due to inequitable conduct." *Id.* at 56.

As explained above in Section IV.D.3.a).ii), Respondents have not introduced clear and convincing evidence that either the first, second, or fifth purported misrepresentation was material. As such, they cannot demonstrate that the patent is invalid due to inequitable conduct on these grounds.

Nor have Respondents demonstrated that the third or fourth purported misrepresentations were material. The only reference to these statements in Respondents' brief is as follows:

> According to Dr. Ellison, Corning additional misrepresented or omitted information about the batch sizes of certain example glasses in Table 1 and batch ingredients used to make certain glasses in Table 1, such as SnO_2 being listed as a batch ingredient in the specification when, in fact, it was not used as a batch ingredient but instead was added using a tin oxide electrode. JX-0002, 13:28-36; RX-0014C, Q/A326-335, 378-392; RX-1326C (Ellison), 89:7-90:1, 90:2-93:21, 168:15-171:22, 207:22-209:9, 209:16-24, 296:14-301:9; RX-0512C, RPX-0551C at Tab [redacted] RDX-0001C.35-37; Tr. (Brow), 233:19-234:2.

RIB at 35-36.[33] As can be seen in the above excerpt, Respondents do not attempt to explain the relevance of each of the statements, let alone establish that they are material for purposes of an inequitable conduct finding.

Because Respondents have not demonstrated that any statement in the examples was material, they cannot establish inequitable conduct on this ground.

2. Translation of Miwa '535

Respondents explain that "[o]n August 1, 2008, Corning submitted a signed Supplemental Information Disclosure Statement identifying Miwa '535 as prior art." RIB at 54. According to Respondents, although Corning submitted an English translation of Miwa '535, the translation "omitted a translation of the Japanese characters for 'mass' that should have been included between

[33] In their reply brief, Respondents state that "Corning's actions were material to patentability and constitute inequitable conduct," but they do not elaborate on this assertion. RRB at 30.

'composition' and the percentage sign." *Id.* Respondents also allege that "the compositional data values were not included in the English translation provided to the USPTO." *Id.*

Even if Respondents could demonstrate materiality of this reference, Respondents have not demonstrated that the intent element of inequitable conduct is satisfied. With respect to intent, Respondents allege that "Corning routinely and consistently misstated, mischaracterized, and withheld information material to patentability." *Id.* at 56. According to Respondents, "[t]he consistency of Corning's misstatements lead to the conclusion that Corning has deceptive intent." *Id.*

A factfinder should only infer intent to deceive when the evidence is clear and convincing. As the Federal Circuit has explained: "[T]he inference [of intent to deceive] must not only be based on sufficient evidence and be reasonable in light of that evidence, but it must also be the single most reasonable inference able to be drawn from the evidence to meet the clear and convincing standard." *Star Sci., Inc. v. R.J. Reynolds Tobacco Co.*, 537 F.3d 1357, 1366 (Fed. Cir. 2008) (alterations added). That is not the most reasonable inference of the facts presented here. There is no indication that the translation of Miwa '535 was anything more than an inadvertent error – if it was an error at all. *See* CIB at 71 (noting that "the translations ***did*** make clear that Miwa535's compositions are reported in 'mass' or 'weight' percent, and there is no evidence the Examiner was confused").

Nor did Respondents establish that there was any pattern in which Corning routinely withheld information. As explained above, Respondents assert that, in addition to the translation issue, there were five misrepresentations in the specification. Respondents' argument that such misrepresentations should be used to infer intent can only prevail if Respondents first establish

that all the statements indeed qualify as misrepresentations. I find that Respondents have not done so.

First, Respondents contend that it was a misrepresentation to report the silica in the examples as measured, when the values were instead calculated by difference. Respondents do not, however, establish that one of skill would consider it inaccurate to call a calculation by difference a measurement. Corning explains in its brief, "SiO2-by-difference" was a "well-established approach" used in measuring substances in glass compositions. CIB at 73 (citing CX-1417C (Brow) at Q/A 498-499). As Corning notes, Dr. Zanotto used such an approach when assessing infringement in this case. *See* RX-0016C at Q/A 53 (explaining that he calculated the amount of B_2O_3 by applying the "by difference" method); Tr. (Zanotto) at 349:23-350:1 (agreeing that using a "by difference" measurement is "totally permissible in the field of glass science to measure oxides by difference"). Given this testimony, I do not find that there is clear and convincing evidence that this statement constituted a misrepresentation.

The second misrepresentation relates to the SnO_2 concentrations for certain examples. RIB at 56. Respondents state that Dr. Ellison represented that the values for SnO_2 were measured or calculated when they were not. *See id.* at 35. Both Respondents and Dr. Carty point to Dr. Ellison's deposition testimony as confirmation of this point, but Dr. Ellison did not testify conclusively that the SnO_2 values were not measured or calculated. When asked about the SnO_2 values in the examples, he initially confirmed that the reported values "were determined from experimental data." RX-1326C (Ellison Dep. Tr.) at 128:9-24. He also explained that it was his goal "to keep tin oxide at what amounts to .07 mole percent." *Id.* at 134:7-8. He acknowledged that the raw data indicates that the values may have been slightly different (*i.e.*, above or below 0.07 mole percent), but he is not sure why that would be the case. *Id.* at 130:9-16, 132:1-12. He stressed that it was

difficult to remember the specifics of experiments that occurred twenty years ago and noted that he was unable to determine if the data did, in fact, show tin oxide under .07 mole percent. *See id.* at 131:13-18; *id.* at 134:25-135:17. Based on this testimony, I do not find that the evidence is *clear and convincing* that Dr. Ellison inaccurately reported the values for SnO_2 as measured or calculated when they were not.

The fifth representation relates to an alleged improper characterization of SnO_2 as a batch ingredient. *See* RIB at 56. Dr. Brow testified that it is not improper to consider SnO_2 as a batch ingredient if it was added to the composition during the manufacturing process instead of as a starting material. CX-1471C (Brow WS) at Q/As 520-524. Neither Respondents' brief nor Dr. Carty's testimony refutes this point. As such, I find that Respondents have not shown that the patent's characterization of SnO_2 as a batch ingredient is a mischaracterization.

Finally, Respondents fail to adequately explain what they believe is inaccurate with respect to the third or fourth purported misrepresentation. Respondents state that Corning misrepresented "batch sizes for certain examples" and "CaBr not being a batch ingredient for certain example glasses." RIB at 56. They do not provide any context, however, to explain what exactly the purported misrepresentation is. Without more, I cannot find that Respondents have shown, by clear and convincing evidence, that these statements amount to misrepresentations.[34]

[34] Additionally, Corning explained why it was not inaccurate to omit $CaBr_2$ from the list of batch materials. It notes that Dr. Ellison [redacted] CIB at 74 (quoting RX-1326C (Ellison Dep. Tr.) at 90:113-91:7, 91:8-93:8). It further states that, "during prosecution of the '394 patent, Dr. Ellison pointed out '[b]romine was supplied by using calcium bromide to provide some of the glass' calcium, with the rest provided by limestone (calcium carbonate)." *Id.* at 75 (quoting JX-0004.273).

For these reasons, I disagree that the evidence shows that "Corning routinely and consistently misstated, mischaracterized, and withheld information material to patentability" such that one could infer intent from what could be an inadvertent omission from a translation. RIB at 56.

3. Conclusion

For the above reasons, I find that Respondents have not shown that the '491 patent is unenforceable due to inequitable conduct.

V. U.S. PATENT NO. 8,640,498

A. Overview

The '498 patent, titled "Fining of Boroalumino Silicate Glasses," issued on February 4, 2014, and names Adam J. G. Ellison as the inventor. JX-0003. It is assigned to Corning. *Id.* The '498 patent issued from U.S. Application Serial No. 12/965,004, filed on December 10, 2010. *Id*. It is a division of Application No. 11/478,493, filed on June 28, 2006, which is now the '394 patent. It claims the benefit of Provisional Application No. 60/694,478, filed on June 28, 2005. *Id.* The '498 patent expires on November 13, 2026. RX-0015C (Ernst WS) at Q/A 376.

1. Asserted Claims

Corning asserts claims 2, 3, 5, 6, and 9 against Respondents. CIB at 7. Corning alleges that the domestic industry products practice these same claims. *Id*. at 35. Because the asserted claims depend on claim 1, claim 1 is also included below:

Claim	Claim Language
1[pre]	A method for producing alkali-free glass sheets by a downdraw process comprising:
1[a]	(A) selecting, melting, and fining batch materials so that the glass making up the sheets comprises SiO_2, Al_2O_3, B_2O_3, MgO, and CaO, and,
1[b]	on an oxide basis, has: (i) a Σ [RO]/[Al_2O_3] ratio greater than or equal to 1.0, where [Al_2O_3] is the mole percent of Al_2O_3 and Σ[RO] is the sum of the mole percents of MgO, CaO, SrO, and BaO; and

1[c]	(ii) a MgO content greater than or equal to 1.0 mole percent;
1[d]	(B) producing the glass sheets from the melted and fined batch materials; wherein: (a) on an oxide basis, the glass making up the glass sheets comprises at most 0.005 mole percent As_2O_3;
1[e]	(b) on an oxide basis, the glass making up the glass sheets comprises at most 0.005 mole percent Sb_2O_3; and
1[f]	(c) SnO_2 is used in the fining and the glass making up the glass sheets has an SnO_2 content which in mole percent on an oxide basis satisfies the relationship: $0.01 \leq SnO_2$; and
1[g]	(d) the glass making up the glass sheets has a liquidus viscosity that is greater than or equal to 100,000 poise.
2	The method of claim 1 wherein the glass making up the glass sheets has an SnO_2 content which in mole percent on an oxide basis satisfies the relationship: $SnO_2 \leq 0.15$.
3	The method of claim 1 wherein the MgO content is between 1.2 and 2.8 mole percent.
5	The method of claim 1 wherein the glass making up the glass sheets has a density that is less than or equal to 2.41 grams/cm^3.
6	The method of claim 1 wherein the glass making up the glass sheets has a linear coefficient of thermal expansion (CTE) over the temperature range 0-300°C. which satisfies the relationship: $28x10^{-7}/°\ C. \leq CTE \leq 34x10^{-7}/°\ C.$
9	The method of claim 1 wherein the downdraw process is a fusion process.

2. Level of Ordinary Skill in the Art

As with the ’491 patent, I previously determined that a person of ordinary skill in the art would have a bachelor’s degree in materials science, geology, chemistry, or a comparable field of study, and at least two to three years of research or industrial experience with the design, manufacturing, characterization, and testing of glasses, including oxide glasses. I further found that more education (*e.g.* a Master’s degree) or work experience in a relevant field may compensate for a deficit in one of the relevant qualifications stated above. Order No. 25 at 11 (July 17, 2025).

3. Claim Construction

During the *Markman* phase, the parties agreed on the construction of the following claim terms:

CLAIM TERM	RELEVANT CLAIMS	PARTIES' AGREED CONSTRUCTION
"alkali-free glass"	All Asserted Claims	"A glass having a total alkali concentration which is less than or equal to 0.1 mole percent, where the total alkali concentration is the sum of the Na_2O, K_2O, and Li_2O concentrations"
"A method for producing alkali-free glass sheets by a downdraw process comprising:"	'498 patent, claim 1	"A method for producing sheets of glass having a total alkali concentration which is less than or equal to 0.1 mole percent, where the total alkali concentration is the sum of the Na_2O, K_2O, and Li_2O concentrations by a downdraw process comprising:" "downdraw process" is defined as below.
"oxide"	All Asserted Claims	Plain and ordinary meaning, i.e., "binary compound in which oxygen is chemically bonded to one other element"
"downdraw process"	All Asserted Claims of '491 and '498 patents	Plain and ordinary meaning, i.e., "a process in which molten glass is drawn vertically downward and forms a glass ribbon"
"fusion process"	'498 patent, claim 9	Plain and ordinary meaning, i.e., "a downdraw process in which separate streams of molten glass flow downward and combine into a single stream of molten glass that is drawn vertically downward and forms a glass ribbon," where "downdraw process" means "a process in which molten glass is drawn vertically downward and forms a glass ribbon"
"fining"	All Asserted Claims of '498 patent	"Removing gaseous inclusions from melted batch materials"

CLAIM TERM	RELEVANT CLAIMS	PARTIES' AGREED CONSTRUCTION
"batch materials"	All Asserted Claims of '498 patent	Plain and ordinary meaning, i.e., "the materials that are mixed and melted to produce glass"
"linear coefficient of thermal expansion"	'498 patent, claim 6	Plain and ordinary meaning, i.e., "the relative change in the length of a glass composition when the temperature of the glass composition changes over a specified range as determined by standard methods"

Id. at 12-13. In the *Markman* order, I construed the following terms:

Claim Term	The Court's Construction
"[mole percent] on an oxide basis"	Plain and ordinary meaning, *i.e.*, "mole percent calculated using elements in their oxide form"
"liquidus viscosity"	Plain and ordinary meaning, which is "the viscosity of a glass composition at its liquidus temperature"

Id. at 20, 32.

B. Infringement

Corning asserts that the 615 Glass and the 616 Glass infringe claims 2-3, 5-6, and 9. CIB at 7.

