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Attorneys for Plaintiff Hitachi Kokusai Electric, Inc. and Kokusai Semiconductor Equipment Corporation

UNITED STATES DISTRICT COURT

DISTRICT OF OREGON

PORTLAND DIVISION

HITACHI KOKUSAI ELECTRIC, INC., a Japanese corporation, and KOKUSAI SEMICONDUCTOR EQUIPMENT CORPORATION, a Delaware corporation,

Plaintiffs,

v.

ASM INTERNATIONAL, N.V., a Netherlands corporation, and ASM AMERICA, INC., a Delaware corporation,

Defendants.

Civil Action No.: 3:18-cv-00323

COMPLAINT FOR PATENT INFRINGEMENT

JURY TRIAL DEMANDED

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiffs Hitachi Kokusai Electric, Inc. ("HiKE") and Kokusai Semiconductor Equipment Corporation ("KSEC") (collectively, "Plaintiffs") for their Complaint against ASM International, N.V. and ASM America, Inc. (collectively, "the ASM Defendants") hereby allege as follows:

NATURE OF THE ACTION

1. This is an action for patent infringement that arises under the patent laws of the United States, Title 35 of the United States Code.

2. Defendants ASM International, N.V. ("ASM International") and ASM America, Inc. ("ASM America") have infringed and continue to infringe United States Patent Nos. 8,673,076 ("the '076 patent"), 7,622,007 ("the '007 patent"), 6,514,869 ("the '869 patent"), 6,783,627 ("the '627 patent") (collectively, "the Asserted Patents"). Plaintiffs' right to relief is asserted against ASM International and ASM America (collectively, "the ASM Defendants") jointly, severally, or in the alternative with respect to the ASM Defendants' making, using, selling, offering for sale, or importing certain semiconductor process equipment for wafer processing, including the Pulsar XP ALD system, EmerALD XP ALD system, Eagle XP8 PEALD system, Dragon XP8 PECVD system, and A412 batch vertical furnace system products (hereinafter, "the Accused Products"). Further, questions of fact and law common to the ASM Defendants will arise in this action.

PARTIES

3. HiKE is a corporation organized and existing under the laws of Japan with its principal place of business in Tokyo, Japan.

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4. KSEC is a Delaware corporation with a place of business located at 2460 N. 1st St., San Jose, CA 95131.

5. ASM International, N.V. is a corporation organized and existing under the laws of the Netherlands with its principal place of business at Versterkerstraat 8, 1332 AP Almere, Netherlands. On information and belief, ASM International, N.V. is engaged in the design, manufacture, importation into the United States, and sale after importation into the United States of semiconductor process equipment.

6. ASM America, Inc. is a Delaware corporation, with its principal place of business at 3340 East University Drive, Phoenix, AZ 85034. On information and belief, Defendant ASM America, Inc. is a wholly-owned subsidiary of ASM International, N.V. On information and belief, ASM America, Inc. is engaged in the activities on behalf of its parent, ASM International, N.V., including performance of services to support the importation and sale of semiconductor process equipment made by or on behalf of ASM International, N.V. into and within the United States, including marketing, repair, and after-sale services of semiconductor process equipment.

JURISDICTION AND VENUE

7. This civil action for patent infringement arises under the patent laws of the United States, 35 U.S.C. §§ 1 et seq.

8. This Court has subject matter jurisdiction over this action pursuant to 28 U.S.C. §§ 1331 and 1338(a).

9. On information and belief, this Court has personal jurisdiction over the ASM Defendants because the ASM Defendants are doing and have done substantial business in this District, including business relating to the sale and distribution of the Accused Products. On information and belief, the ASM Defendants have continuous and systematic business contacts with the State of Oregon and either directly or through subsidiaries and intermediaries conduct business in Oregon by shipping, distributing, offering for sale, selling, advertising (including the provision of an interactive web page—*e.g.*, http://www.asm.com/solutions/products) the

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Accused Products in the State of Oregon. Also, on information and belief, the ASM Defendants directly or through their subsidiaries and intermediaries conduct business in Oregon through their Regional Service Office located at 7235 NE Evergreen Parkway, Suite 200, Hillsboro, OR 97124. The ASM Defendants directly or through their subsidiaries and intermediaries have purposefully and voluntarily placed the Accused Products into the stream of commerce with the intention and expectation that the Accused Products will be purchased and used by customers in Oregon. Therefore, the exercise of jurisdiction over the ASM Defendants is proper under the applicable jurisdictional statutes and would not offend traditional notions of fair play and substantial justice.

10. Venue is proper in this District pursuant to 28 U.S.C. §§ 1391(b), 1391(c), and/or 1400(b) because, among other reasons, the ASM Defendants have committed acts of infringement in this District and have a regular and established place of business in this District.

COUNT ONE
(Infringement of U.S. Patent No. 8,673,076)

11. Plaintiffs incorporate by reference and re-allege Paragraphs 1–10 of their Complaint, as if fully set forth herein.

12. On March 18, 2014, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 8,673,076 ("the '076 patent"), which is titled "Substrate Processing Apparatus and Semiconductor Device Producing Method" and attached hereto as Exhibit A.

13. The '076 patent generally relates to a substrate processing apparatus, which comprises a reaction container to process a plurality of substrates, a heater for heating the substrates, and at least one gas introducing nozzle for supplying a gas into the reaction container. *See* Ex. A, '076 patent at Abstract, claim 1.

14. The '076 patent has been assigned to HiKE. HiKE holds all right, title, and interest in the '076 patent, including the right to collect and receive damages for past, present,

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and future infringement of the ’076 patent.

15. The ASM Defendants have infringed and continue to infringe at least claim 1 the ’076 patent in this District and throughout the United State by making, using, importing, selling, and/or offering for sale one or more of the Accused Products, such as the A412 batch vertical furnace system (“the A412”). The ASM Defendants have infringed and are currently infringing literally and/or under the doctrine of equivalents.

16. For example, the ASM Defendants’ A412 batch vertical furnace system contains each element of and infringes at least claim 1 of the ’076 patent, which recites the following:

> 1. A substrate processing apparatus, comprising:
>
> a reaction container to process a plurality of substrates;
>
> a heater to heat said plurality of substrates; and
>
> at least one nozzle through which reaction gas is to be supplied into said reaction container, wherein
>
> said nozzle includes a horizontal portion extending in a horizontal direction and a vertical portion rising in a vertical direction,
>
> said horizontal portion is attached to a sidewall of said reaction container with said horizontal portion penetrating the sidewall of said reaction container,
>
> said vertical portion is disposed in said reaction container apart from an inner wall of said reaction container such that a portion of the vertical portion is opposed to said heater,
>
> a flow-path cross-sectional area of a first portion of said vertical portion that is opposed to at least said heater is greater than a flow-path cross-sectional area of said horizontal portion,
>
> a flow-path cross-sectional shape of said first portion of said vertical portion that is opposed to at least said heater is formed into a substantially elliptic shape with a short axis thereof oriented toward a central portion of the substrate, said vertical portion that is not opposed to said heater includes a second portion, wherein a flow-path cross-sectional area of said section portion is smaller than the flow-path cross-sectional area of said first portion, and a flow-path cross-sectional shape of said second portion is formed into a circular shape, and the short axis of the substantially elliptic shape of the flow-path cross-sectional shape of said first

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portion is substantially equal to the diameter of the circular shape of the flow-path cross-sectional shape of said second portion, thus providing a substantially equivalent lateral clearance between the nozzle and the plurality of substrates at the first and second portions.

17. On information and belief, the A412 (shown below) is a substrate processing apparatus that includes a reaction container to process a plurality of substrates. *See* Advance Vertical Furnace, ASM, http://www.asm.com/solutions/products/low-pressure-chemical-vapor-deposition-and-diffusion-products/advance-vertical-furnace (last visited Feb. 3, 2018). On information and belief, the A412 is a "batch vertical furnace optimized to meet the needs of advanced semiconductor applications" wherein "a large stack of wafers can be loaded into the furnace chamber for simultaneous thermal processing." *Id.*

18. On information and belief, the A412 also includes a heater to heat a plurality of substrates. *See, e.g.*, Advance Vertical Furnace, ASM, http://www.asm.com/solutions/products/low-pressure-chemical-vapor-deposition-and-diffusion-products/advance-vertical-furnace (last visited Feb. 7, 2018) (listing "Major Applications" for A412 as "Oxidation, both high and low temperature" and "Anneal and cure"); U.S. Patent No. 7,629,256, assigned to ASM International N.V. and attached hereto as Exhibit B, at 7:54-60 ("FIGS. 6-8 illustrate another version of an exemplary batch reactor, also commercially available under the trade name Advance 412™ or A412™ from ASM International N.V. of Bilthoven, The

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Netherlands. FIG. 6 is a schematic cross-sectional side-view of the elongated furnace with a gas injector. The process tube or chamber 526 is preferably surrounded by a heating element (not shown).”). For example, on information and belief, the A412’s “[v]ertical batch processing increases productivity because a large stack of wafers can be loaded into the furnace chamber for simultaneous thermal processing.” *See* Advance Vertical Furnace, ASM, http://www.asm.com/solutions/products/low-pressure-chemical-vapor-deposition-and-diffusion-products/advance-vertical-furnace (last visited Feb. 3, 2018).