1. 616 Glass

a) Claim 1

Corning does not assert claim 1. Claim 1 is, however, an independent claim upon which the asserted claims depend. As such, it is necessary to analyze whether the 616 Glass meets the limitations of claim 1.

i) Undisputed Limitations

Limitations 1[pre], 1[a], 1[c], 1[d], 1[e], 1[f], and 1[g] recite: "A method for producing alkali-free glass sheets by a downdraw process comprising: (A) selecting, melting, and fining batch

materials so that the glass making up the sheets comprises SiO_2, Al_2O_3, B_2O_3, MgO, and CaO, and . . . (ii) a MgO content greater than or equal to 1.0 mole percent; (B) producing the glass sheets from the melted and fined batch materials; wherein (a) on an oxide basis, the glass making up the glass sheets comprises at most 0.005 mole precent As_2O_3; (b) on an oxide basis, the glass making up the glass sheets comprises at most 0.005 mole percent Sb_2O_3; (c) SnO_2 is used in the fining and the glass making up the glass sheets has an SnO_2 content in which mole percent on an oxide basis satisfies the relationship: $0.01 \leq SnO_2$; and (d) the glass making up the glass sheets has a liquidous viscosity that is greater than or equal to 100,000 poise." JX-0003 at cl. 1. Respondents do not dispute that the 616 Accused Products meet these limitations. Undisputed Claim Limitations at 4. The evidence shows that these limitations are met. CX-0002C (Martin WS) at Q/As 455-474, 481-493.

ii) Ratio Limitation

Claim 1[b] recites: "on an oxide basis, has: (i) a Σ [RO]/[Al_2O_3] ratio greater than or equal to 1.0, where [Al_2O_3] is the mole percent and Σ[RO] is the sum of the mole percents of MgO, CaO, SrO, and BaO." JX-0003 at cl. 1. This limitation is hereafter referred to as "the '498 Ratio Limitation."

The parties dispute whether the '498 Ratio Limitation should be read as requiring a ratio greater than or equal to 1.0 or if it should be read as requiring a ratio greater than or equal to 1.00. This matters because, under the former interpretation, a ratio could be greater than or equal to 0.95 and meet the claim limitation. Under Respondents' construction, the ratio could not dip below 1.00 by more than one hundredth. For the reasons below, I find that the '498 Ratio Limitation should be interpreted as not permitting ratio values that fall below 1.0 by more than one hundredth (.01).

(a) Claim Construction

Corning argues that "[t]here is no merit to Respondents' attempt to rewrite the claim language 1.0 to require 1.00." CIB at 14. Corning states that such an interpretation is "contrary to [the term's] plain meaning and the disclosures of the specification." *Id.* Corning further notes that "[t]here was no clear and unambiguous disavowal of the plain meaning in the specification or prosecution of the '498 Patent's process claims." *Id.*

Respondents argue that "[w]hen viewed in the context of the entire patent and relevant file histories, [the '498 Ratio Limitation] clearly refers to 1.00, that is, the ratio cannot dip below 1.00 by more than one hundredth (.01)." RIB at 58. According to Respondents, "[t]he specification uses the numbers '1.00,' '1.0,' and '1' interchangeably to refer to the same critical concept of charge balancing, which means that the number of moles of alkaline earth oxides . . . referred to as 'RO' in the ratio, must be the same or greater than the number of moles of Al_2O_3." *Id.* Respondents further argue that the prosecution history confirms that the '498 Ratio Limitation should be read as requiring a ratio of 1.00. *Id.* at 60-63.[35]

For the reasons set forth below, I find that the claim language and specification support Corning's interpretation of the claim, but Corning disavowed any value below 1.0 by more than a hundredth during prosecution. I also note that, unlike the BaO Limitation discussed above, the issue with respect to this limitation is *not* whether the scientific convention of rounding applies. In

[35] Respondents also argue that "Corning could have used language such as 'about' or 'approximately' in claim 1 to extend the '498's Ratio Limitation to cover values below 1.00, but it did not." RIB at 58. As noted above with respect to the BaO Limitation of the '491 patent, the Federal Circuit has rejected "any invitation to create a bright-line rule – either that language like 'precisely' or 'exactly' is always needed to avoid rounding or that the lack of approximation language, even when it may be found elsewhere in the claims, dictates a precise value." *Actelion Pharms.*, 85 F.4th at 1171.

fact, by disavowing any number greater than 1.0 by more than a hundredth, Corning has disavowed any ratio below 0.99, when rounding would encompass ratios as low as 0.95.

First, I find that the claim language supports Corning's view of the claim. The claim itself uses one decimal point (1.0) with respect to the '498 Ratio Limitation of the '498 patent. The remainder of the claim language indicates this precision is intentional. Specifically, some limitations within the '498 patent also use one decimal point, while other limitations include more than one decimal point. For example, claim limitation 1[c] recites "a MgO content greater than or equal to 1.0 mole percent," while claim limitations 1[d] and 1[e] specify that the method must produce glass sheets in which arsenic and oxide must comprise at most 0.005 mole percent. Additionally, the '491 patent uses different language and specifically requires a ratio of 1.00. *See* JX-0002 at cl. 1. As Corning notes, "[d]ifferent claim terms are presumed to have different meanings." CIB at 15 (quoting *Bd. of Regents of the Univ. of Tex. Sys. v. BENQ Am. Corp.,* 533 F.3d 1362, 1371 (Fed. Cir. 2008)). The fact that the patentee chose to specify mole oxides using a different number of decimal points depending on the substance indicates that the patentee was intentional in specifying the level of precision necessary to meet the claim.

Next, I find that the specification provides evidence that the patentee intentionally claimed a ratio of 1.0. The specification sets forth three aspects of the invention. The first and second aspects relate to glass compositions and specify a ratio of 1.00. JX-0003 at 4:6-20 ("In accordance with a first aspect, the invention provides an alkali-free glass comprising in mole percent on an oxide basis. . . wherein (a) $1.00 \leq \Sigma [RO]/[Al_2O_3] \leq 1.25$"); *id.* at 4:30-43 ("In accordance with a second aspect, the invention provides an alkali-free glass comprising in mole percent on an oxide basis . . . wherein $\Sigma [RO]/[Al_2O_3] \geq 1.00$."). The third aspect, however, relates to "a method of

producing glass and specifies a ratio greater than or equal to 1.0."[36] *Id.* at 4:54-60. By using a different number of decimal points for the ratio related to manufacturing versus composition, the patentee suggested there is a difference in the level of precision required.

Respondents disagree that the specification's use of different decimal points was intentional. Instead, Respondents argue that the specification uses "the numbers '1.00,' '1.0,' and '1" interchangeably." RIB at 58. Respondents do not, however, point to anything in the specification that states an explicit intent to use the terms interchangeably. Without an expression of such intent, I decline to find that the patentee intended interchangeable use of the terms. *See, e.g., Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014) (explaining that "a patentee must clearly set forth a definition of the disputed claim term other than its plain and ordinary meaning and must clearly express an intent to redefine the term") (internal quotations and citations omitted).[37]

I find, however, that the patentee disavowed a ratio less than 1.0 during prosecution.[38] In an Office Action dated November 28, 2008, the Examiner rejected claims 1-17 as obvious over U.S. Patent No. 6,831,029 ("Chacon") in view of U.S. Patent No. 6,468,933 ("Nartia"). JX-0004.214-.217. Regarding the [RO]/[Al_2O_3] limitation specifically, the Examiner noted that the

[36] Respondents do not assert that the use of 1.0 with respect to the third aspect is a typographical error.

[37] Respondents also argue that the numbers in the '498 Ratio Limitation refer to the "concept of charge balancing." RIB at 58. This theory was not addressed in Respondents' pre-hearing brief and it is therefore waived pursuant to my Ground Rules. *See* Ground Rule 11.2. It appears that this theory relates to a question I asked Dr. Carty at the hearing. *See* RIB at 58 (citing the transcript related to my question). My question did not open the door for Respondents to introduce new arguments.

[38] Corning argues that "Respondents' post-hearing brief does not assert disclaimer/disavowal" and they have therefore waived this argument. CRB at 3. While Respondents' brief may not use the words "prosecution disavowal," they clearly made such an argument sufficiently to put Corning on notice of the argument. *See* RIB at 60-63.

pending claims "include language regarding the ratio of the sum of divalent metal oxides to aluminum oxide" and that "[t]hese claims specify that the ratio between these two must be between 1 and 1.25." *Id.* at JX-0004.220. The Examiner noted that, in Chacon, "the ratio between RO and alumina in the glass composition is between .9 and 1.2 in this composition. This range reads on the instantly claimed range[.]" *Id.*

In a Response to the Office Action, the applicant submitted a declaration from Dr. Ellison, the inventor of both the '394 and '498 patents, as well as the inventor of the prior art Chacon patent. *Id.* at JX-0004.237. In this declaration, Dr. Ellison stressed the criticality of the 1.00 ratio. He explained that "the work of the present application was performed to improve the glass of [Chacon]" and that he was specifically "seeking glasses that could be fined using tin oxide and still had the strain point, CTE, and density properties desired by manufacturers of liquid crystal displays and a liquidus viscosity greater than or equal to 100,000 poises so that the glass could be manufactured by, for example, the fusion process." *Id.* at JX-0004.237-.238. He further stated:

> In the course of my work, I found that in order to use tin fining it was critical that the glass have both a MgO content greater than or equal to 1.0 mole percent and a RO/Al_2O_3 ratio greater than or equal to 1.00, where Al_2O_3 is the mole percent of Al_2O_3 and RO is the sum of the mole percents of MgO, CaO, SrO, and BaO in the glass.

Id. at JX-0004.238. Dr. Ellison also distinguished Chacon on the basis of the MgO content and 1.00 ratio, while emphasizing the criticality of the 1.00 ratio. Dr. Ellison stated that "a RO/Al_2O_3 ratio of 1.00 is the cutoff for successful tin fining." *Id.* He further noted: "[A] RO/Al_2O_3 ratio of 1.00 or above leads to successful tin fining (assuming $MgO \geq 1.0$), while a RO/Al_2O_3 ratio below 1.00 does not work, in that the number of blisters per pound in the glass rises to commercially unacceptable levels." *Id.* Additionally, Dr. Ellison explained: "When the RO/Al_2O_3 ratio dropped below 1.00, even by just a hundredth, the blister level immediately jumped up, e.g., to levels of 2 blisters/pound and above." *Id.* at JX-0004.239. Dr. Ellison concluded by drawing a clear

distinction between the invention of the '394 application and the Chacon and Nartia patents explaining:

> In summary, the data of Exhibit A demonstrates that commercial practice of tin fining for glasses having a MgO content greater than or equal to 1.0 mole percent require a RO/Al_2O_3 ratio greater than or equal to 1.00. Neither the Chacon patent nor the Narita patent contains any disclosure of this critical requirement for the successful practice of tin fining.

Id.

Dr. Ellison's statements were repeated in the patentee's written response to the Office Action. In the response, Corning quoted *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990), which states:

> The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range[.]"

JX-0004.233.

Thus, both Dr. Ellison and Corning emphasized the criticality of the 1.00 ratio. They further clearly distinguished the ratio in the pending claims from Chacon's disclosed ratio of 0.9-1.2, indicating that the invention of the application could not go below a ratio of 1.0. I find such statements constitute a clear and unmistakable disavowal.

Corning argues that there was not a disavowal because the declaration was submitted during prosecution of the '394 patent. I disagree. The Federal Circuit has held that "[w]hen multiple patents derive from the same initial application, the prosecution history regarding a claim limitation in any patent that has issued applies with equal force to subsequently issued patents that contain the same claim limitation." *Azurity Pharms. v. Alkem Labs.*, 133 F.4th 1359, 1368 (Fed. Cir. 2025) (quoting *Elkay Mfg. Co. v. Ebco Mfg. Co.*, 192 F.3d 973, 980 (Fed. Cir. 1999)); *see also E.I. du Pont De Nemours & Co. v. Unifrax I LLC*, 921 F.3d 1060, 1070 (Fed. Cir. 2019) ("When

a parent application includes statements involving 'common subject matter' with the terms at issue, those statements are relevant to construction of the terms in the child patent"); *Ormco Corp. v. Align Tech., Inc.*, 498 F.3d 1307, 1314 (Fed. Cir. 2007) (explaining that "prosecution disclaimer may arise from disavowals made during the prosecution of ancestor patent applications"). Corning contends that the language of the '498 patent is different, but it does not point to any differences in the language of the ratio limitation, other than the level of precision.[39] *See* CIB at 18-19; CRB at 7. Indeed, while there are minor differences in the claim language, none of these differences are relevant to the way in which the patentee and Dr. Ellison distinguished the ratio limitation from Chacon. JX-0001 at cl. 1; JX-0003 at cl. 1.

Nor am I persuaded by Corning's argument that the statements in Dr. Ellison's declaration should be disregarded because "the Asserted Claims of the '498 Patent do not impose any requirements or limitations for gaseous inclusions or defects to be below any threshold." CIB at 19. While this is correct, it is also correct that Dr. Ellison made these statements in connection with claims that also did not contain any restrictions on blisters. JX-0004.120-.125 (language of claim 1-17). Thus, Dr. Ellison's statements cannot be read as only applying to claims that specifically limit defects. Further, Dr. Ellison was adamant that a ratio below 1.00 "does not work." JX-0004.238. He did not qualify this statement regarding the level of defects. Finally, Corning itself emphasized that the same concern regarding defects applies to the '498 patent. Dr. Martin, for example, testified that all of the Asserted Patents "are directed to novel compositions of boroalumino silicate glass with properties optimized for use as substrate glass in LCD panels and that can be made nearly defect-free glass without using toxic materials such as arsenic or antimony

[39] Nor does Corning argue how the level of precision is a difference that would distinguish the '498 patent from the statements made by Dr. Ellison.

as fining agents." CX-0002C (Martin WS) at Q/A 33. He noted that one innovation of the Asserted Patents was that "a mole percent of MgO of 1.0 or greater, with the ratio of ΣRO to Al_2O_3 from 1.00 to 1.25 in mole percent, can be made nearly defect free without using toxic arsenic or antimony as fining agents while providing desired properties." *Id.* Thus, the one of the primary concerns of the invention was producing defect- free (i.e., blister free) glass.

Finally, I do not find that any statements made during the prosecution of the '498 patent alter this finding. Corning argues that "throughout prosecution the claims recited an RO/alumina-ratio of ≥ 1.0." CIB at 19. Corning also states that it "distinguished the claims over the prior art" based on this 1.0 ratio. *Id.* at 20. Corning does not, however, point to any instance in which the difference between 1.0 and 1.00 was relevant during prosecution. For example, Corning states that, to distinguish the invention from Miwa," the applicant noted that "the Miwa reference . . . does not disclose the criticality of having both a RO/Al_2O_3 ratio ≥1.0 and a MgO content ≥ 1.0 mol%." *Id.* Corning primarily distinguished Miwa on the basis of the MgO content and not the ratio. JX-0006.112 ("[A] person of ordinary skill in the would never realize the importance of having a MgO content ≥ 1.0 mole % from a reference such as Miwa which, most time, does not use any MgO.").

Moreover, during prosecution of the '498 patent, Corning once again emphasized the criticality of the 1.00 ratio.[40] In the Miwa distinction referenced above, Corning wrote:

> In accordance with the invention, it was discovered that to achieve these goals, the glass making up the glass sheets has to have <u>both</u> a MgO content greater than or equal to 1.0 mole percent and an RO/Al_2O_3 ratio **<u>greater than or equal to 1.00</u>**. The criticality of the MgO content and the RO/ Al_2O_3 ratio to low gaseous inclusion levels for tin fining and high liquidous viscosities for downdraw forming is discussed at, for example, page 10, line 19, to page 15, line 26, of applicant's specification. Figure 3 further illustrates the criticality of the RO/Al_2O_3 ratio to

[40] Corning's statement to the contrary is thus inaccurate. *See* CIB at 20 ("Thus, in arguing for and establishing patentability, the Applicant only relied on the RO/alumina-ratio of 1.0, never 1.00.").

> gaseous inclusion levels for a MgO content greater than or equal to 1.0 mole percent.

Id. (emphasis added). As such, I do not find that the prosecution history of the '498 patent indicates the disavowal made in the prosecution of the '394 patent should not apply.

For these reasons, I find that the '498 Ratio Limitation should be interpreted as not permitting ratio values that fall below 1.0 by more than one hundredth (.01).

(b) Application to Claim

As noted above with respect to the '491 patent, Dr. Martin's testing showed a ratio of [redacted], while the testing from Respondents all showed a ratio of less than 1.00 (ranging from [redacted] to [redacted]):

[redacted]

RDX-0006C.0042.

For the reasons set forth above with respect to the '491 patent, I find Dr. Martin's tests results to be unreliable. Because all the remaining test results are less than 1.0 by more than one hundredth, I find that Corning has not demonstrated that this limitation is met.

Nor am I persuaded by Corning's arguments that testing from Respondents' experts demonstrates infringement. Corning argues that Dr. Zanotto found that certain samples of the 616 Glass had a Σ[RO] of about [redacted] and that certain other samples had an Al_2O_3 concentration of about [redacted]. CIB at 24-25. Corning argues that, if both of these findings had been in one glass sample, that sample would have a Σ [RO]/[Al_2O_3] of greater than 1.00. *Id.* at 25. As noted above with respect to the '491 patent, Corning asserts that there is variability in the 616 Glass. Corning itself notes that "Drs. Brow and Martin provided extensive testimony that different samples of 616 Glass demonstrate appreciable compositional differences in their oxide concentrations." *Id.* at 29. Thus, one cannot assume that the sample that had a Σ[RO] of about [redacted] could also have an Al_2O_3 concentration of about [redacted]. As such, I find that Corning has not established that the '498 Ratio Limitation is met.

iii) Conclusion

For these reasons, I find that the 616 Glass does not meet claim 1 of the '498 patent. As such, I find that the 616 Accused Products do not infringe claim 1.

b) Claims 2, 3, 5, 6, and 9

I previously found that the 616 Glass does not satisfy the limitations of claim 1. Because claims 2, 3, 5, 6, and 9 depend on claim 1, I find that the 616 Glass does not infringe these claims. If, however, the Commission disagrees as to claim 1, I note that Respondents do not dispute that the additional limitation of claims 2, 3, 5, 6, and 9 are met. Undisputed Claim Limitations at 4.

2. 615 Glass

Corning asserts that the 615 Products infringe claims 2-3, 5-6, and 9 of the '498 patent. CIB at 7. Corning notes that "[m]ultiple independent sources of evidence" establish infringement, such as Caihong's internal and outsourced testing, testimony from Caihong witnesses, and

Caihong manufacturing documents. *Id.* Corning states that "Dr. Martin's independent testing on Caihong-produced samples of 615 Glass provides additional confirmation." *Id.*

Respondents do not dispute that the 615 Glass meets the limitations of the asserted claims. Undisputed Limitations at 4. Respondents argue, however, that, as with the '491 patent, Corning failed to show infringement of the 615 Glass due to flaws in Dr. Martin's testing methodology. RIB at 17, 65 (referring back to the arguments made for the '491 patent); *see also* Undisputed Limitations at 4 n. 3.

As with the '491 patent, I afford Dr. Martin's testing no weight. Nevertheless, I find that the Asserted Claims are met. Caihong itself conducted internal testing of the 615 Glass. CX-0002C (Martin WS) at Q/As 263, 269, 280, 284, 288, 295, 297-298, 304-305, 309 (testifying that the Caihong internal tests demonstrated that the Asserted Claims are infringed); CPX-0248C (compiling CX-0028C; CX-0196C-CX-0292C). Tests results from [redacted] also confirm infringement. CX-0002C (Martin WS) at Q/As 263, 268, 280, 283, 287, 294, 297-298, 304-305, 308 (testifying that the [redacted] tests results demonstrate that the Asserted Claims are infringed); CX-0030C-CX0033C; CX-0194C; CX-0293C-CX-0308C. Finally, testimony from Caihong's corporate witnesses and Caihong's manufacturing documents support a finding of infringement. CX-0002C (Martin WS) at Q/As 270, 272-275, 279, 297-298, 301-302, 310, 314, 319-320; *see also* CX-0180C; CX-0181C; CX-0182C; CX-0183C; CX-0184C.6; CPX-0089C; CX-0283C.7; CX-0294C.7; CX-0295C.7; CX-0035C.7; CX-0034C.7; CX-0296C.7; CX-0297C.7; CX-0179C; CX-0308C; CX-0036C.7.[41]

[41] I note that this evidence demonstrates a ratio above 1.0. *See, e.g.*, CX-0002C (Martin WS) at Q/A 283 (explaining that the [redacted] report found a ratio of 1.1.); *id.* at Q/A 284 (explaining that Caihong's [redacted] show a ratio around 1.1).

Accordingly, I find that Corning has established that the 615 Products meet the limitations of claims 2-3, 5-6, and 9 of the '498 patent. As such, I find that Corning has shown that the 615 Accused Products meet the limitations of claims 2-3, 5-6, and 9 of the '498 patent.

C. Technical Prong

Corning asserts that the DI Products practice claims 2-3, 5-6, and 9 of the '498 patent. CIB at 35. Corning explains that "[m]ultiple independent sources of evidence establish" infringement, such as Corning documents and testing by Respondents' experts. *Id.*

Respondents do not dispute that the DI Products meet the limitations of the asserted claims. Undisputed Limitations at 5. Respondents instead argue that that, for the same reasons as for the '491 patent, "Corning has not complied with the DI technical prong." RIB at 94; *see also* Undisputed Limitations at 5 n. 4.

I afford Dr. Martin's testing no weight. Nevertheless, I find that Corning has shown that the DI Products practice claims 2-3, 5-6, and 9. Dr. Martin testified that internal Corning documents and his knowledge of Corning's manufacturing process demonstrate that the DI Products meet claims 2-3, 5-6, and 9. CX-0002C (Martin WS) at Q/As 642-662, 664-666; *id.* at Q/As 553-554, 561-563, 577-579, 583-585, 612-613, 618-623, 627-628, 630-633, 637-640, CPX-0078C; CPX-0085C; CPX-0087C; CPX-0088C; CX-0026C.7; CX-311; CX-0378; CX-0382C; CX-0384C. For limitations 1[a], 1[b], 1[d], 1[e], 1[f], and claim 3, Dr Martin also explained that test results from Respondents' experts, Dr. Henderson and Dr. Zanotto, demonstrated that these limitations are met. *See id.* at Q/A 560 (testifying that Dr. Henderson and Dr. Zanotto "found an average concentration [of] SiO_2, Al_2O_3, B_2O_3, MgO, CaO, SrO, and BaO in the samples they tested that fall within the ranges described in limitation 1[a]"); *id.* at Q/A 565 (testifying that "[t]he testing results from Dr. Henderson and Dr. Zanotto indicate that the [RO]/[Al_2O_3] ratio of the DI Products is between 1.00 and 1.25"); *id.* at Q/A 570 (testifying that "[t]he testing results from Dr. Henderson

and Dr. Zanotto indicate that the DI Products have an SnO_2 concentration of at least 0.01 mol%"); *id.* at Q/A 637 (testifying that Dr. Henderson's testing showed that the DI Products had an average SnO_2 concentration of [redacted] and Dr. Zanotto's testing showed that the DI Products had an average SnO_2 concentration of [redacted] (XRF testing) and [redacted] (ICP testing); *id.* at Q/A 654 (testifying that "neither Dr. Henderson's EPMA testing nor Dr. Zanotto's XRF or ICP testing detected any As_2O_3 in the DI Products samples they tested); *id.* at Q/A 655 (testifying that "neither Dr. Henderson's EPMA testing nor Dr. Zanotto's XRF or ICP testing detected any Sb_2O_3 in the DI Product samples they tested"); *id.* at Q/A 663 (testing that both Dr. Henderson and Dr. Zanotto's testing found that the DI Product samples had an average MgO concentration between 1.2 and 2.8 mole percent); CPX-0064C; CPX-0067C. Respondents do not dispute this evidence. Thus, even without the results of Dr. Martin's testing, I find that Corning has shown that the DI Products practice the claims. [42]

For these reasons, I find that the technical prong is met for the '498 patent.

D. Invalidity

Respondent asserts that the '498 patent is invalid because: (1) the asserted claims are indefinite; (2) the asserted claims are invalid for lack of written description; (3) the '498 patent does not comply with the enablement requirement; (4) the asserted claims are invalid due to obviousness-type double patenting; (5) claims 1, 2, and 9 are invalid as anticipated by Japanese Patent Application Publication No. 2003-192377 ("Miwa '377"); and (6) claims 1, 3, 5-6, and 9

[42] I note that this evidence demonstrates a ratio above 1.0. *See, e.g.*, CX-0002C (Martin WS) at Q/A 562-563 (finding that Corning's internal documents show [redacted]); *id.* at Q/A 565 (noting that testing by Drs. Henderson and Zanotto showed [redacted] *see also id.* at Q/A 649-650 (incorporating discussing for the '394 patent to the analysis for the '498 patent).

are obvious in view of Miwa '535 in combination with Japanese Patent Publication No. H10-59741 ("JP '741"). RIB at 65, 67, 76, 77, 82, 86.

1. Indefiniteness

Respondents argue that "[t]he '498 patent's asserted claims are invalid because they include the same Σ [RO]/[Al_2O_3] ratio requirement as the '491 patent's asserted claims" when the Ratio Limitation as construed as requiring a ratio of 1.00. RIB at 65-66. Respondents also assert that, "even if the ALJ does not agree with Respondents' construction . . . the asserted claims are still invalid for indefiniteness . . . because Caihong's 616 Glass would not infringe if its composition were assessed via batch calculation yielding a ratio of 0.946 but would potentially infringe depending on the glass test result relied upon to assess infringement." *Id.* at 66.

Corning argues that "Respondents have not shown indefiniteness." CIB at 64. Corning's arguments are the same as set forth above with respect to the '491 patent.

I find that Respondents have not shown that the claims are indefinite, for the reasons set forth above with respect to the '491 patent. I further note that, because I adopted Respondents' proposed construction, this is not a situation in which one method (batch calculations) results in non-infringement, while another (measuring the glass) results in infringement.

2. Written Description

Respondents argue that "the '498 patent's asserted claims are invalid for lack of written description because the specification does not include sufficient disclosure to show possession of the claimed inventions by Dr. Ellison." RIB at 67. Respondents state that "[t]he '498 patent's asserted claims are even broader than the '491's, such that the arguments [with respect to the '491 patent"] apply with even greater significance." *Id.* Respondents specifically assert that: (1) "[t]he specification lacks written description for glass compositions that include up to 97.55 mol% of unrecited 'other oxides' and/or 'contaminants'"; (2) the specification lacks written description for

Al_2O_3, MgO, CaO, SrO, and BaO; (3) "[t]he '498 patent's asserted claims lack written description for full claim scope of the recited amount of SnO_2"; and (4) "[t]he '498 patent's asserted claims lack written description for inclusion of BaO." *Id.* at 68, 73, 76.

a) Claimed Oxides

Respondents argue that the '498 patent's claims are even broader than the claims of the '491 patent. RIB at 67. Respondents note that the claims do not "recite any mol% ranges for the recited oxides SiO_2, Al_2O_3, B_2O_3, MgO, or CaO." *Id.* Respondents further assert that, while "[t]he specification discloses preferred ranges of certain oxides to achieve certain glass properties, [the claims] provide no upper or lower limit on the amount of SiO_2 or B_2O_3." *Id.* at 70.