19. On information and belief, the A412 also includes at least one nozzle through which reaction gas is supplied into the reaction container. *See* Advance Vertical Furnace, ASM, http://www.asm.com/solutions/products/low-pressure-chemical-vapor-deposition-and-diffusion-products/advance-vertical-furnace (last visited Feb. 7, 2018) (listing “major applications” of the A412 as “Silicon nitride,” “TEOS,” and “Atomic Layer Deposition for metals and dielectrics”); Enabling Advanced Wafer Processing with New Materials, ASM International at 25 (July 11, 2017), http://www.asm.com/Downloads/20170711%20ASMI%20Investor%20Technology%20Seminar%20presentation%20July%2011%202017%20revREL.pdf (noting “Applications” as including “LPCVD Silicon, SiN, TEOS, HTO” and “Batch ALD (AIO, AIN, TiN, SiN, SiO, etc”)).

20. On information and belief, the at least one nozzle through which reaction gas is supplied into the reaction container includes a horizontal portion extending in a horizontal direction and a vertical portion rising in a vertical direction. *See, e.g.*, Ex. B, ’256 patent at Fig. 6 (shown below); *see also id.* at 7:54-60 (“FIGS. 6-8 illustrate another version of an exemplary batch reactor, also commercially available under the trade name Advance 412™ or A412™ from ASM International N.V. of Bilthoven, The Netherlands. FIG. 6 is a schematic cross-sectional side-view of the elongated furnace with a gas injector. The process tube or chamber 526 is preferably surrounded by a heating element (not shown).”).

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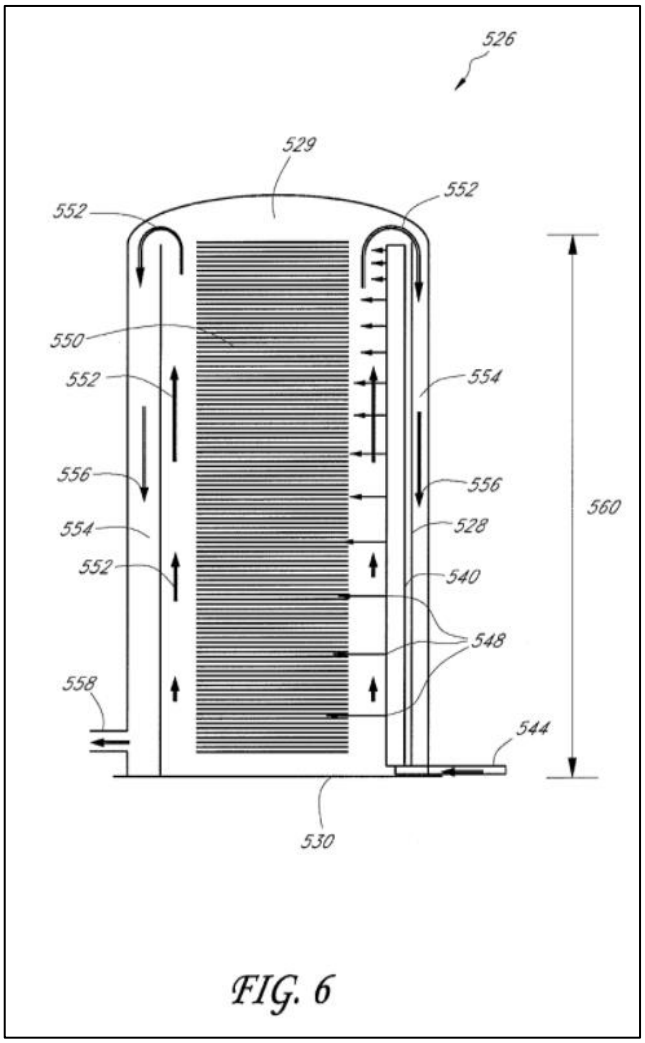

FIG. 6

21. On information and belief, the horizontal portion of the A412's nozzle is attached to a sidewall of the reaction container with the horizontal portion penetrating the reaction container's sidewall. On information and belief, the vertical portion is disposed in the reaction container apart from an inner wall of the reaction container so that at least part of the vertical portion is opposed to the heater. *See, e.g.*, Ex. B, '256 patent at 7:54-60 ("FIGS. 6-8 illustrate another version of an exemplary batch reactor, also commercially available under the trade name Advance 412™ or A412™ from ASM International N.V. of Bilthoven, The Netherlands. FIG. 6 is a schematic cross-sectional side-view of the elongated furnace with a gas injector. The process tube or chamber 526 is preferably surrounded by a heating element (not shown).").

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22. In the A412, on information and belief, a flow-path cross-sectional area of a first portion of the nozzle's vertical portion that is opposed to at least the heater is greater than a flow-path cross-sectional area of said horizontal portion. Additionally, on information and belief, a flow-path cross-sectional shape of the first portion of the vertical portion that is opposed to at least the heater is formed into a substantially elliptic shape with a short axis thereof oriented toward a central portion of the substrate. *See* Ex. B, '256 patent at Figs. 7, 8 (shown below); *see also id.* at 9:11-26 (discussing Fig. 8).

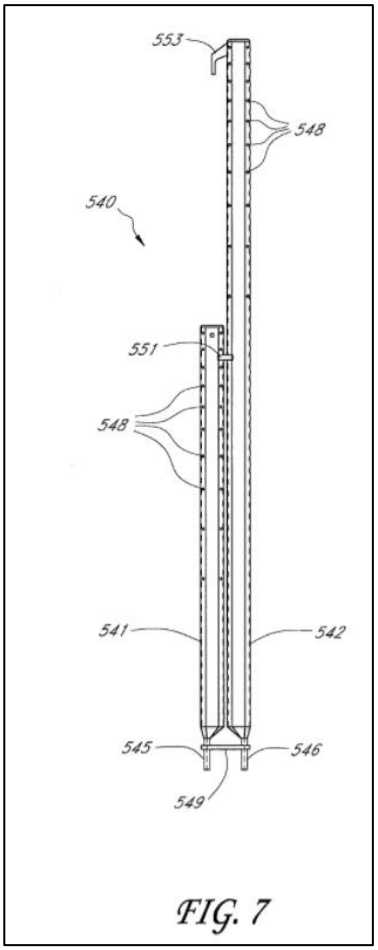

FIG. 7

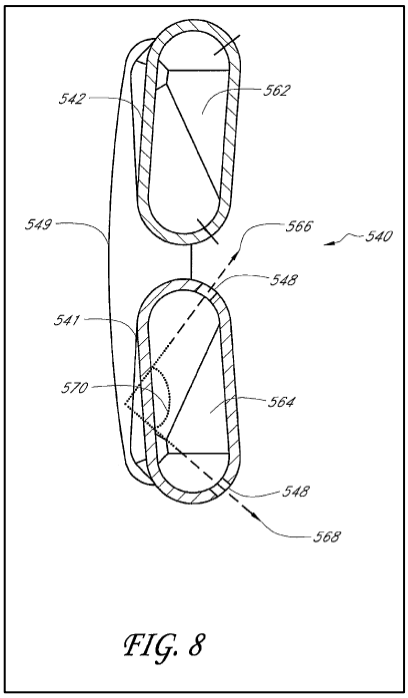

FIG. 8

23. Additionally, on information and belief, the vertical portion of the A412's at least one nozzle that is not opposed to the heater includes a second portion, wherein a flow-path cross-sectional area of the section portion is smaller than the flow-path cross-sectional area of the first portion, and a flow-path cross-sectional shape of the second portion is formed into a circular

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shape. *See, e.g.*, Ex. B, '256 patent at Fig. 7 (shown above).

24. On information and belief, in the A412, the short axis of the substantially elliptic shape of the flow-path cross-sectional shape of the first portion is substantially equal to the diameter of the circular shape of the flow-path cross-sectional shape of the second portion, thus providing a substantially equivalent lateral clearance between the nozzle and the plurality of substrates at the first and second portions.

25. The ASM Defendants have known or should have known of the '076 patent and its infringement since at least March 18, 2014.

26. On information and belief, the ASM Defendants indirectly infringe the '076 patent under 35 U.S.C. § 271(b) by actively and knowingly inducing others to make, use, sell, offer for sale, or import the Accused Products, including but not limited to the A412 batch vertical furnace system, that embody or use the inventions claimed in the '076 patent. At least this product, as provided by the ASM Defendants to their customers and used as intended and instructed, infringes the '076 patent. The ASM Defendants sold and/or offered for sale one or more of the Accused Products, including but not limited to the A412 batch vertical furnace system, and are continuing to do so, to customers with the specific intent to actively encourage them to use one or more of the Accused Products, including but not limited to the A412 batch vertical furnace system in the United States in a manner that the ASM Defendants know to be infringing.

27. For example, among other things, on information and belief, the ASM Defendants' acts of inducement include: providing the Accused Products to customers, and intending them to make, use, offer to sell, sell, and/or import the Accused Products; advertising the Accused Products in the United States to encourage customers to use the patented invention of the '076 patent by operating the Accused Products in accordance with the ASM Defendants' specifications, installation materials, and instruction materials; and encouraging customers to communicate directly with the ASM Defendants' representatives and providing information

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about the Accused Products for purposes of customer support and training, technical assistance, design, product and part replacement, sales, and marketing of the Accused Products.

28. More specifically, the ASM Defendants "offer complete programs for all of [their] products" with "theory and hands-on sessions" that "assist [customers] until [they] become comfortable and confident with [their] wafer processing system." *See, e.g.*, ASM Customer Training, http://www.asm.com/support/customer-training (last visited Feb. 1, 2018). On information and belief, the ASM Defendants previously provided "product training classes" at ASM sites for the Accused Products. *See id.* For example, the A412 product training class has included "[i]nformal lectures, demonstrations and practical exercises" that provide customers "with an introduction and basic understanding of operating and maintaining the A412." *See* A412 Part 1 Equipment Training: Course Overview, https://training2.asm.com/training/include/desc/A412-P1.pdf (last visited Feb. 1, 2018); *see also* A412 Part 2 Equipment Training: Course Overview, https://training2.asm.com/training/include/desc/A412-P2.pdf (last visited Feb. 1, 2018).

29. In addition, on information and belief, the ASM Defendants also engage in extensive communications and onsite visits with customers in the course of selling and offering to sell the Accused Products. These communications and visits include, on information and belief, exchanging information with potential customers concerning their product needs and the capabilities of the Accused Products, as well as demonstrations of the Accused Products to assure the customer that the ASM Defendants' Accused Products meet the customer's technical specifications. These communications and visits also include, on information and belief, the installation of equipment at customer sites to facilitate evaluation of the Accused Products before, during, and/or after customers have made a purchase commitment. On information and belief, the ASM Defendants further support the installation of the Accused Products by having engineers and other representatives travel to a customer site or otherwise assist the customer to set-up the Accused Product and make them ready for use and operation. On information and

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belief, the ASM Defendants perform ongoing support and maintenance of the Accused Products at customer sites. On information and belief, the foregoing activities by the ASM Defendants result in the Accused Products being configured to perform and function in a manner that infringes HiKE's and KSEC's asserted patents.

30. Additionally, the ASM Defendants "offer a full range of support options worldwide" and "offer standard and tailored service and spares programs." *See* ASM Technical Service and Spares Support, http://www.asm.com/support/technical-service-and-spares-support (last visited Feb. 1, 2018). Such programs include the PerforMAX: Bank of Hours Program that provides customers "with a fixed number of 'banked' ASM service labor hours" to be used "for tasks such as repair and qualification, on-the-job training, tool relocation and preventative maintenance services" for the Accused Products (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-bank-of-hours-program); the PerforMAX: Engineer On-Site Program that provides "on-site operational and support expertise for your ASM equipment," including the Accused Products, by "measuring and managing system performance metrics, and sharing equipment and best-known wafer processing methods" (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-engineer-on-site-program); the PerforMAX: Full Service Program (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-full-service-program); the PerforMAX: Performance Maintenance Program that "enables [a customer] to become an expert in the services needed to deliver high productivity from [their] ASM processing equipment," including the Accused Products (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-performance-maintenance-program); the PerforMAX: Productivity Enhancement Program that "utilizes ASM field and factory expertise to perform site evaluations and to analyze [customers'] site and equipment performance" (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-

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programs/performax-productivity-enhancement-program); and the PerforMAX: Consumables Consignment Program that provides customers "with on-site stocking of genuine ASM consumable parts" (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-spares-programs). The ASM Defendants further provide customers with "Field Support Services" to meet "local service and support requirements" for the Accused Products at locations across the globe, including the U.S. *See* ASM Field Support Services, http://www.asm.com/support/field-support-services (last visited Feb. 1, 2018). Moreover, the ASM Defendants "offer equipment product performance upgrades" for the Accused Products to "extend the life and investment of [customers'] equipment." *See* ASM Product Performance Upgrade, http://www.asm.com/support/product-performance-upgrade (last visited Feb. 1, 2018). The ASM Defendants also actively and knowingly encourage customers to use one or more of the Accused Products by way of "product presentations and demonstrations" with opportunities to "evalut[e] equipment on site," thereby encouraging customers to "reach[] a sufficient level of confidence in the product's performance and compatibility with the customer's requirements to place an order." *See* ASM 2016 Statutory Annual Report at 98, http://www.asm.com/Downloads/2016_Statutory_annual_report.pdf (last visited Feb. 1, 2018). Further, the ASM Defendants maintain regional sales and service offices in the U.S. for sale and service of the Accused Products. *See id.* at 176.

31. On information and belief, the ASM Defendants have also contributed to and/or are contributing to the infringement of the '076 patent by making, using, importing, offering for sale, and/or selling one or more of the Accused Products, including but not limited to the A412 batch vertical furnace system. The ASM Defendants have made and/or sold such products with knowledge that they are especially designed for use in a patented system and/or apparatus for use in a patented process and are not a staple article of commerce suitable for substantial non-infringing use. For example, among other things, on information and belief, the ASM Defendants actively and knowingly sell such products and provide customer support, installation

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and instruction material, and other documentation to customers for such products' use as a component of a patented system and/or apparatus for use in a patented process. On information and belief, the ASM Defendants' customers have used and continue to use such products in the United States in this manner and infringed the '076 patent.

32. Moreover, on information and belief, Defendant ASM International takes active steps to induce infringement of at least claim 1 the '076 patent by Defendant ASM America, knowing that those steps will induce, encourage, and facilitate direct infringement by Defendant ASM America. On information and belief, such active steps include, but are not limited to, manufacturing the Accused Products and their components, configuring the Accused Products and their components, providing Defendant ASM America with instructions on use of the Accused Products and their components, encouraging Defendant ASM America to make and/or use the Accused Products and their components, selling the Accused Product and their components. On information and belief, Defendant ASM International knew or should have known that such activities induce Defendant ASM America to infringe at least claim 1 of the '076 patent since at least March 18, 2014.

33. On information and belief, Defendant ASM International also contributes to the infringement of at least claim 1 of the '076 patent by Defendant ASM America. Acts by Defendant ASM International that contribute to the infringement by Defendant ASM American include providing the Accused Products, components, and related parts that comprise the substrate processing apparatus in the manner described above. The Accused Products, components, and related parts are especially adapted for use in the infringing products, and they have no substantial non-infringing uses. On information and belief, Defendant ASM International knew or should have known that such activities contribute to Defendant ASM America's infringement of at least claim 1 of the '076 patent since at least March 18, 2014.

34. As a result of the ASM Defendants' infringement of the '076 patent, HiKE has suffered and continues to suffer damages. HiKE is entitled to recover from the ASM Defendants

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the damages adequate to compensate for such infringement in an amount to be determined at trial.

35. The ASM Defendants' acts of infringement of the '076 patent herein have been committed and are being committed with full knowledge of HiKE's rights in the patent. On information and belief, the ASM Defendants have acted and are continuing to act despite knowing that their actions constituted direct and/or indirect infringement of a valid patent, and they knew or should have known of this infringement since at least March 18, 2014. The ASM Defendants' acts constitute willful and deliberate infringement, entitling HiKE to enhanced damages under 35 U.S.C. § 284 and reasonable attorneys' fees and costs because this is an exceptional case under 35 U.S.C. § 285.