In contrast to the '491 patent, Respondents challenged the sufficiency of the written description for the claimed oxides. I find, however, that Respondents have not established, by clear and convincing evidence, that the asserted claims are invalid due to a lack of written description. Respondents speculate about hypothetical compositions with various oxides and claim that Dr. Ellison was not in possession of all of these potential combinations. RIB at 68-75. The '498 patent recites a method for making glass – not compositions. As Corning notes, Respondents did not establish that any hypothetical composition could be made using the claimed method. CIB at 58. Respondents did not, for example, indicate that any composition would meet the claim liquidus viscosity requirement or would be the result of a method of making a glass using a downdraw process. *Id.* Corning, as patentee, would not have had a need to describe a method to produce a composition that does not meet the invention. Thus, by failing to establish that any hypothetical composition meets the claimed requirements, Respondents have failed to show that the asserted claims are invalid due to lack of written description.

Furthermore, Respondents' arguments ignore the knowledge of one of skill in the art. As noted above, Dr. Brow testified that one of skill would "have been familiar with the underlying

chemistry of the glasses of the invention, the physical properties of the glasses, and how to achieve the desired properties by adjusting the glass composition, and the testing and characterization of such glasses. CX-1471C (Brow WS) at Q/A 473. Given this, Respondents fail to explain why one of skill would attempt to create compositions with high concentrations of contaminants, for example. *See also* Tr. Carty at 394:2-16 (agreeing that one of skill would have understood that contaminants should be minimized and that one "would do what they could to keep the level of contaminants low as they could"). Respondents also fail to explain why one of skill would create compositions such as Ex-Comp-4, which includes 94 mol% of SiO_2. One of skill would recognize that such a composition would be unlikely to form a glass, much less be suitable for a downdraw process or have the claimed liquidus viscosity. *See* CX-1471C (Brow WS) at Q/A 456.

Respondents' written description argument also fails to address the teachings of the specification. For example, Corning notes that Dr. Carty's Ex-Comp-3 includes just 0.01 mol% of SiO_2. CIB at 59. Yet, the specification teaches that SiO_2 "serves as the basic glass former of the glass of the invention" and "is specified to have a concentration of 64.0-71.0 mole percent on an oxide basis," and "[p]referably . . . between 66.0 and 70.5 mole percent, . . . and most preferably, between 67.0 and 69.5 mole percent." JX-0003 at 5:24-27, 5:55-66, 6:29-32; *see also* Tr. (Carty) at 392:8-13 (acknowledging that one of skill would understand that the largest components of the patent's glasses will be SiO_2, Al_2O_3, and B_2O_3). Respondents fail to explain *why* one of skill would then attempt to make a composition with so little SiO_2.

For these reasons, I find that Respondents have not established, by clear and convincing evidence, that the Asserted Claims lack written description on this ground.

b) Other Oxides

Respondents assert that: (1) "[t]he '498 patent's claims . . . lack written description for Al_2O_3 amounts higher than 12 mol%; (2) the '498 patent lacks written description because "[o]ther

than claim 3, the ’498 patent’s claims provide no upper limit on the amount of MgO that may be included in their claimed glasses”; and (3) “the specification shows that the inventor did not have possession of glasses including CaO amounts less than 6 mol% or greater than 11.5 mol%, SrO amounts greater than 2.0 mol% and/or BaO amounts greater than 0.1 mol%.” RIB at 73.

I find that these arguments are waived pursuant to my Ground Rules. Respondents only make conclusory assertions and fail to explain how there is clear and convincing evidence to support a finding of a lack of written description on these grounds.

c) SnO_2

Respondents argue that “the ’498 patent’s asserted claims are invalid for lack of written description with respect to the claimed amounts of SnO_2, which exceed the solubility limit of SnO_2 according to Dr. Ellison.” RIB at 76.

For the same reasons as set forth with respect to the ’491 patent, I find that Respondents have not established that the specification lacks written description for the full claim scope of the recited amount of SnO_2.

d) BaO

Respondents argue that “the ’498 patent’s asserted claims are invalid for lack of written description with respect to the unbounded amount of BaO that could be included in the glasses of the ’498 patent’s asserted claims.” RIB at 76.

Respondents did not assert this theory in their pre-hearing brief and it is thus waived. Ground Rule 11.2. Accordingly, Respondents cannot establish that the asserted claims are invalid on this ground.

3. Enablement

Respondents argue that, for the same reasons as for the ’491 patent, “the ’498 patent is invalid because it does not enable the full scope [of] its claims.” RIB at 76. Respondents further

assert that "[t]he lack of enablement is even more apparent given the broader nature of the '498 patent's claims and lack of written description." *Id.*

Despite differences between the two patents, Respondents do not identify any facts that are different or any factors that would be impacted in the enablement analysis. Respondents merely refer back to the analysis for the '491 patent. *See* RIB at 76 ("For the reasons above in §III.D regarding lack of enablement of the '491 patent's claims, the '498 patent is invalid because it does not enable the full scope of its claims."); RRB at 41 ("For the reasons above in §III.D, the '498 is invalid because it does not enable the full scope of its claims."). Thus, Respondents have waived any argument with respect to the differences between the two patents. *See* Ground Rule 14.2.

Accordingly, for the same reasons discussed above with respect to the '491 patent, I find that Respondents have not established, by clear and convincing evidence, that the '498 patent is invalid due to lack of enablement.

4. Obviousness-Type Double Patenting

The applications leading to the '491 and '498 patents were filed the same day (December 10, 2010) and the patents issued the same day (February 4, 2014). JX-0002; JX-0003. Both patents also claim priority to the '493 Application that issued as the '394 patent. *Id.* The '493 Application originally included composition claims (claims 1-17) and method claims (claims 18-20). JX-0004.36-.39. During prosecution of the '493 Application, the Examiner issued a restriction requirement:

> ***Election/Restrictions***
>
> 1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
>
> I. Claims 1-17, drawn to a composition of alkali-free glass, classified in class 501, subclass 70.
>
> II. Claims 18-20, drawn to a method for producing alkali-free glass sheets by a down draw process, classified in class 65, subclass 126.

JX-0004.84. Corning thereafter elected to prosecute the claims of Group I, which were eventually issued in the '394 patent. JX-0004.89-.94. On December 10, 2010, Corning filed a continuation application that issued as the '491 patent and a divisional that issued as the '498 patent. JX-0005.18; JX-0006.4. The '498 patent claims are directed to methods corresponding to Group II. JX-0006.210. The '498 patent expires on November 13, 2026. Corning filed a terminal disclaimer to the '394 patent and thus the '491 patent has an earlier expiration date of October 7, 2026. JX-0005.105.

Respondents argue that "[t]he asserted claims of the '498 patent are invalid for [obviousness-type double patenting] in light of the '491 patent." RIB at 77. Respondents specifically assert that "claims 1-3,4-6, and 9 of the '498 patent are patentably indistinct from claims 13-15, 17-18, and 21 of the '491 patent." *Id.* at 78. Respondents also assert that the safe harbor provision does not apply, as that provision "protects only patents that are filed 'as a result of' the restriction requirement." *Id.* at 81.

Corning argues that obviousness-type double patenting "does not apply for three independent reasons": (1) "the '498 patent . . . is protected under the § 121 safe harbor from [obviousness-type double patenting] against the '491 patent"; (2) "the '498 Patent application was not a later-filed patent application with respect to the '491 Patent"; and (3) "Respondents failed to

prove by clear and convincing evidence the '498 Patent claims would have been obvious." CIB at 49, 51.

I find that Respondents failed to demonstrate that the doctrine of obviousness-type double patenting applies. As noted above, the applications leading to the '491 and '498 patents were filed on the same day.[43] Thus, this is not a situation involving a later filed patent. *See Procter & Gamble Co. v. Teva Pharms. USA, Inc.*, 566 F.3d 989, 999 (Fed. Cir. 2009) (explaining that the doctrine prevents a patentee from extending his exclusive rights "in a later-filed patent that are not patentably distinct from claims in the earlier filed patent").

Respondents assert that the doctrine still applies because, while filed on the same day, the '498 patent expires later than the '491 patent. I am not persuaded by this argument. In *Allergan*, the Federal Circuit held "that a first-filed, first-issued, later-expiring claim cannot be invalidated by a later-filed, later-issued, earlier-expiring reference claim having a common priority date." 111 F.4th at 1369. The court explained that the purpose of the obviousness-type double patenting doctrine "is to prevent patentees from obtaining a second patent on a patentably indistinct invention to effectively extend the life of a first patent to that subject matter." *Id.* The court elaborated that "the fact that the '356 patent expires later is of no consequence here because it is not a 'second, later expiring patent for the same invention." *Id.* While the situation here is distinguishable given that the applications were filed on the same day, the Federal Circuit's reasoning in *Allergan* applies. The '498 patent is also not a second patent on the invention and the patentee did not file the application leading to the '498 patent in order to extend the life of the '491

[43] I reject Corning's position that the '498 patent was filed before the '491 patent. *See* CIB at 51. Although this may be technically true given the application numbers, it does not change the fact that the applications were essentially filed simultaneously.

patent. Thus, I find that Respondents have not demonstrated that the doctrine applies to this situation.

Accordingly, I find that Respondents have not demonstrated the asserted claims of the '498 patent are invalid for obviousness-type double patenting.

5. Anticipation

Respondents argue that claims 1, 2, and 9 are invalid as anticipated by Miwa '377. RIB at 82.

a) Overview of Miwa '377

Miwa '377 is a Japanese patent application filed on December 21, 2001 and published on July 9, 2003. RX-1461. The Abstract states that the problem to be solved is "[t]o provide a glass that satisfies the characteristics required of a display substrate, does not contain arsenic oxide, and is able to reduce bubbles in the glass." *Id.* It states that the solution is:

> [A] glass substantially free of arsenic oxide and alkali metal oxides, containing 0.005 to 0.4 mass% SnO_2 and 8 to 13.5 mass% alkaline earth metal oxides (MgO, CaO, SrO, BaO), satisfying the equation Ys <_ 0.13X-1, where the molar content of SnO_2 is Ys and the molar content of alkaline earth metal oxide is X, and having the following composition: 50 to 70 mass% SiO_2, 10 to 19 mass% $A1_2O_3$, 5 to 15 mass% B_2O_3, 0 to 3 mass% MgO, 0 to 12 mass% CaO, 0 to 6 mass% SrO, 0 to 5 mass% BaO, 0 to 2 mass% ZnO, 0 to 1 mass% ZrO_2, 0 to 5 mass% TiO_2, 0 to 5 mass% P_2O_5, and 0 to 5 mass% Sb_2O_3.

Id.

Respondents rely on Embodiment 8 of Miwa '377. This embodiment is shown in the middle column in the below chart:

[0057]

[Table 3]

Sample / Composition	No. 7		No. 8		No. 9	
	mass%	mol%	mass%	mol%	mass%	mol%
SiO_2	62.0	68.62	61.2	66.61	60.0	67.72
Al_2O_3	16.0	10.44	17.0	10.90	14.0	9.31
B_2O_3	10.5	10.03	8.0	7.52	11.0	10.72
MgO	-	-	2.0	3.24	-	-
CaO	8.0	9.49	6.0	7.00	6.5	7.86
SrO	0.8	0.51	4.0	2.52	2.3	1.51
BaO	0.5	0.22	0.5	0.21	1.5	0.66
ZnO	-	-	-	-	0.7	0.58
ZrO_2	0.4	0.22	0.15	0.08	0.45	0.25
TiO_2	-	-	-	-	0.	0.42
SnO_2	0.3	0.13	0.15	0.07	0.05	0.02
P_2O_5	-	-	-	-	1.0	0.48
Sb_2O_3	1.5	0.34	-	-	2.0	0.47
Cl	-	-	1.0	1.84	-	-
MCSB	9.3	10.22	12.5	12.97	10.3	10.03
0.13 x X-1		0.33		0.69		0.30
Density (g/cm^3)	2.39		2.44		2.45	
Thermal Expansion Coefficient (x 10^{-1}/°C)	33		35		34	
Stress Point	669°C		693°C		650°C	
$10^{2.5}$ dPa · s	1603°C		1619°C		1539°C	
Liquid Phase Temperature	1042°C		1089°C		1065°C	
SnO_2 Opacity	No		No		No	
HCl Resistance Amount of Corrosion Appearance	1.8 μm ○		0.1 μm ○		0.8 μm ○	
BHF Resistance Amount of Corrosion Appearance	0.7 μm ○		0.6 μm Δ		0.7 μm ○	
Bubble Retention	○		○		○	

Id. at Table 3.

b) Analysis

i) 1[pre][44]

Limitation 1[pre] recites "A method for producing alkali-free glass sheets by a downdraw process comprising." Respondents assert that "Miwa '377 discloses glass suitable for making glass sheets for LCDs that 'is substantially free of arsenic oxide and alkali metal oxides, and can be formed using the downdraw method." RIB at 83 (quoting RX-1461).