36. The ASM Defendants' acts of infringement have caused and will continue to cause irreparable harm to HiKE for which there is no adequate remedy at law, thereby entitling HiKE to injunctive relief.

COUNT TWO

(Infringement of U.S. Patent No. 7,622,007)

37. Plaintiffs incorporate by reference and re-allege Paragraphs 1–36 of their Complaint, as if fully set forth herein.

38. On November 24, 2009, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 7,622,007 ("the '007 patent"), which is titled "Substrate Processing Apparatus and Semiconductor Device Producing Method" and attached hereto as Exhibit C.

39. The '007 patent generally relates to a substrate processing apparatus, which comprises a reaction container for processing multiple substrates, a heater for heating the substrates, and gas introducing nozzles for supplying a gas into the reaction container. *See* Ex. C, '007 patent at Abstract.

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40. The ’007 patent has been assigned to HiKE. HiKE holds all right, title, and interest in the ’007 patent, including the right to collect and receive damages for past, present, and future infringement of the ’007 patent.

41. The ASM Defendants have infringed and continue to infringe at least claim 1 the ’007 patent in this District and throughout the United State by making, using, importing, selling, and/or offering for sale one or more of the Accused Products, such as the A412 batch vertical furnace system (“the A412”). The ASM Defendants have infringed and are currently infringing literally and/or under the doctrine of equivalents.

42. For example, the ASM Defendants’ A412 batch vertical furnace system contains each element of and infringes at least claim 1 of the ’007 patent, which recites the following:

> 1. A substrate processing apparatus, comprising:
>
> a reaction container to process a plurality of substrates;
>
> a heater to heat said plurality of substrates; and
>
> a plurality of nozzles having different lengths through which reaction gas is to be supplied into said reaction container, wherein
>
> each of said plurality of nozzles includes a horizontal portion extending in a horizontal direction and a vertical portion rising in a vertical direction,
>
> said horizontal portion is attached to a sidewall of said reaction container with said horizontal portion penetrating the sidewall of said reaction container,
>
> said vertical portion is disposed in said reaction container apart from an inner wall of said reaction container such that a portion of the vertical portion is opposed to said heater,
>
> a flow-path cross-sectional area of the portion of said vertical portion that is opposed to at least said heater is greater than a flow-path cross-sectional area of said horizontal portion, and
>
> a flow-path cross-sectional shape of the portion of said vertical portion that is opposed to at least said heater is formed into a substantially elliptic shape with a short axis thereof oriented toward a central portion of the substrate.

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43. On information and belief, the A412 (shown below) is a substrate processing apparatus that includes a reaction container to process a plurality of substrates. *See* Advance Vertical Furnace, ASM, http://www.asm.com/solutions/products/low-pressure-chemical-vapor-deposition-and-diffusion-products/advance-vertical-furnace (last visited Feb. 3, 2018). On information and belief, the A412 is a "batch vertical furnace optimized to meet the needs of advanced semiconductor applications" wherein "a large stack of wafers can be loaded into the furnace chamber for simultaneous thermal processing." *Id.*

44. On information and belief, the A412 also includes a heater to heat a plurality of substrates. *See, e.g.*, Advance Vertical Furnace, ASM, http://www.asm.com/solutions/products/low-pressure-chemical-vapor-deposition-and-diffusion-products/advance-vertical-furnace (last visited Feb. 7, 2018) (listing "Major Applications" for A412 as "Oxidation, both high and low temperature" and "Anneal and cure"); Ex. B, '256 patent at 7:54-60 ("FIGS. 6-8 illustrate another version of an exemplary batch reactor, also commercially available under the trade name Advance 412™ or A412™ from ASM International N.V. of Bilthoven, The Netherlands. FIG. 6 is a schematic cross-sectional side-view of the elongated furnace with a gas injector. The process tube or chamber 526 is preferably surrounded by a heating element (not shown)."). For example, on information and belief, the A412's "[v]ertical batch processing increases productivity because a large stack of wafers can be

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loaded into the furnace chamber for simultaneous thermal processing." *See* Advance Vertical Furnace, ASM, http://www.asm.com/solutions/products/low-pressure-chemical-vapor-deposition-and-diffusion-products/advance-vertical-furnace (last visited Feb. 3, 2018).

45. On information and belief, the A412 also includes a plurality of nozzles having different lengths through which reaction gas is supplied into the reaction container. *See* Advance Vertical Furnace, ASM, http://www.asm.com/solutions/products/low-pressure-chemical-vapor-deposition-and-diffusion-products/advance-vertical-furnace (last visited Feb. 7, 2018) (listing "major applications" of the A412 as "Silicon nitride," "TEOS," and "Atomic Layer Deposition for metals and dielectrics"); Enabling Advanced Wafer Processing with New Materials, ASM International at 25 (July 11, 2017), http://www.asm.com/Downloads/20170711%20ASMI%20Investor%20Technology%20Seminar%20presentation%20July%2011%202017%20revREL.pdf (noting "Applications" as including "LPCVD Silicon, SiN, TEOS, HTO" and "Batch ALD (AIO, AIN, TiN, SiN, SiO, etc")).

46. On information and belief, each of the plurality of nozzles having different lengths through which reaction gas is supplied into the reaction container in the A412 includes a horizontal portion extending in a horizontal direction and a vertical portion rising in a vertical direction as shown below in Figures 6 and 7 of U.S. Patent No. 7,629,256, assigned to ASM International N.V. *See, e.g.*, Ex. B, '256 patent at Figs. 6-7 (shown below).

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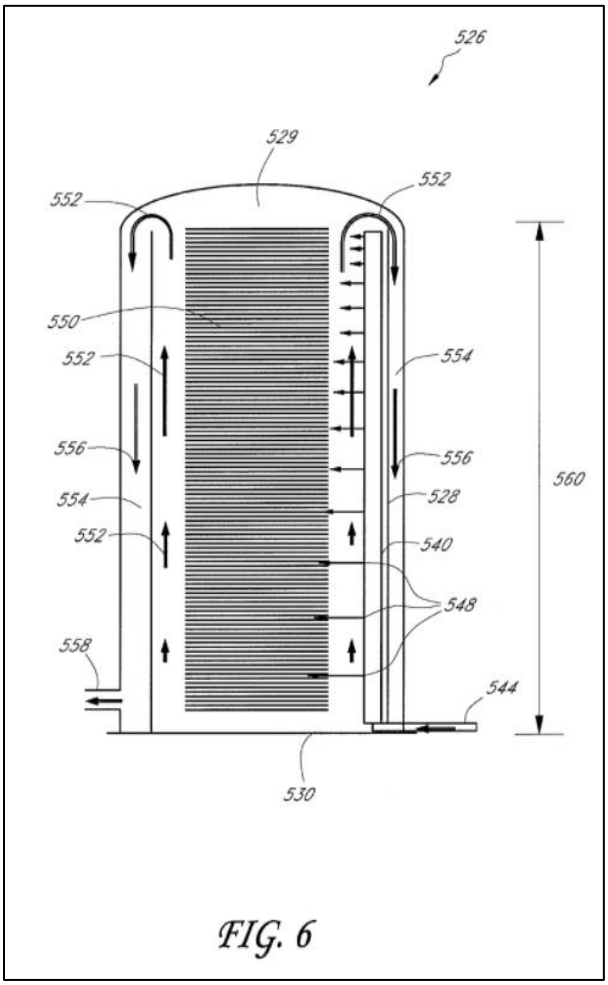

FIG. 6

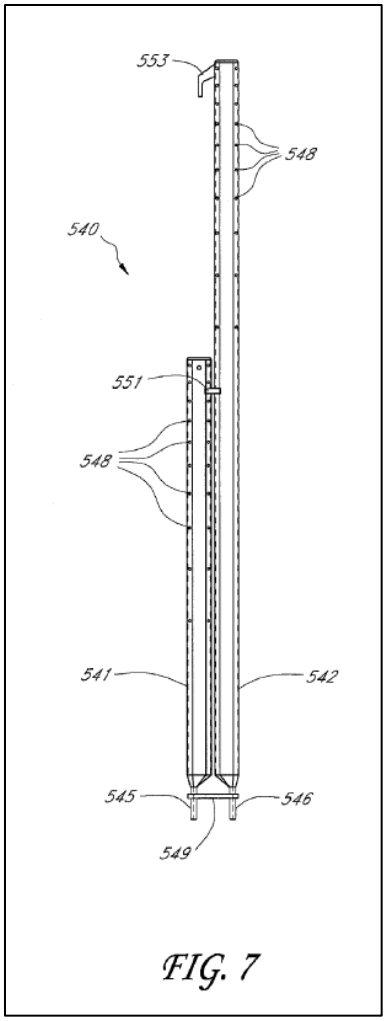

FIG. 7

47. On information and belief, the horizontal portion of the A412's nozzle is attached to a sidewall of the reaction container with the horizontal portion penetrating the reaction container's sidewall. On information and belief, the vertical portion is disposed in the reaction container apart from an inner wall of the reaction container so that part of the vertical portion is opposed to the heater. *See, e.g.*, Ex. B, '256 patent at 7:54-60 ("FIGS. 6-8 illustrate another version of an exemplary batch reactor, also commercially available under the trade name Advance 412™ or A412™ from ASM International N.V. of Bilthoven, The Netherlands. FIG. 6 is a schematic cross-sectional side-view of the elongated furnace with a gas injector. The process tube or chamber 526 is preferably surrounded by a heating element (not shown).").

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48. On information and belief, in the A412, a flow-path cross-sectional area of the portion of said vertical portion that is opposed to at least the heater is greater than a flow-path cross-sectional area of said horizontal portion. Additionally, on information and belief, a flow-path cross-sectional shape of the portion of said vertical portion that is opposed to at least the heater is formed into a substantially elliptic shape with a short axis thereof oriented toward a central portion of the substrate. *See* Ex. B, '256 patent at Figs. 7, 8 (shown below).

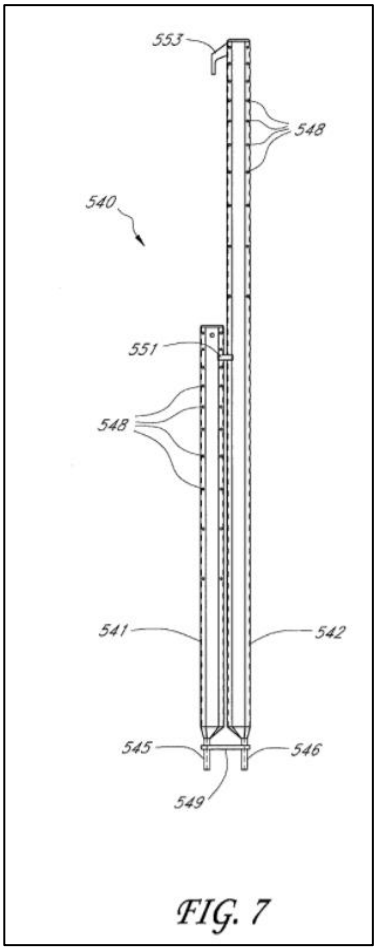

FIG. 7

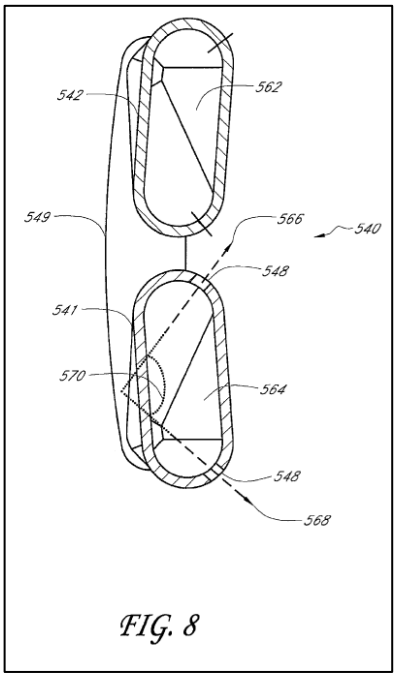

FIG. 8

49. On information and belief, the ASM Defendants have known or should have known of the '007 patent and its infringement since at least August 28, 2012.

50. On information and belief, the ASM Defendants indirectly infringe the '007 patent under 35 U.S.C. § 271(b) by actively and knowingly inducing others to make, use, sell,

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offer for sale, or import the Accused Products, including but not limited to the A412 batch vertical furnace system, that embody or use the inventions claimed in the '007 patent. At least this product, as provided by the ASM Defendants to their customers and used as intended and instructed, infringes the '007 patent. The ASM Defendants sold and/or offered for sale one or more of the Accused Products, including but not limited to the A412 batch vertical furnace system, and are continuing to do so, to customers with the specific intent to actively encourage them to use one or more of the Accused Products, including but not limited to the A412 batch vertical furnace system in the United States in a manner that the ASM Defendants know to be infringing.

51. For example, among other things, on information and belief, the ASM Defendants' acts of inducement include: providing the Accused Products to customers and intending them to make, use, offer to sell, sell, and/or import the Accused Products; advertising the Accused Products in the United States to encourage customers to use the patented invention of the '076 patent by operating the Accused Products in accordance with the ASM Defendants' specifications, installation materials, and instruction materials; and encouraging customers to communicate directly with the ASM Defendants' representatives and providing information about the Accused Products for purposes of customer support and training, technical assistance, design, product and part replacement, sales, and marketing of the Accused Products.

52. More specifically, the ASM Defendants "offer complete programs for all of [their] products" with "theory and hands-on sessions" that "assist [customers] until [they] become comfortable and confident with [their] wafer processing system." *See, e.g.*, ASM Customer Training, http://www.asm.com/support/customer-training (last visited Feb. 1, 2018). On information and belief, the ASM Defendants previously provided "product training classes" at ASM sites for the Accused Products. *See id.* For example, the A412 product training class has included "[i]nformal lectures, demonstrations and practical exercises" that provide customers "with an introduction and basic understanding of operating and maintaining the A412." *See*

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A412 Part 1 Equipment Training: Course Overview, https://training2.asm.com/training/include/desc/A412-P1.pdf (last visited Feb. 1, 2018); *see also* A412 Part 2 Equipment Training: Course Overview, https://training2.asm.com/training/include/desc/A412-P2.pdf (last visited Feb. 1, 2018).

53. In addition, on information and belief, the ASM Defendants also engage in extensive communications and onsite visits with customers in the course of selling and offering to sell the Accused Products. These communications and visits include, on information and belief, exchanging information with potential customers concerning their product needs and the capabilities of the Accused Products, as well as demonstrations of the Accused Products to assure the customer that the ASM Defendants' Accused Products meet the customer's technical specifications. These communications and visits also include, on information and belief, the installation of equipment at customer sites to facilitate evaluation of the Accused Products before, during, and/or after customers have made a purchase commitment. On information and belief, the ASM Defendants further support the installation of the Accused Products by having engineers and other representatives travel to a customer site or otherwise assist the customer to set-up the Accused Product and make them ready for use and operation. On information and belief, the ASM Defendants perform ongoing support and maintenance of the Accused Products at customer sites. On information and belief, the foregoing activities by the ASM Defendants result in the Accused Products being configured to perform and function in a manner that infringes HiKE's and KSEC's asserted patents.

54. Additionally, the ASM Defendants "offer a full range of support options worldwide" and "offer standard and tailored service and spares programs." *See* ASM Technical Service and Spares Support, http://www.asm.com/support/technical-service-and-spares-support (last visited Feb. 1, 2018). Such programs include the PerforMAX: Bank of Hours Program that provides customers "with a fixed number of 'banked' ASM service labor hours" to be used "for tasks such as repair and qualification, on-the-job training, tool relocation and preventative

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maintenance services" for the Accused Products (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-bank-of-hours-program); the PerforMAX: Engineer On-Site Program that provides "on-site operational and support expertise for your ASM equipment," including the Accused Products, by "measuring and managing system performance metrics, and sharing equipment and best-known wafer processing methods" (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-engineer-on-site-program); the PerforMAX: Full Service Program (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-full-service-program); the PerforMAX: Performance Maintenance Program that "enables [a customer] to become an expert in the services needed to deliver high productivity from [their] ASM processing equipment," including the Accused Products (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-performance-maintenance-program); the PerforMAX: Productivity Enhancement Program that "utilizes ASM field and factory expertise to perform site evaluations and to analyze [customers'] site and equipment performance" (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-productivity-enhancement-program); and the PerforMAX: Consumables Consignment Program that provides customers "with on-site stocking of genuine ASM consumable parts" (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-spares-programs). The ASM Defendants further provide customers with "Field Support Services" to meet "local service and support requirements" for the Accused Products at locations across the globe, including the U.S. *See* ASM Field Support Services, http://www.asm.com/support/field-support-services (last visited Feb. 1, 2018). Moreover, the ASM Defendants "offer equipment product performance upgrades" for the Accused Products to "extend the life and investment of [customers'] equipment." *See* ASM Product Performance Upgrade, http://www.asm.com/support/product-performance-upgrade (last visited Feb. 1, 2018).