[44] The parties agree that 1[pre] is limiting. *See* CRB at 16 n. 4.

Corning disputes three aspects of this limitation: (1) alkali-free glass; (2) downdraw process; and (3) glass sheets. CIB at 41.

I first find that Miwa '377 discloses alkali-free glass. Miwa '377 specifically states that "the glass in the present invention . . . is substantially free of arsenic oxide and alkali metal oxides." RX-1461 at [0073]. It also indicates that the solution of the invention was to produce "a glass substantially free of arsenic oxide and alkali metal oxides." *Id.* at [Abstract]. Corning asserts that, because Miwa '377 only discloses batch materials, the finished glass may not be alkali-free. Given the descriptions in Miwa '377 (including the stated solution of the invention), however, it is clear that the embodiments of the invention produce glass that is indeed alkali-free.

I further find that Respondents have not shown that Miwa '377 discloses a method for producing glass sheets. Miwa '377 explicitly states that batches of glass raw materials "form glass plates." RX-1461 at [0061]. Dr. Ernst notes that Miwa '377 also discloses that "the glass in the present invention . . . [is] particularly suitable for use as glass substrates in liquid crystal displays." RX-0015C (Ernst WS) at Q/A 276 (citing RX-1461 at [0073]). According to Respondents, this statement demonstrates that the glass compositions of Miwa '377 "are intended to produce glass sheets." RRB at 43. Respondents do not, however, explain *how* this is so. It may well be that glass substrates for LCDs *must* be formed using glass sheets, but Respondents do not make this argument. Nor do Respondents assert that one of skill would consider glass sheets and glass plates to be the same thing.[45] Without more, I cannot find that there is clear and convincing evidence that Miwa '377 discloses a method for producing glass sheets.

[45] Respondents do state that one of skill would "at once envisage the claimed arrangement or combination," thereby implying that one of skill would understand that a glass plate can be a glass sheet. RRB at 43. But the testimony cited by Respondents for this point does not support this statement. *See* RX-0015C (Ernst WS) at Q/As 276-277.

For these reasons, I find that Miwa '377 does not disclose limitation 1[pre].

ii) 1[a]-1[f]

Limitations 1[a] through 1[f] recite: (A) selecting, melting, and fining batch materials so that the glass making up the sheets comprises SiO_2, Al_2O_3, B_2O_3, MgO, and CaO, and, on an oxide basis, has: (i) a Σ [RO]/[Al_2O_3] ratio greater than or equal to 1.0, where [Al_2O_3] is the mole percent of Al_2O_3 and Σ[RO] is the sum of the mole percents of MgO, CaO, SrO, and BaO; and (ii) a MgO content greater than or equal to 1.0 mole percent; (B) producing the glass sheets from the melted and fined batch materials; wherein: (a) on an oxide basis, the glass making up the glass sheets comprises at most 0.005 mole percent As_2O_3; (b) on an oxide basis, the glass making up the glass sheets comprises at most 0.005 mole percent Sb_2O_3; and (c) SnO_2 is used in the fining and the glass making up the glass sheets has an SnO_2 content which in mole percent on an oxide basis satisfies the relationship: $0.01 \leq SnO_2$." JX-0003 at cl. 1.

Corning makes three arguments as to why Miwa '377 does not disclose these limitations: (1) "Dr. Ernst has not shown that the mol% of all components of glass formed after the melting process for Embodiment 8 inherently satisfy 1[a]-1[f]"; (2) "Miwa377 does not disclose 'producing glass ***sheets*** from the melted and fined batch materials for Embodiment 8"; and (3) Miwa '377 "fails to disclose a glass sheet comprising at most 0.005 mol% As_2O_3 (limitation 1[d]) or at most 0.005 mol% Sb_2O_3 (limitation 1(e)]." CIB at 42.

I find that Respondents have not shown that the finished glass compositions meet the required ratio. In order to determine whether the '498 Ratio Limitation is met, the amounts of MgO, CaO, SrO, BaO, and Al_2O_3 in the finished glass must be known. Miwa '377 discloses the mol% for the batch materials, as opposed to the finished glass. *See* RX-1461 at [0060-0061] ("[B]atches of glass raw materials were mixed to form the compositions in each table . . . "). While one of skill would understand that the batch materials can serve as a proxy for the values of the

oxides in the finished glass, one would still need to assess manufacturing conditions and retention factors in order to arrive at the mol% of the oxides in the composition. *See* Tr. (Carty) at 423:18-425:11 (testifying about batch calculations generally and acknowledging that batch calculations require consideration of manufacturing conditions and retention factors); *see also* CX-0002C (Martin WS) at Q/A 512 ("Batch calculations are a way to estimate or predict what the composition of a glass will be based on the amount of batch ingredients that you start with to make the glass."). Dr. Ernst does not provide any testimony as to these factors. Rather, he appears to perform the ratio calculation based off the mol% of the batch ingredients only. *See* RX-0015C (Ernst WS) at Q/A 285 (testifying that the ratio for Embodiment 8 is 1.19); *see also* Table 3 (noting that MgO is 3.24 mol%, CaO is 7.00 mol%, SrO is 2.52 mol%, BaO is 0.21 mol%, and Al_2O_3 is 10.90 mol%, resulting in a ratio of 1.19). Without at least some testimony that he has considered manufacturing conditions and retention factors, Respondents have not shown that the method disclosed in Miwa '377 results in compositions that meet the claimed ratio based on the batch values alone.

Next, for the reasons set forth with respect to limitation 1[pre], I find that Respondents have not shown that Miwa '377 discloses glass sheets.

Finally, I find that Respondents have not demonstrated that Miwa '377 discloses at most 0.005% mol% As_2O_3. According to Dr. Ernst, "Embodiment 8 of Miwa '377 includes 0 mol% of As_2O_3." RX-0015C (Ernst WS) at Q/A 293. Miwa '377 does not, however, expressly state that the amount of As_2O_3 in Embodiment 8 is zero, as it does not list As_2O_3 at all. *See* RX-1461 at Table 3. Because of this, Dr. Ernst refers instead to paragraph 52 which states that the glass should be "substantially free" of arsenic oxide and further states that the amount "should be kept to 0.05 mass% or less, preferably 0.02 wt% or less, and more preferably 0.01 wt% or less." RX-1461 at [0052]. As Corning points out, however, this amount is reported "to the tenth of a weight%." CIB

at 42. As noted above with respect to infringement, rounding can have an impact on the claim's analysis. Thus, Respondents have not clearly demonstrated that a concentration up to 0.05 mass% of As_2O_3 is the same as disclosing an As_2O_3 value of 0.005 mole percent.[46]

For all of these reasons, Respondents have not demonstrated that Miwa '377 discloses claim limitations 1[a], 1[b] and 1[d].

iii) 1[g]

Limitation 1[g] recites: "the glass making up the glass sheets has a liquidus viscosity that is greater than or equal to 100,000 poise." JX-0003 at cl. 1.

Corning argues that "Miwa377 does not disclose liquidus viscosity values at all, let alone for Embodiment 8." CIB at 42

In support of their contention that Miwa '377 discloses this limitation, Respondents cite to paragraph 12, which provides "that the 'liquid phase viscosity is preferably no less than 10^5 dPa·s, and more preferably no less than $10^{5.5}$ dPa·s." RIB at 85; *see also id.* at 85-86 (explaining that a POSA would have understood this amount corresponds to 316,000 ± 40,000 poise"). Respondents argue that, while "the specific liquidus viscosity of each embodiment in Miwa '377 is not disclosed," one of skill would "recognize that this disclosure applies to all the embodiments of Miwa '377." *Id.* at 86.

As an initial matter, I find that Respondents have not established that the above statement in Miwa '377 (found in paragraph 12) describes the present invention, as opposed to prior art. Dr. Ernst conceded that "[t]he description of liquidus viscosity in paragraph 12 refers to the prior art as it falls under the prior art section of Miwa '377." Tr. (Ernst) at 546:19-24. Accordingly, I

[46] I find, however, that Respondents have demonstrate that Miwa '377 discloses at most 0.005 mol% of Sb_2O_3. Embodiment 8 expressly indicates that there is no Sb_2O_3 in the composition. RX-1461 at Table 3; *see also* RX-0015C (Ernst WS) at Q/A 295.

disagree that Miwa '377 discloses that the glasses produced by the methods described in Miwa '377 have a liquidous viscosity greater than or equal to 100,000 poise.[47]

c) Conclusion

For these reasons, I find that Respondents have not demonstrated that Miwa '377 anticipates claim 1 of the '498 patent. Because claims 2 and 9 depend on claim 1, Respondents likewise have not demonstrated that Miwa '377 anticipates claims 2 and 9.

6. Obviousness

Respondents argue that "[c]laims 1, 3, 5-6, and 9 would have been obvious in view of Miwa '535 in combination with JP '741." RIB at 87.

a) Overview of JP '741

JP '741 is a Japanese patent application filed on August 21, 1996 and published on March 3, 1998. RX-0225. JP '741 sought to "provide an alkali-free glass that does not use As_2O_3 as a clarifying agent and does not contain bubbles that cause display defects." *Id.* The applicant explained that "the object of the present invention could be realized by using SnO_2 instead of As_2O_3 as a clarifying agent." *Id.* at [0007].

b) Analysis

Corning disputes that Miwa '535 and JP '471 disclose each limitation of the asserted claims. CIB at 47. Corning also argues that Dr. Ernst selected Embodiment 15 based solely on hindsight bias. *Id.* at 44. Even assuming Corning is incorrect about these points, I find that

[47] Even if the above statement described the invention, I would still find Respondents have not demonstrated that this description applies to all embodiments. Dr. Ernst agreed that "the description of liquidus viscosity in paragraph 12 is not asserting that Miwa '377's examples all have a particular liquidus viscosity." Tr. (Ernst) at 547:10-14. Additionally, the statement indicates that there is a preference for a certain liquidus viscosity, but it does not state that every disclosed embodiment meets this preference.

Respondents have not demonstrated that Miwa ’535 and JP ’471 render the asserted claims obvious.

Respondents’ invalidity theory relies on modifying Embodiment 15 of Miwa ’535 to use SnO_2 as the fining agent, instead of Sb_2O_3. As with the obviousness analysis with respect to the ’491 patent, this modification involves two steps: (1) decreasing Sb_2O_3 from the 0.02 mole percent provided for in Embodiment 15 to the 0.005 mole percent maximum set forth in limitation 1[e] and (2) replacing Sb_2O_3 with SnO_2.

I find that Respondents have shown that one would be motivated to decrease Sb_2O_3. Respondents argue “at the time of the ’498 patent, a POSA would have known that both As_2O_3 and Sb_2O_3 were toxic and harmful to health and the environment.” RIB at 91. Respondents further state that “[b]ecause JP ’741 explains that As_2O_3 is highly toxic and should not be used in glass production, a POSA would also have been motivated to avoid Sb_2O_3, which, as discussed, presents similar toxicity and environmental concerns.” *Id.*; *see also* RX-0015C (Ernst WS) at Q/A 338 (testifying that one of skill would “have been motivated to make a glass substantially free of Sb_2O_3” due to health and environmental concerns).

I find that there is not, however, clear and convincing evidence that one of skill would have thought to increase SnO_2 to compensate for the decrease of Sb_2O_3 and had a reasonable expectation of success. The evidence does show that one of skill would recognize that SnO_2 is an alternative fining agent. For example, JP ’741 taught that SnO_2 can be used as a fining agent and specifically suggested using SnO_2 instead of As_2O_3. RX-0015C (Ernst WS) at Q/As 338-339. Additionally, Embodiment 15 of Miwa ’535 indicates that the composition has 0.04 mol% SnO_2.

This does not mean, however, that one would necessarily think to substitute SnO_2 for Sb_2O_3 and expect to have a composition with the desired properties. With respect to motivation, Respondents write:

> [A] POSA would have been motivated to replace the Sb_2O_3 content in Miwa '535's Embodiment 15 with SnO_2, a known non-toxic fining agent. RX-0015C, Q/A338-339. Indeed, by 2005, alternative, non-toxic fining agents, were also well-known. RX-0199.8; RX-0015C, Q/A64. For example, RX-0194 discloses that 'tin oxide (SnO_2) is not toxic and has use as a fining agent." RX-0194, ¶[0021]; RX-0015C, Q/A66. Halide fining, which is allowed by the asserted claims, was also known to a POSA. RX-0211.61; RX-0015C, Q/A68-69.

RIB at 91. It further states:

> Embodiment 15 of Miwa '535 discloses a glass with 0.04 mol% SnO_2, which overlaps with "at least 0.01 mole percent SnO_2," and describes that the glass can comprise 0.01 to 0.3 mass% SnO_2. RX-0224, ¶[0017]; Table 3; RX-0015C, Q/A340. JP '741 also describes that SnO_2 is used as a clarifying (fining) agent and includes example compositions using SnO_2. RX-0225, ¶¶[0037], [0008]-[0011], Table 2. Accordingly, a POSA would have been motivated by Miwa '535 in view of JP '741 to use SnO_2 as a fining agent with a reasonable expectation of success in achieving a glass with at least 0.01 mol% SnO_2, rendering obvious limitation 1[f].

Id. at 91-92. Respondents do not provide any details as to why one of skill be understand that such a substitution would be workable. Instead, they treat this substitution as if it were as simple as replacing one fining agent with another without any impact to the glass properties whatsoever. The record, however, shows that this field is unpredictable. Dr. Carty testified that "[t]he development and testing of new glass compositions is an unpredictable field that demands significant experimentation and testing to confirm the physical properties of the glass." RX-0014C (Carty WS) at Q/A 305; *see also* CX-1471C (Brow WS) at Q/A 476 ("The development of new compositions and the manufacture of glass sheets can be relatively more unpredictable than other fields.").