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The ASM Defendants also actively and knowingly encourage customers to use one or more of the Accused Products by way of "product presentations and demonstrations" with opportunities to "evalut[e] equipment on site," thereby encouraging customers to "reach[] a sufficient level of confidence in the product's performance and compatibility with the customer's requirements to place an order." *See* ASM 2016 Statutory Annual Report at 98, http://www.asm.com/Downloads/2016_Statutory_annual_report.pdf (last visited Feb. 1, 2018). Further, the ASM Defendants maintain regional sales and service offices in the U.S., including the "Regional Sales/Service Office" located in San Jose, CA, for sale and service of the Accused Products. *See id.* at 176.

55. On information and belief, the ASM Defendants have also contributed to and/or are contributing to the infringement of the '007 patent by making, using, importing, offering for sale, and/or selling one or more of the Accused Products, including but not limited to the A412 batch vertical furnace system. The ASM Defendants have made and/or sold such products with knowledge that they are especially designed for use in a patented system and/or apparatus for use in a patented process and are not a staple article of commerce suitable for substantial non-infringing use. For example, among other things, on information and belief, the ASM Defendants actively and knowingly sell such products and provide customer support, installation and instruction material, and other documentation to customers for such products' use as a component of a patented system and/or apparatus for use in a patented process. On information and belief, the ASM Defendants' customers have used and continue to use such products in the United States in this manner and infringed the '007 patent.

56. Moreover, on information and belief, Defendant ASM International takes active steps to induce infringement of at least claim 1 the '007 patent by Defendant ASM America, knowing that those steps will induce, encourage, and facilitate direct infringement by Defendant ASM America. On information and belief, such active steps include, but are not limited to, manufacturing the Accused Products and their components, configuring the Accused Products

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and their components, providing Defendant ASM America with instructions on use of the Accused Products and their components, encouraging Defendant ASM America to make and/or use the Accused Products and their components, selling the Accused Product and their components. On information and belief, Defendant ASM International knew or should have known that such activities induce Defendant ASM America to infringe at least claim 1 of the '007 patent since at least August 28, 2012.

57. On information and belief, Defendant ASM International also contributes to the infringement of at least claim 1 of the '007 patent by Defendant ASM America. Acts by Defendant ASM International that contribute to the infringement by Defendant ASM American include providing the Accused Products, components, and related parts that comprise the substrate processing apparatus in the manner described above. The Accused Products, components, and related parts are especially adapted for use in the infringing products, and they have no substantial non-infringing uses. On information and belief, Defendant ASM International knew or should have known that such activities contribute to Defendant ASM America's infringement of at least claim 1 of the '007 patent since at least August 28, 2012.

58. As a result of the ASM Defendants' infringement of the '007 patent, HiKE has suffered and continues to suffer damages. HiKE is entitled to recover from the ASM Defendants the damages adequate to compensate for such infringement in an amount to be determined at trial.

59. The ASM Defendants' acts of infringement of the '007 patent herein have been committed and are being committed with full knowledge of HiKE's rights in the patent. On information and belief, the ASM Defendants have acted and are continuing to act despite knowing that their actions constituted direct and/or indirect infringement of a valid patent, and they knew or should have known of this infringement since at least at least August 28, 2012. The ASM Defendants' acts constitute willful and deliberate infringement, entitling HiKE to enhanced damages under 35 U.S.C. § 284 and reasonable attorneys' fees and costs because this

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is an exceptional case under 35 U.S.C. § 285.

60. The ASM Defendants' acts of infringement have caused and will continue to cause irreparable harm to HiKE for which there is no adequate remedy at law, thereby entitling HiKE to injunctive relief.

COUNT THREE

(Infringement of U.S. Patent No. 6,514,869)

61. Plaintiffs incorporate by reference and re-allege Paragraphs 1–60 of their Complaint, as if fully set forth herein.

62. On February 4, 2003, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 6,514,869 ("the '869 patent"), which is titled "Method for Use in Manufacturing a Semiconductor Device" and attached hereto as Exhibit D.

63. The '869 patent relates to a semiconductor device manufacturing method for processing a plurality of substrates by alternately repeating a pretreatment stage and a continuous substrate processing stage. *See* Ex. D, '869 patent at Abstract.

64. The '869 patent has been assigned to HiKE. HiKE holds all right, title, and interest in the '869 patent, including the right to collect and receive damages for past, present, and future infringement of the '869 patent.

65. The ASM Defendants have infringed and continue to infringe the '869 patent in this District and throughout the United States by making, using, importing, selling, and/or offering for sale one or more of the Accused Products, including but not limited to the ASM Defendants' Pulsar XP ALD system, EmerALD XP ALD system, Eagle XP8 PEALD system, and Dragon XP8 PECVD system products. The ASM Defendants have infringed and are currently infringing literally and/or under the doctrine of equivalents. To the extent that the ASM Defendants may argue that the Accused Products do not perform one or more of the steps recited in the method claim asserted from the '869 patent, then, based on information and belief,

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the ASM Defendants are responsible as direct infringers for the performance of the method steps by customers involved in the process of performing the semiconductor device manufacturing method because the ASM Defendants direct or control the performance of the customers and/or because the ASM Defendants formed a joint enterprise with the customers for the purpose of making the semiconductor device. For example, to the extent that the ASM Defendants argue they do not load a substrate on a heater unit, process the loaded substrate, unload the processed substrate, or otherwise process a plurality of substrates, then, based on information and belief, the ASM Defendants are liable for customers' performance of these steps because the ASM Defendants have either contracted with customers to perform such method steps, or the ASM Defendants otherwise control customers' performance of such steps through an agency and/or corporate relationship or through the existence of a joint enterprise for the purpose of making the semiconductor device.

66. For example, the ASM Defendants' Pulsar XP ALD system, EmerALD XP ALD system, Eagle XP8 PEALD system, and Dragon XP8 PECVD system products contain each element of and infringe at least claim 1 of the '869 patent, which recites the following:

> 1. A semiconductor device manufacturing method for processing a plurality of substrates by alternately repeating a pretreatment stage and a continuous substrate processing stage, wherein the continuous substrate processing stage comprises the steps of:
>
> loading a substrate on a heater unit located at a substrate loading/unloading position, the heater unit supporting and heating the substrate;
>
> processing the loaded substrate after transferring the heater unit having thereon the loaded substrate to a substrate processing position;
>
> unloading the processed substrate; and
>
> repeating the loading step, the processing step and the unloading step until a set of substrates are processed, and
>
> wherein the pretreatment stage is carried out by maintaining the heater unit between the substrate loading/unloading position and the substrate processing position.

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67. On information and belief, the use of the ASM Defendants' semiconductor manufacturing devices such as Pulsar XP ALD system, EmerALD XP ALD system, Eagle XP8 PEALD system, and Dragon XP8 PECVD system products (shown below), infringe at least claim 1 of the '869 patent, by processing a plurality of substrates by alternately repeating a pretreatment stage and a continuous substrate processing stage. For example, on information and belief, the Pulsar XP ALD product (shown below) "works by exposing the heated wafer to controlled pulses of process gases." *See, e.g.*, Pulsar XP ALD, ASM, http://www.asm.com/solutions/products/atomic-layer-deposition-products/pulsar-xp-ald (last visited Feb. 6, 2018); *see also* EmerALD XP ALD, ASM, http://www.asm.com/solutions/products/atomic-layer-deposition-products/emerald-xp-ald; *see also* Dragon XP8 PECVD, ASM, http://www.asm.com/solutions/products/plasma-enhanced-chemical-vapor-deposition/dragon-xp8; Eagle XP8 PEALD, ASM, http://www.asm.com/solutions/products/plasma-enhanced-ald/eagle-xp8-peald ("The Eagle® XP8 is the highest throughput single wafer PEALD tool in the industry.").