The record also shows that seemingly minor changes to glass compositions can have large impacts and that one must consider the other components. For example, Dr. Carty testified that

"[a] POSA would have known that the physical properties of the glass can be greatly affected by small changes in the overall composition, which would be unpredictable." RX-0014C (Carty WS) at Q/A 294; *see also id.* at Q/As 230-234 (testifying that liquidus viscosity could be impacted by the addition of other oxides). RX-1326C (Ellison Dep. Tr.) at 295:1-296:3. The record also contains testimony that some oxides behave in similar ways as other oxides, such that substituting one for the other could impact the composition.[48] It is possible that one of skill would understand that the extra addition of tin oxide would *not* have an impact on the composition, but there needs to be testimony that states as such. Additionally, Respondents did not explain if there are any differences between the compositions in JP '741 and Miwa '535 that would lead one to believe that SnO_2 could be successful used in JP '741 but not in Embodiment 15.

Additionally, the record suggests that simply substituting SnO_2 for Sb_2O_3 was not obvious. First, the record shows that it was commonly accepted that SnO_2 was an inferior fining agent. CX-1471C (Brow WS) at Q/A 263; CX-0185C (Caihong internal document from 2012 indicating that SnO_2 is an inferior fining agent). Second, as Corning notes, both Miwa '535 and JP '741 were filed by the same company, Nippon Electric Glass ("NEG"). Miwa '535 was filed six years after JP '741. Despite one of skill's knowledge that there were concerns with Sb_2O_3 and JP '741's teaching that SnO_2 could be used as a fining agent, seventeen embodiments in Miwa '535 contained Sb_2O_3. Thus, NEG did not seemingly find it obvious to use the teachings of JP '741 to modify the embodiments of Miwa '535. *See* Tr. (Ernst) at 567:22-569:3 (conceding that it is fair to say that "glass scientists at NEG would have been aware" of the work disclosed by JP '741 at the time of

[48] For example, Dr. Carty testifies that "MnO and ZnO would function the same as MgO, CaO, SrO, and BaO in the general chemistry sense," and "[t]he inclusion of these oxides would therefore impact the $\Sigma[RO]/[Al_2O_3]$ ratio." RX-0014C (Carty WS) at Q/A 231. He further testifies that Y_2O_3 or La_2O_3 would "behave similarly to Al_2O_3" and therefore would also impact the ratio. *Id.* at Q/A 233.

Miwa '535's filing over six years later and confirming that he is "not aware of any commercial glasses developed by NEG . . . that eliminated arsenic or antimony prior to the release of EAGLE XG in 2006"). Respondents' briefs do not address these concerns. *See* RIB at 91-92; RRB at 45 (acknowledging that SnO_2 is an inferior fining agent but stating that "Corning ignores the motivation a POSA would have to substitute a toxic fining agent for a non-toxic one").

Accordingly, Respondents' evidence to suggest one of skill may have been motivated to make this substitution falls short of the clear and convincing standard. As such, I find that Respondents have not established that claims 1, 3, 5-6, and 9 are obvious in view of Miwa '535 in combination with JP '471.

c) Secondary Considerations

Secondary considerations of nonobviousness may rebut a prima facie case of obviousness. Here, where Respondents have not made out a prima facie case of obviousness, there is no showing to rebut. Accordingly, I need not consider any secondary considerations of nonobviousness.

E. Inequitable Conduct

Respondents argue that, for the same reasons as for the '491 patent, "the '498 patent is unenforceable due to inequitable conduct." RIB at 94; *see also* RRB at 49. For the reasons set forth above with respect to the '491 patent, I find that Respondents have not shown that the '498 patent is unenforceable due to inequitable conduct.

VI. PATENT MISUSE

Respondents argue that "Corning has committed patent misuse." RIB at 100. According to Respondents, "Corning has used this Investigation to leverage its already dominant position in the LCD glass market, using soon-to-expire patents to further reduce competition." *Id.*

Corning asserts that "[t]here is no evidence of patent misuse." CIB at 75. Corning explains that "[i]t is not patent misuse to notify an infringer's customers of infringement or to reach

agreement to stop infringement, as long as a patentee 'had a good faith belief' of infringement, which Corning did." *Id.* at 75-76.

"Patent misuse is an affirmative defense to an accusation of patent infringement, the successful assertion of which requires that the alleged infringer show that the patentee has impermissibly broadened the physical or temporal scope of the patent grant with anticompetitive effect." *Virginia Panel Corp. v. MAC Panel Co.*, 133 F.3d 860, 868 (Fed. Cir. 1997); *see also Princo Corp. v. Int'l Trade Comm'n*, 616 F.3d 1318, 1328 (Fed. Cir. 2010) ("[T]he key inquiry under the patent misuse doctrine is whether, by imposing the condition in question, the patentee has impermissibly broadened the physical or temporal scope of the patent grant and has done so in a manner that has anticompetitive effects."). "Where the patentee has not leveraged its patent beyond the scope of rights granted by the Patent Act, misuse has not been found." *Princo*, 616 F.3d at 1328.

Respondents allege that "Corning has entered into restrictive agreements with customers in the LCD glass industry, including HKC, LG, Vizio, and others, [redacted] RIB at 100. It is common in patent litigation, however, for a patentee to execute licensing agreements with accused infringers. Thus, to demonstrate that there is patent misuse in this instance, Respondents must explain how these specific agreements differ from the normal agreement and why these differences amount to misuse. Respondents have not done so.

Instead, Respondents simply state that the agreements [redacted]

[redacted] *Id.* at 101-102. But Respondents do not make any legal arguments as to why such facts constitute misuse. Pursuant to my Ground Rules, Respondents have therefore waived this argument. *See* Ground Rule 14.2.

Additionally, I am not aware of Federal Circuit precedent that supports Respondents' position. The Federal Circuit has found patent misuse where a patentee "requires the purchase of an unpatented product as a condition for obtaining a license to the patent" (*Princo*, 616 F.3d at 1327), but Respondents do not allege such facts here. *See* RIB at 101 (alleging that Corning required the purchase of a product covered by the patent). I also am unaware of any precedent that finds misuse when a party executes an agreement where the licensee agrees not to purchase an allegedly infringing product. *See, e.g.*, *Princo*, 616 F.3d at 1328 (noting only that it is patent misuse if the patentee restricts the licensee's ability to use, sell, or purchase an article of commerce "not within the scope of [the patentee's] patent monopoly"). Finally, while Respondents note that both the '491 and '498 patents expire in the near future, they do not allege that Corning's agreements require payment of licensing fees after the expiration of the patents.

Accordingly, I find that Respondents have not established that the patents are invalid due to patent misuse.

VII. ECONOMIC PRONG

Corning asserts that it satisfies the domestic industry requirement under sub-prongs (A) and (B). CIB at 104.

Respondents argue that Corning did not meet its burden to show that the economic prong is satisfied. RIB at 94. Respondents assert that "Corning's evidence did not consider the realities

of Corning's fusion draw business a whole, the development timeline of EAGLE XG, and the increasingly global and foreign nature of Corning's activities." *Id.*[49]

A. Overview

Corning is based in its namesake town of Corning, NY. CIB at 104. There are two facilities that are relevant to both sub-prongs (A) and (B): (1) the [redacted]; and (2) the Sullivan Park ("Sullivan Park") research facility located in Corning, New York.

1. [redacted]

[redacted] is located in [redacted]. CX-0001C (Kudva WS) at Q/A 11. A picture of the facility is included below:

[redacted]

Id.

[redacted][50] *Id.* [redacted] is responsible for both [redacted]. *Id.* With respect to [redacted] Tr. (Arnold) at 287:17-21; *see also* CX-0001C

[49] To the extent that Respondents contend that anything in its list of "undisputed facts" on page 95 constitute arguments, I find that Respondents have waived them under my Ground Rules. *See* Ground Rule 14.2.

[50] EAGLE XG glass itself is manufactured globally, *i.e.*, not in the United States. *See* CX-0001C (Kudva WS) at Q/A 11.

(Kudva WS) at Q/A 11 ("[redacted]"). With respect to [redacted], Mr. Gautam Kudva, Vice President of Technology & Engineering at Corning, explains that [redacted] CX-0001C (Kudva WS) at Q/A 13. Finally, [redacted] *Id.*[51]

2. Sullivan Park

Sullivan Park is located in Corning, New York. CX-0001C (Kudva WS) at Q/A 19. A picture of the facility is included below:

[51] [redacted] CX-0004C (Arnold WS) at Q/A 18. [redacted] and [redacted] are "the only two facilities in the world that conduct this work." *Id.*

Id. Sullivan Park is "Corning's primary research, development, and engineering ('RD&E') facility in the U.S." CX-0004C (Arnold WS) at Q/A 17. The research conducted by Corning includes [redacted] CX-0001C (Kudva WS) at Q/A 19. Corning [redacted] CX-0004C (Arnold WS) at Q/A 42.

B. Labor and Capital

1. Total Investments

Dr. Jonathan Arnold, Corning's economic expert, concluded that the total labor and capital investments are as follows:

CX-0004C (Arnold WS) at Q/A 61. These investments include: [redacted] in allocated investments in salaries, wages, and benefits at [redacted]; (2) [redacted] in salaries, wages, and benefits in development and engineering at Sullivan Park; and (3) [redacted] in salaries, wages, and benefits related to EAGLE XG research at Sullivan Park. CIB at 107, 113; *see also* CX-0004C (Arnold WS) at Q/A 59.

a) [redacted]

Corning "employs [redacted]. CX-0004C (Arnold WS) at Q/A 20. These workers are highly skilled and the work "[redacted] CX-0001C (Kudva WS) at Q/A 11. The total for salaries, wages, and benefits for employees at [redacted] is [redacted] (for the period from 2015 to 2024) and [redacted] (for the narrower period from 2022 through 2024). CX-0004C (Arnold WS) at Q/A 23. Using what he calls the [redacted] ratio (described more fully below), Dr. Arnold "estimate[d] that Corning employed between [redacted] people per year from 2015 through 2024 (and more specifically, between [redacted] people per year from 2022 through

2024)" for work related to EAGLE XG Glass. *Id.* at Q/A 32. He also applied the [redacted] ratio to the salary, wage, and benefit investments set forth above, and "estimate[d] that Corning expended [redacted] from 2015 through 2024 (of which [redacted] occurred from 2022 through 2024)" for work related to EAGLE XG Glass. *Id.* at Q/A 35.

b) Sullivan Park

Corning invests in salaries, wages, and benefits for development and engineering ("D&E") and research at Sulivan Park (collectively, "RD&E"). In total, Corning (via the Corning Display Technologies business segment) "expended [redacted] from 2015 through 2024 (of which [redacted] was incurred from 2022 through 2024) on RD&E labor related to EAGLE XG Glass" at Sullivan Park. CX-0004C (Arnold WS) at Q/A 52. The EAGLE XG research expenditures "are [redacted]." *Id.* at Q/A 43. The D&E salaries included in the numbers "[redacted] *Id.* Dr. Arnold explained that it was unnecessary to allocate these investments because "the documents [he] was provided were already allocated specifically to projects and teams related to EAGLE XG Glass." *Id.* at Q/A 50; *see also id.* at Q/A 52 ("For research and development & engineering labor, as I previously explained, the documents I was provided were [redacted] related to EAGLE XG Glass, so I did not need to apply the Sullivan Park ratio.").

In terms of headcount, Dr. Arnold states that Corning Display Technologies "employed between [redacted] employees at Sullivan Park per year between 2018 through 2024 (and between [redacted] employees per year from 2022 through 2024)." *Id.* at Q/A 42. After applying an allocation, he "estimate[d] that Corning employed between [redacted] employees each year from

2018 through 2024 (and between [redacted] employees per year from 2022 through 2024) to work on RD&E projects related to EAGLE XG Glass." *Id.* at Q/A 51.

2. Allocation

As noted above, Dr. Arnold did not need to allocate the labor investments for either research or D&E at Sullivan Park. With respect to the labor investments at [redacted], Dr. Arnold applied what he called "the [redacted] ratio" to allocate the salaries, wages, and benefits of [redacted] employees to the DI Products. CX-0004C (Arnold WS) at Q/A 29. Corning uses the [redacted] ratio to allocate its expenditures in the ordinary course of business. *See* Tr. (Kudva) at 78:20-24 ("[redacted] . . . [T]hese are done as part of our day-to-day ordinary business."). As Mr. Kudva explains:

[redacted]

RX-0001C (Kudva WS) at Q/A 16. Thus, the allocation used by Dr. Arnold was not created for this litigation but is instead one that Corning regularly uses to track its [redacted] investments.