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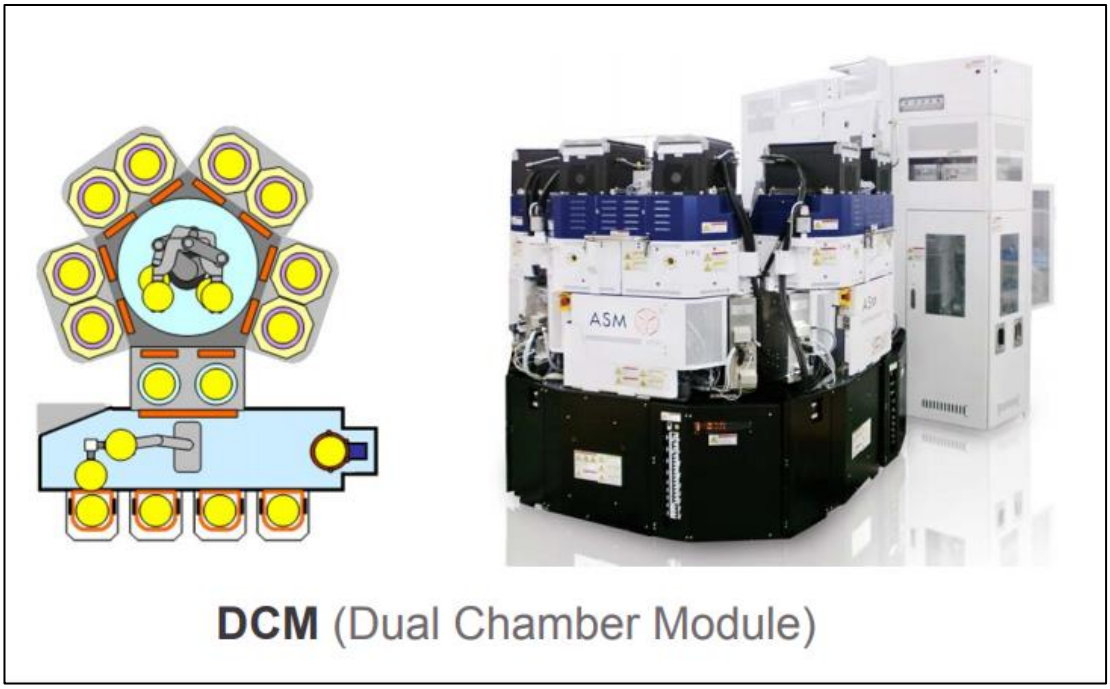
68. On information and belief, the ASM Defendants' Pulsar XP ALD system, EmerALD XP ALD system, Eagle XP8 PEALD system, and Dragon XP8 PECVD system products' continuous processing stage includes at least the steps of: (a) loading a substrate on a heater unit located at a substrate loading/unloading position, the heater unit supporting and heating the substrate; (b) processing the loaded substrate after transferring the heater unit having the loaded substrate to a substrate processing position; (c) unloading the processed substrate; and repeating steps (a)-(c) until a set of substrates are processed. For example, on information and belief, "[a] central robot is designed to move two wafers simultaneously to dual chamber modules" in the XP8 system. *See* Plasma Enhanced Atomic Layer Deposition – Products, ASM, http://www.asm.com/solutions/products/plasma-enhanced-ald (last visited Feb. 3, 2018); *see also* Plasma Enhanced Chemical Vapor Deposition – Products, ASM, http://www.asm.com/solutions/products/plasma-enhanced-chemical-vapor-deposition (last visited Feb. 3, 2018) ("A central robot designed to move two wafers simultaneously to Dual Chamber Modules (DCM) makes XP8 the highest-productivity single-wafer process tool in the industry.").



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See Enabling Advanced Wafer Processing with New Materials, ASM International: Analyst and Investor Technology Seminar at 13 (July 11, 2017), http://www.asm.com/Downloads/20170711%20ASMI%20Investor%20Technology%20Seminar%20presentation%20July%2011%202017%20revREL.pdf (last visited Feb. 4, 2018).

69. Additionally, on information and belief, in the ASM Defendants' Pulsar XP ALD system, EmerALD XP ALD system, Eagle XP8 PEALD system, and Dragon XP8 PECVD system products, a heating unit, including, for example, a susceptor, which supports and heats the substrate, is moved vertically from an initial loading/unloading position to a second position where the substrate is processed, *i.e.*, a processing position. Thereafter, on information and belief, the substrate is unloaded from the heating unit. On information and belief, a pretreatment stage occurs when the heating unit is maintained between the initial loading/unloading position and the processing position. For example, on information and belief, "[t]he XP8 incorporates eight process chambers in a compact configuration around one central handling platform" where "[t]wo wafers are moved simultaneously into DCM, or dual chamber modules, which generally doubles the throughput compared to single wafer movements." *See* ASMI Statutory Annual Report 2016 at 31, http://www.asm.com/Downloads/2016_Statutory_annual_report.pdf (last visited Feb. 4, 2018). Additionally, on information and belief, the ASM Defendants' Pulsar XP ALD system and EmerALD XP ALD system products are part of the ASM Defendants' "Thermal Product Line." *See* Product Lines: Thermal, ASM, http://www.asm.com/en/careers/discover-asm/product-lines ("Our Thermal business unit consists of three product lines – Atomic Layer Deposition (ALD), Epitaxy technology and CVD Diffusion technology.") (last visited Feb. 6, 2018).

70. On information and belief, the ASM Defendants have known or should have known of the '869 patent and its infringement since at least July 10, 2012.

71. On information and belief, the ASM Defendants indirectly infringe the '869 patent under 35 U.S.C. § 271(b) by actively and knowingly inducing others to make, use, sell,

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offer for sale, or import the Accused Products, including but not limited to the ASM Defendants' Pulsar XP ALD system, EmerALD XP ALD system, Eagle XP8 PEALD system, and Dragon XP8 PECVD system products, that embody or use the inventions claimed in the '869 patent. At least the ASM Defendants' Pulsar XP ALD system, EmerALD XP ALD system, Eagle XP8 PEALD system, and Dragon XP8 PECVD system products, as provided by the ASM Defendants to their customers and used as intended and instructed, infringe the '869 patent. The ASM Defendants sold and/or offered for sale one or more of the Accused Products, including but not limited to the ASM Defendants' Pulsar XP ALD system, EmerALD XP ALD system, Eagle XP8 PEALD system, and Dragon XP8 PECVD system products, and are continuing to do so, to customers with the specific intent to actively encourage them to use one or more of the Accused Products, including but not limited to the ASM Defendants' Pulsar XP ALD system, EmerALD XP ALD system, Eagle XP8 PEALD system, and Dragon XP8 PECVD system products in the United States in a manner that the ASM Defendants know to be infringing.

72. For example, among other things, on information and belief, the ASM Defendants' acts of inducement include: providing the Accused Products to customers and intending them to use the Accused Products to practice the claimed method; advertising the Accused Products in the United States to encourage customers to use the patented invention of the '869 patent by operating the Accused Products in accordance with the ASM Defendants' specifications, installation materials, and instruction materials; and encouraging customers to communicate directly with the ASM Defendants' representatives and providing information about the Accused Products for purposes of customer support and training, technical assistance, design, product and part replacement, sales, and marketing of the Accused Products.

73. More specifically, the ASM Defendants "offer complete programs for all of [their] products" with "theory and hands-on sessions" that "assist [customers] until [they] become comfortable and confident with [their] wafer processing system." *See, e.g.*, ASM Customer Training, http://www.asm.com/support/customer-training (last visited Feb. 1, 2018).

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On information and belief, the ASM Defendants previously provided "product training classes" at ASM sites for the Accused Products. *See id.* For example, the XP8 product training class has included "[i]nformal lectures, demonstrations and practical exercises" that provide customers with "in-depth coverage and hands-on practice in learning the individual functions associated with XP8™ system user interface." *See* ASM XP8 Part 1 Maintenance Training: Course Overview, https://training2.asm.com/training/include/desc/XP8-Part1.pdf (last visited Feb. 1, 2018); *see also* ASM XP8 Part 2 Maintenance Training: Course Overview, https://training2.asm.com/training/include/desc/XP8-Part2.pdf (last visited Feb. 1, 2018). Additionally, on information and belief, the Pulsar XP ALD product training class has included "[i]nformal lectures, demonstrations and practical exercises" that provide customers with "an intermediate understanding on operating and maintaining the Pulsar® P3000." *See* ASM Pulsar® P3000 Part 1/2 Equipment Training: Course Overview, https://training2.asm.com/training/include/desc/PulsarXP-P1-P2.pdf (last visited Feb. 15, 2018); *see also* ASM EmerALD Training Course Overview, https://training2.asm.com/training/include/desc/EmerALD-P1-P2.pdf (last visited Feb. 15, 2018);

74. In addition, on information and belief, the ASM Defendants also engage in extensive communications and onsite visits with customers in the course of selling and offering to sell the Accused Products. These communications and visits include, on information and belief, exchanging information with potential customers concerning their product needs and the capabilities of the Accused Products, as well as demonstrations of the Accused Products to assure the customer that the ASM Defendants' Accused Products meet the customer's technical specifications. These communications and visits also include, on information and belief, the installation of equipment at customer sites to facilitate evaluation of the Accused Products before, during, and/or after customers have made a purchase commitment. On information and belief, the ASM Defendants further support the installation of the Accused Products by having engineers and other representatives travel to a customer site or otherwise assist the customer to

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set-up the Accused Product and make them ready for use and operation. On information and belief, the ASM Defendants perform ongoing support and maintenance of the Accused Products at customer sites. On information and belief, the foregoing activities by the ASM Defendants result in the Accused Products being configured to perform and function in a manner that infringes HiKE's and KSEC's asserted patents.