Respondents dispute that the [redacted] ratio is a reasonable allocation. RIB at 96-97. For the reasons set forth below, I am not persuaded by Respondents' arguments. Respondents first note that Corning's fact witness, Joseph Bulkley, included a mistake in his testimony which, according to Respondents, renders his testimony unreliable. *Id.* at 96. Respondents note that, in his direct testimony, Mr. Bulkley [redacted],[52]

[redacted]

but, at the hearing, Mr. Bulkley testified that "[redacted]

[redacted]

RIB at 96. According to Respondents, this error "exposes . . . flaws in Corning's evidence," as [redacted] Respondents assert that "[t]he entire foundation of Corning's economic analysis for [redacted] is unexplained and unreliable." *Id.*

I disagree. If Respondents had questions about the allocation method Corning uses in the ordinary course of business, they could have obtained this information during discovery. The fact that Respondents are not able to understand the rationale behind the allocation method is insufficient for me to find that it is unreasonable. Further, I find Mr. Buckley to be a credible witness and I am therefore not persuaded by any inference that the error in his witness statement renders his testimony to be unreliable. Finally, Respondents did not demonstrate that any error was significant. Corning explains that "Dr. Arnold only relied on [redacted] which indisputably was correctly calculated in the source document [redacted] and reflects how Corning allocates its [redacted] expenditures." CRB at 50.

Respondents also argue that Corning failed to demonstrate that its allocation method was reasonable. RIB at 97. According to Respondents, "Corning never explained how [redacted] has a rational connection to the amount of domestic work performed or the value it adds to the DI Product." *Id*. I disagree with this point too.

Dr. Arnold explained that he [redacted] CX-0004C (Arnold WS) at Q/A 29. He further explained:

[redacted]

Id. at Q/A 30. Finally, he explained:

[redacted]

[redacted]

Id. at Q/A 31. During the hearing, Mr. Bulkley also noted that [redacted] is used to allocate [redacted] costs because "[redacted]

I find this explanation to be sufficient to demonstrate that the allocation methodology that Corning uses in the ordinary course of business is reasonable. I further note that, in many investigations before the Commission, companies do not allocate their investments to specific products in the ordinary course of business and thus parties are forced to rely on litigation-created allocation methods to estimate the costs. The fact that this allocation method is a pre-existing method (instead of litigation driven) is further evidence of its reliability. Finally, Respondents do not offer an alternative allocation method (or even introduce their own expert testimony). *Certain High Density Fiber Optic Equip. & Components Thereof*, Inv. No. 337-TA-1194, Comm'n Op. at 65 (Aug. 23, 2021) (noting that the respondents did not suggest an alternative method and "in the absence of a better alternative, it is reasonable . . . for the ID to adopt the sales allocation approach suggested by [complainant's] economic expert").

Respondents did not otherwise challenge Corning's labor and capital investments. I therefore find that Corning has shown that it invested [redacted] in labor and capital from 2015-2024 and [redacted] for the narrower period of 2022-2024.

3. Significance

Corning argues that its investments in labor and capital ae both quantitatively and qualitatively significant. CIB at 118-121. Respondents disagree that Corning has demonstrated significance. RIB at 95, 100.

a) Qualitative Significance

Corning argues that [redacted] CIB at 118. Corning explains that [redacted] *Id.* at 119. Corning notes: "Without this facility in [redacted] Corning would not be able to produce the DI Products at [redacted]." *Id.* Corning also states that "[f]or Sullivan Park, the continued and ongoing RD&E projects there are critical to the continued success of EAGLE XG Glass and its manufacture." *Id.* According to Corning, "[t]he Sullivan Park research projects include projects focused on [redacted] *Id.*

I find that the evidence shows that Corning's labor and capital investments are quantitatively significant. Mr. Kudva testified that [redacted] He stated that [redacted] Tr. (Kudva) at 94:16-95:5.

With respect to the significance of [redacted] specifically, Mr. Kudva explained that [redacted] and noted that [redacted] CX-0001C (Kudva WS) at Q/A 11. He concluded: "Without these systems, Corning could not produce EAGLE XG Glass." *Id.* He also explained that "[redacted] *Id.* He further noted that

[redacted] Hence, [redacted] plays a critical role in Corning's innovation and manufacturing process." *Id.*

Dr. Kudva explained that [redacted] *Id.* at Q/A 19. He noted: "Since the invention of EAGLE XG Glass, Sullivan Park has continued to be instrumental in the continued success of the product. [redacted] *Id.* The employees at Sullivan Park have [redacted] *Id.*

Respondents argue that the activities at [redacted] are not significant because [redacted] RIB at 95. Respondents also note that [redacted] *Id.* at 95-96. The fact that [redacted] work performed by [redacted] is also done abroad does not diminish the significance of the work performed domestically. As set forth above, Mr. Kudva repeatedly testified that the work performed at [redacted] CX-0001C (Kudva WS) at Q/A 11. Dr. Arnold further testified that "[redacted] is, in substance, the fountainhead of knowledge. [redacted] Tr. (Arnold) at 287:19-21. He explained that "[t]he [redacted] *Id.* at 287:22-288:1.

I therefore find that Corning's labor and capital investments are qualitatively significant.

b) Quantitative Significance

The Commission has explained that "[e]valuating significance requires 'a holistic review of all relevant considerations that is very context dependent.'" *Certain Soft Projectile Launching Devices, Components Thereof, Ammunition, & Prods. Containing Same*, Inv. No. 337-TA-1325, Comm'n Op. at 26 (Dec. 18, 2025) (hereinafter, "*Soft Projectile*") (quoting *Wuhan Healthgen Biotechnology Corp. v. Int'l Trade Comm'n*, 127 F.4th 1334, 1338 (Fed. Cir. 2025)). "A quantitative analysis is required in assessing the economic prong of the domestic industry requirement." *Id.* (citing *Lelo, Inc. v. U.S. Int'l Trade Comm'n*, 786 F.3d 879, 883 (Fed. Cir. 2015)). "The relevant considerations include 'an examination of the facts in each investigation, the article of commerce, and the realities of the marketplace.'" *Id.* (quoting *Certain Printing and Imaging Devices and Components Thereof*, Inv. No. 337-TA-690, Comm'n Op. at 27 (Feb. 17, 2011)).

Corning asserts that its investments are quantitatively significant based on two comparisons. First, Corning notes that "from 2020-2024, approximately [redacted] of Corning's investments in labor worldwide for EAGLE XG Glass occurs at [redacted] and Sullivan Park." CIB at 121.[53] Second, Corning asserts that "as a percentage of total EAGLE XG Glass D&E expenditures and research labor expenditures worldwide, Corning's domestic investments in labor represents approximately [redacted] from 2015-2024." *Id.*

Respondents complain that "Corning did not compare domestic investments and revenue." RIB at 97. It further asserts that "Corning failed to perform value-addition and failed to explain

[53] Dr. Arnold notes that "[f]rom 2022 through 2024, this comparison also yields approximately [redacted] percent." CX-0004C (Arnold WS) at Q/A 65.

how these ratios provide a meaningful indication of significance, especially in the context of a large number of investments made overseas across many years." *Id.* at 100. In their reply brief, Respondents point to the Commission's recent decision in *Soft Projectile* as evidence that Corning failed to meet its burden. RRB at 49.

I find that Corning's first comparison demonstrates the significance of its labor and capital investments. Dr. Arnold explains that the [redacted] figure is a result of comparing Corning's investment in labor at [redacted] and Sullivan Park for the domestic industry products to Corning's worldwide investment in labor for the domestic industry products, which includes the salary, wages, and benefits of employees involved in manufacturing, Operating Expense Labor (including development & engineering), and Research Labor. CX-0004C (Arnold WS) at Q/A 65. Respondents do not argue that [redacted] is not a significant number. *See* RIB at 100. Nor do Respondents assert that it was inappropriate to rely only on the 2020-2024 timeframe in the significance analysis. *Id.*

Respondents instead argue that the [redacted] figure fails to "provide a meaningful indication of significance." RIB at 100. The Commission has previously indicated that a comparison of domestic investments in the DI products to foreign investments in the DI products is appropriate, however. *See Certain Bone Cements, Components Thereof & Prods. Containing the Same*, Inv. No. 337-TA-1153, Comm'n Op. at 26 (Jan. 25, 2021) ("The Commission has looked to several different contextual indicators to determine if these investments and expenditures are sufficient to constitute a domestic industry. For instance, one methodological approach the Commission has used in both pre- and post-1988 investigations is 'comparing complainant's domestic expenditures to its foreign expenditures'"); *Certain Botulinum Toxin Prods, Processes for Manf. or Relating to Same & Certain Prods. Containing Same,* Inv. No. 337-TA-1145, Comm'n Op. at

49 (Jan. 13, 2021) ("In considering the significance of the Complainants' domestic investments, a comparison of domestic investments to foreign investments is one appropriate mode of contextual analysis, but not the only permissible one."); C*ertain Movable Barrier Operator Sys. & Components Thereof*, Inv. No. 337-TA-1118, Comm'n Op. at 23 (Jan. 12, 2021) ("Depending on the facts of the investigation, the Commission has held that the significance of the complainant's investments may be proven, *inter alia*, by a comparative analysis of the complainant's domestic and foreign costs for producing a saleable DI product."); *Certain Carburetors & Prods. Containing Such Carburetors*, Inv. No. 337-TA-1123, Comm'n Op. at 19 (Oct. 28, 2019) ("The Commission has also assessed the relative domestic contribution to the protected article by comparing complainant's product-related domestic activities to its product-related foreign activities.").

I am also not persuaded by Respondents' argument that Corning's analysis does not account for the fact that a "[redacted]" RIB at 100. Respondents do not cite to any evidence showing that U.S. labor investments decreased while foreign labor investments increased. *See id.* In fact, Respondents do not cite to any evidence at all on this point. *Id.* Additionally, for at least the last four years, the ratio to U.S. labor investments in the DI Products to foreign labor investments in the DI Products has remained stable. *See* CX-0004C (Arnold WS) at Q/A 65 (indicating that, from 2020-2024, [redacted] of Corning's investments in labor worldwide occurred at [redacted] and Sullivan Park and that this number was [redacted] from 2022-2024). Further, by comparing domestic investments to worldwide investments, the analysis necessarily takes into account the investments made overseas. Respondents do not explain why they believe otherwise.

Finally, I am not persuaded by Respondents' argument that Corning should have compared domestic investments to revenue or performed another type of value-added analysis. *See* RIB at 97, 100. The Commission has not mandated that a complainant perform any particular analysis. Recently, in *Soft Projectiles*, the Commission explained that it has looked "to several different 'contextual indicators,' including a value-added approach or comparative analyses, such as comparing investments to revenue or the cost of goods sold, to determine if a complainant's investments and expenditures are sufficient to constitute a domestic industry." Comm'n Op. at 26; *see also id.* at 35 ("[T]he Commission has relied on several metrics as part of its significance analysis, including the value added to the DI article by domestic activities, the relative domestic contribution to the DI article by comparing domestic DI article activities to foreign DI article activities, and whether the domestic activities practice the claim of the patent."). The Commission specifically explained that "[w]hich comparative analysis is most useful and persuasive depends upon the facts of the investigation under a holistic review of the evidence." *Id*. at 36. The Commission did not, however, mandate any particular approach to assess significance. In fact, it noted that it was using a "comparison of the U.S. investments in the DI products to the sales/projected revenue," because the information on the non-U.S. employment was incomplete/unreliable. [54] *Id.* at 36. Prior Commission opinions likewise indicate that a revenue comparison could serve as an alternative to a domestic-to-foreign comparison. *See Certain Wearable Elec. Devices with ECG Functionality & Components Thereof*, Inv. No. 337-TA-1266

[54] The Commission rejected the complainants' comparison of its domestic DI Product labor investments to their worldwide DI Product labor investments because the complainants did not include the manufacturing costs in their worldwide labor total. *Id.* at 27-29 (noting that the complainants did not "account for the manufacturing costs" and concluding therefore that "Complainants failed to provide sufficient evidence to satisfy one of their own proposed significance metrics").

Comm'n Op. at 22 (Jan. 20, 2023) ("The Commission, however, has made clear that a domestic-to-foreign comparison is not a requirement, nor is it "preferred" as a general matter to show significance. . . . The appropriate context for evaluating significance may vary depending upon the facts of a particular investigation. For example, significance may be shown, *inter alia*, by demonstrating the value added by domestic activities, by comparing domestic investments to costs or revenues for DI products, or other contextual evidence of significance to the company's operations, the marketplace, or the industry in question."); *see also Certain Elec. Candle Prods. & Components Thereof*, Inv. No. 337-TA-1195, Comm'n Op. at 17 (Sept. 13, 2021) ("That significance and substantiality evaluation may employ any number of contextual indicators to prove that the investments are significant or substantial including, *inter alia*, comparing domestic investments to foreign investments, comparing domestic investments to domestic activities, or through the added value by the domestic investment.").

For these reasons, I find that Corning has established that its labor investments in the domestic industry products at [redacted] and Sullivan Park are significant.[55]

[55] It is unclear if the Commission would accept Corning's second comparison as demonstrating significance. First, I note that this comparison assumes that [redacted] is a [redacted] *See* CX-0004C (Arnold WS) at Q/A 65 ("This alternative comparison is appropriate if one were to consider [redacted] as a [redacted] (and not a [redacted]). . ."). The evidence, however, indicates that the employees at [redacted] include [redacted]. *See* CX-0001C (Kudva WS) at Q/A 11. Second, Commissioner Kearns has stated that "the significance analysis under section 337(a)(3)(B) should be based on a full picture of all expenses associated with the domestic industry products, not a selective subset of those expenses, such as those for research and development ('R&D') and technical support." *Certain Smart Wearable Devices, Sys., & Components Thereof*, Inv. No. 337-TA-1398, Comm'n Op. at 6 n. 4 (Sept. 5, 2025). Commissioner Kearns specifically notes that "[l]abor costs relating to manufacturing activities" are relevant to the analysis and a failure to include foreign manufacturing costs can "prove fatal to a complainant's burden to satisfy the economic prong." *Id.* at 6-7 n. 4. Because I find that Corning has shown significance through its first theory, I do not address the merits of this second theory.

C. Conclusion

I find that Complainant has shown that the economic prong of the domestic industry requirement is satisfied. Because I find that Corning has shown that the domestic industry is satisfied under section 337(a)(3)(B), I need not determine whether Corning also meets the economic prong under section 337(a)(3)(A). *See Lashify, Inc. v. Int'l Trade Comm'n*, 130 F.4th 948, 957 (Fed. Cir. 2025) ("The statute's use of 'or' to separate the three clauses means that satisfying any one of the clauses suffices for satisfying the economic prong of the domestic industry requirement.").

VIII. CONCLUSIONS OF LAW

1. The importation or sale requirement of section 337 has been satisfied.

2. Commission Rule 210.12(a)(7) has been satisfied.

3. The 616 Accused Products do not infringe U.S. Patent No. 8,642,491.

4. The 615 Accused Products infringe claims 3, 6, 8, and 12 of U.S. Patent No. 8,642,491.

5. The technical prong of the domestic industry requirement for U.S. Patent No. 8,642,491 has been satisfied.

6. The asserted claims of U.S. Patent No. 8,642,491 are not invalid for indefiniteness.

7. The asserted claims of U.S. Patent No. 8,642,491 are not invalid for lack of written description.

8. The asserted claims of U.S. Patent No. 8,642,491 are not invalid for lack of enablement.

9. The asserted claims of U.S. Patent No. 8,642,491 are not invalid under 35 U.S.C § 103 for obviousness.

10. U.S. Patent No. 8,642,491 is not unenforceable due to inequitable conduct.

11. The 616 Accused Products do not infringe U.S. Patent No. 8,640,498.

12. The 615 Accused Products infringe claims 2-3, 5-6, and 9 of U.S. Patent No. 8,640,498.

13. The technical prong of the domestic industry requirement for U.S. Patent No. 8,640,498 has been satisfied.

14. The asserted claims of U.S. Patent No. 8,640,498 are not invalid for indefiniteness.

15. The asserted claims of U.S. Patent No. 8,640,498 are not invalid for lack of written description.

16. The asserted claims of U.S. Patent No. 8,640,498 are not invalid for lack of enablement.

17. The asserted claims of U.S. Patent No. 8,640,498 are not invalid for obviousness-type double patenting.

18. Claims 1, 2, and 9 of U.S. Patent No. 8,640,498 are not invalid under 35 U.S.C § 102 for anticipation.

19. Claims 1, 3, 5-6, and 9 of U.S. Patent No. 8,640,498 are not invalid under 35 U.S.C § 103 for obviousness.

20. U.S. Patent No. 8,640,498 is not unenforceable due to inequitable conduct.

21. U.S. Patent No. 8,642,491 is not unenforceable due to patent misuse.

22. U.S. Patent No. 8,640,498 is not unenforceable due to patent misuse.

23. The economic prong of the domestic industry requirement has been satisfied.

IX. RECOMMENDED DETERMINATION ON REMEDY AND BOND

The Commission's Rules provide that the administrative law judge shall issue a recommended determination concerning the appropriate remedy in the event the Commission finds a violation of section 337 and the amount of bond to be posted by respondents during Presidential review of any Commission remedies. *See* 19 C.F.R. § 210.42(a)(l)(ii).

A. Limited Exclusion Order[56]

The Commission has broad discretion in selecting the form, scope, and extent of the remedy in a section 337 proceeding. *Viscofan, S.A. v. U.S. Int'l Trade Comm'n*, 787 F.2d 544, 548 (Fed. Cir. 1986). A limited exclusion order directed to a respondent's infringing products is among the remedies that the Commission may impose. *See* 19 U.S.C. § 1337(d).

The parties agree that a limited exclusion order is appropriate if the Commission finds a violation of section 337. CIB at 122; RIB at 102. Respondents argue, however, that certain products should be excluded from the LEO or that they should be permitted to certify that certain imported products are not covered by the LEO. *Id.* at 102-103.

Respondents first argue that the LEO "should be limited to covering Accused Products that Corning shows to include infringing glass and are imported." RIB at 102. As discussed in Section II.B, I found that Corning has established that the importation requirement has been met. I am therefore not persuaded by Respondents' argument that the LEO should exclude products on the ground that the importation requirement has not been met.

Respondents also argue that the LEO should exclude: (1) "all LCD panels models manufactured by CSOT that have not been proven to be made using Caihong glass"; (2) "all TCL TV models identified that contain LCD panels provided by panel suppliers [redacted]; and (3) "any non-TV TCL products." RIB at 102-103. They also seek a certification provision permitting TCL to certify that the imported products do not contain Caihong glass substrates. *Id.* at 103.

[56] The parties' arguments in this section address Hisense, but I issued an Initial Determination terminating Hisense from this Investigation on March 24, 2026. Order No. 57. I therefore do not address the arguments specific to Hisense.

I decline to recommend such carve-outs. "In previous investigations, the Commission has rejected requests to exempt allegedly non-infringing configurations when such designs have not been adjudicated." *Certain Liquid Coolers for Elec. Components in Computers, Components Thereof, Devices for Controlling Same, & Prods. Containing Same*, Inv. No. 337-TA-1394, Comm'n Op. at 29 (Aug. 5, 2025); *see also Certain Dermatological Treatment Devices and Components Thereof*, Inv. No. 337-TA-1356, Comm'n Op. at 34-35 (June 18, 2025) (declining to exempt alleged non-infringing configurations "which were not disclosed during the investigation and thus not considered by the ALJ or the Commission") (citing *Certain Robotic Vacuum Cleaning Devices and Components Thereof Such as Spare Parts*, Inv. No. 337-TA-1057, Comm'n Op. at 56-58 (Feb. 1, 2019)). I did not adjudicate whether any CSOT panels with glass other than the 615 Glass or 616 Glass infringe each patent. Nor did I adjudicate whether panels made by entities other than CSOT infringe the patents. Because the other LCD panels have not been adjudicated, I decline to recommend that the Commission exclude these products from any remedial order.

Finally, Respondents state that "the Commission should delay enforcement of any LEO against [TCL] for a period of six months to permit transition away from any infringing Caihong glass." RIB at 103. Respondents' argument here is conclusory and fails to explain why such a delay is necessary and/or supported by Commission precedent. *Id.* I therefore decline to recommend a delay.

For these reasons, I recommend entry of an LEO but decline to recommend the exclusions requested by Respondents. I further recommend that the LEO should include a certification provision. *See Certain Multiple Mode Outdoor Grills & Parts Thereof*, Inv. No. 337-TA-895, Comm'n Op. at 56 (Feb. 20, 2015) ("[I]t has been Commission practice for the past several years

to include certification provisions in all exclusion orders to aid . . . CBP in enforcing the Commission's remedial orders.").

B. Cease and Desist Orders

Section 337(f)(1) provides that the Commission may issue cease and desist orders ("CDOs"), in addition to, or instead of, an exclusion order. *See* 19 U.S.C. § 1337(f)(1). "CDOs are generally issued when, with respect to the imported infringing products, respondents maintain commercially significant inventories in the United States or have significant domestic operations that could undercut the remedy provided by an exclusion order." *Semiconductor Devices*, Comm'n Op. at 36.

Corning asserts that a CDO should issue against TCL. CIB at 122. Respondents disagree and argue that "Corning has not identified any specific level of inventory of accused products within the U.S. that has been shown to contain accused Caihong glass." RIB at 103.

TCL entered into a stipulation related to inventory and agreed "not to take a position regarding whether the identified inventory is commercially significant." CX-0847C at ¶ 7. It is, however, still Corning's burden to establish that the inventory is commercially significant. *Certain Pick-Up Truck Folding Bed Cover Sys. & Components Thereof (III)*, Inv. No. 337-TA-1353, Comm'n Op. at 13 (Oct. 2, 2024) ("A complainant seeking a cease and desist order must demonstrate, based on the record, that this remedy is necessary to address the violation found in the investigation so as to not undercut the relief provided by the exclusion order.") (internal quotations and citations omitted). Here, Corning makes no effort to meet its burden. In the two paragraphs in its opening brief dedicated to CDOs, Corning writes: "TCL . . . maintain[s] domestic inventories of hundreds – if not thousands – of TVs that incorporate the accused glass and represent commercially significant inventories justifying a CDO." CIB at 122. Corning does not, however, provide inventory totals specific to TCL (as opposed to combined totals with former respondent

Hisense), total the inventory for each model number, or introduce any evidence to demonstrate that such levels are significant in the context of this investigation. *See* CIB at 122. Nor does it indicate how many of the TVs in the United States contain 615 Glass (if any), as opposed to 616 Glass. *Id.* As such, I decline to find that Corning has established that TCL maintains commercially significant inventory.

It is therefore my recommendation that a CDO against TCL should not issue in this Investigation.

C. Bond

Pursuant to section 337(j)(3), the administrative law judge and the Commission must determine the amount of bond to be required of a respondent during the 60-day Presidential review period following the issuance of permanent relief, should the Commission determine to issue a remedy. The purpose of the bond is to protect the complainant from any injury. 19 U.S.C. § 1337(j)(3); 19 C.F.R. §§ 210.42(a)(1)(ii), 210.50(a)(3).

When reliable price information is available, the Commission has often set the bond by eliminating the differential in sales prices between the domestic product and the imported, infringing product. *Microsphere Adhesives*, Comm'n Op. at 24. In other cases, the Commission has turned to alternative approaches, especially when the level of a reasonable royalty rate could be ascertained. *See Certain Integrated Circuit Telecomm. Chips & Prods. Containing Same, Including Dialing Apparatus*, Inv. No. 337-TA-337, Comm'n Op. at 41-43, USITC Pub. No. 2670 (1995). A 100% bond has been required when no effective alternative existed. *Certain Flash Memory Circuits & Prods. Containing Same*, Inv. No. 337-TA-382, USITC Pub. No. 3046, Comm'n Op. at 26-27 (July 1997) (a 100% bond imposed when price comparison was not practical because the parties sold products at different levels of commerce, and the proposed royalty rate appeared to be *de minimis* and without adequate support in the record).

Corning asserts that "[a] bond of 100% should issue." CIB at 122. Corning argues that "[t]he accused glasses compete with EAGLE XG Glass in the U.S." and that "Caihong seeks to market its Accused Products at a price undercutting the DI Products." *Id*. As to TCL Corning asserts that "[a] bond of 100% of the value of the imported infringing articles should issue," because there is insufficient evidence to calculate a bond based on price differential or reasonable royalty. *Id.* at 123.

Respondents argue that "Corning has not identified any evidence demonstrating that a bond rate higher than 0% is necessary to offset any alleged competitive advantage of Caihong." RIB at 103. According to Respondents, "Corning has not demonstrated that it experienced or will experience any harm or injury from the alleged importation of the Accused Products." *Id.* at 104. Respondents assert that "[t]he bond rate should be set at 0%." *Id.*

The law instructs that a bond should be set to protect a complainant from any injury. 19 U.S.C. § 1337(j)(3); 19 C.F.R. §§ 210.42(a)(1)(ii), 210.50(a)(3). It is, however, Corning's burden to demonstrate that a bond is necessary. *Certain Dental Implants*, Inv. No. 337-TA-934, Comm'n Op. at 56 (May 11, 2016) ("The complainant bears the burden of establishing its request for an appropriate bond amount to be imposed on respondents' continued activities during the Presidential review period based on the record."). Here, Corning asserts that "[t]he accused glasses compete with EAGLE XG in the U.S." and that Caihong markets the Accused Products at a price that undercuts the DI Products. CIB at 122. Corning does not, however, cite to any evidence in support of its statements. Corning therefore did not meet its burden to show that a bond is necessary.

For these reasons, I recommend that the Commission set a bond rate of 0%.

X. INITIAL DETERMINATION ON VIOLATION

For the reasons set forth above, it is my Initial Determination that a violation of section 337 of the Tariff Act, as amended, has occurred in the importation into the United States, the sale for importation, or the sale within the United States after importation of certain glass substrates for liquid crystal displays, products containing the same, and methods for manufacturing the same.

I hereby certify to the Commission this Initial Determination and the Recommended Determination.

The Secretary shall serve the confidential version of this Initial Determination upon counsel who are signatories to the Protective Order (Order No. 1) issued in this investigation. A public version will be served at a later date upon all parties of record.

Pursuant to 19 C.F.R. § 210.42(h), this Initial Determination shall become the determination of the Commission unless a party files a petition for review pursuant to 19 C.F.R. § 210.43(a) or the Commission, pursuant to 19 C.F.R. § 210.44, orders on its own motion a review of the Initial Determination or certain issues therein.

XI. ORDER

Within seven days of the date of this document, the parties shall jointly submit a single proposed public version of this document with any proposed redactions indicated in red. If the parties submit excessive redactions, they may be required to provide declarations from individuals with personal knowledge, justifying each proposed redaction and specifically explaining why the information sought to be redacted meets the definition for confidential business information set forth in 19 C.F.R. § 201.6(a). The proposed redactions should be made electronically, in a single PDF file using the "Redact Tool" within Adobe Acrobat. The proposed redactions should be submitted as "marked" but not yet "applied." If the parties do not have any redactions to the order,

they should so state. The proposed redactions or statement of no redactions should be submitted via email to Moore337@usitc.gov and not filed on EDIS.

Bryan F. Moore
Administrative Law Judge