75. Additionally, the ASM Defendants "offer a full range of support options worldwide" and "offer standard and tailored service and spares programs." *See* ASM Technical Service and Spares Support, http://www.asm.com/support/technical-service-and-spares-support (last visited Feb. 1, 2018). Such programs include the PerforMAX: Bank of Hours Program that provides customers "with a fixed number of 'banked' ASM service labor hours" to be used "for tasks such as repair and qualification, on-the-job training, tool relocation and preventative maintenance services" for the Accused Products (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-bank-of-hours-program); the PerforMAX: Engineer On-Site Program that provides "on-site operational and support expertise for your ASM equipment," including the Accused Products, by "measuring and managing system performance metrics, and sharing equipment and best-known wafer processing methods" (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-engineer-on-site-program); the PerforMAX: Full Service Program (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-full-service-program); the PerforMAX: Performance Maintenance Program that "enables [a customer] to become an expert in the services needed to deliver high productivity from [their] ASM processing equipment," including the Accused Products (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-performance-maintenance-program); the PerforMAX: Productivity Enhancement Program that "utilizes ASM field and factory expertise to perform site evaluations and to analyze [customers'] site and equipment performance" (*see*

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http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-productivity-enhancement-program); and the PerforMAX: Consumables Consignment Program that provides customers "with on-site stocking of genuine ASM consumable parts" (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-spares-programs). The ASM Defendants further provide customers with "Field Support Services" to meet "local service and support requirements" for the Accused Products at locations across the globe, including the U.S. *See* ASM Field Support Services, http://www.asm.com/support/field-support-services (last visited Feb. 1, 2018). Moreover, the ASM Defendants "offer equipment product performance upgrades" for the Accused Products to "extend the life and investment of [customers'] equipment." *See* ASM Product Performance Upgrade, http://www.asm.com/support/product-performance-upgrade (last visited Feb. 1, 2018). The ASM Defendants also actively and knowingly encourage customers to use one or more of the Accused Products by way of "product presentations and demonstrations" with opportunities to "evalut[e] equipment on site," thereby encouraging customers to "reach[] a sufficient level of confidence in the product's performance and compatibility with the customer's requirements to place an order." *See* ASM 2016 Statutory Annual Report at 98, http://www.asm.com/Downloads/2016_Statutory_annual_report.pdf (last visited Feb. 1, 2018). Further, the ASM Defendants maintain regional sales and service offices in the U.S., including the "Regional Sales/Service Office" located in San Jose, CA, for sale and service of the Accused Products. *See id.* at 176.

76. On information and belief, the ASM Defendants have also contributed to and/or are contributing to the infringement of the '869 patent by making, using, importing, offering for sale, and/or selling one or more of the Accused Products, including but not limited to the Pulsar XP ALD system, EmerALD XP ALD system, Eagle XP8 PEALD system, and Dragon XP8 PECVD system products. The ASM Defendants have made and/or sold such products with knowledge that they are especially designed for use in a patented system and/or apparatus for use

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in a patented process and are not a staple article of commerce suitable for substantial non-infringing use. For example, among other things, on information and belief, the ASM Defendants actively and knowingly sell such products and provide customer support, installation and instruction material, and other documentation to customers for such products' use as a component of a patented system and/or apparatus for use in a patented process. On information and belief, the ASM Defendants' customers have used and continue to use such products in the United States in this manner and infringed the '869 patent.

77. Moreover, on information and belief, Defendant ASM International takes active steps to induce infringement of at least claim 1 the '869 patent by Defendant ASM America, knowing that those steps will induce, encourage, and facilitate direct infringement by Defendant ASM America. On information and belief, Defendant ASM International directs or controls Defendant ASM America's performance of claimed steps by taking active steps that include, but are not limited to, instructing Defendant ASM American to use the Accused Product, manufacturing the Accused Products and their components, configuring the Accused Products and their components, providing Defendant ASM America with instructions on use of the Accused Products and their components, encouraging Defendant ASM America to make and/or use the Accused Products and their components, selling the Accused Product and their components. On information and belief, the benefit to Defendant ASM America is a product to sell to customers for profit, and Defendant ASM International conditions Defendant ASM America's receipt of the product and subsequent sale to customers on taking steps of the claimed method. On information and belief, Defendant ASM International knew or should have known that such activities induce Defendant ASM America to infringe at least claim 1 of the '869 patent since at least July 10, 2012.

78. On information and belief, Defendant ASM International also contributes to the infringement of at least claim 1 of the '869 patent by Defendant ASM America. Acts by Defendant ASM International that contribute to the infringement by Defendant ASM American

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include providing the Accused Products, components, and related parts for performing the claimed method in the manner described above. The Accused Products, components, and related parts are especially adapted for the infringing process, and they have no substantial non-infringing uses. On information and belief, Defendant ASM International knew or should have known that such activities contribute to Defendant ASM America's infringement of at least claim 1 of the '869 patent since at least July 10, 2012.

79. As a result of the ASM Defendants' infringement of the '869 patent, HiKE has suffered and continues to suffer damages. HiKE is entitled to recover from the ASM Defendants the damages adequate to compensate for such infringement in an amount to be determined at trial.

80. The ASM Defendants' acts of infringement of the '869 patent herein have been committed and are being committed with full knowledge of HiKE's rights in the patent. On information and belief, the ASM Defendants have acted and are continuing to act despite knowing that their actions constituted direct and/or indirect infringement of a valid patent, and they knew or should have known of this infringement since at least July 10, 2012. The ASM Defendants' acts constitute willful and deliberate infringement, entitling HiKE to enhanced damages under 35 U.S.C. § 284 and reasonable attorneys' fees and costs because this is an exceptional case under 35 U.S.C. § 285.

81. The ASM Defendants' acts of infringement have caused and will continue to cause irreparable harm to HiKE for which there is no adequate remedy at law, thereby entitling HiKE to injunctive relief.

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COUNT FOUR

(Infringement of U.S. Patent No. 6,783,627)

82. Plaintiffs incorporate by reference and re-allege Paragraphs 1–81 of their Complaint, as if fully set forth herein.

83. On August 31, 2004, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 6,783,627 ("the '627 patent"), which is titled "Reactor with Remote Plasma System and Method of Processing a Semiconductor Substrate" and attached hereto as Exhibit E.

84. The '627 patent relates to a processing reactor having a housing including a cover, a gas injector supported in the cover, and in which chemical reactants are excited prior to injection into the reactor's processing chamber to provide better control of the substrate processing conditions and, further, to enable new semiconductor device applications. *See* Ex. E, '627 patent at 1:8-15, claim 11.

85. The '627 patent has been assigned to KSEC. KSEC holds all right, title, and interest in the '627 patent, including the right to collect and receive damages for past, present, and future infringement of the '627 patent.

86. The ASM Defendants have infringed and continue to infringe the '627 patent in this District and throughout the United States by making, using, importing, selling, and/or offering for sale one or more of the Accused Products, including but not limited to the XP8 system and EmerALD XP products. The ASM Defendants have infringed and are currently infringing literally and/or under the doctrine of equivalents.

87. For example, the ASM Defendants' XP8 system and EmerALD XP products contain each element of and infringe at least claim 11 of the '627 patent, which recites the following:

11. A reactor for processing a semiconductor substrate, said reactor comprising:

a reactor housing defining a processing chamber and being adapted to support the

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substrate in said processing chamber;

a plasma generator for ionizing at least one gas into a gas plasma;

at least one gas injector, said gas injector being adapted to inject the ionized gas into said processing chamber and onto the substrate supported therein for processing the substrate, wherein said housing includes a cover, said gas injector being supported in said cover, said gas injector including a plurality of orifices through which the ionized gas is delivered into said processing chamber.

88. On information and belief, the XP8 system (shown below as Eagle XP8 and Dragon XP8) and EmerALD XP (shown below) products are reactors for processing a semiconductor substrate that include a reactor housing adapted to support the substrate in the processing chamber. For example, on information and belief, the XP8 system products are plasma enhanced CVD and ALD tools. *See, e.g.*, Enabling Advanced Wafer Processing with New Materials, ASM International: Analyst and Investor Technology Seminar at 13 (July 11, 2017), http://www.asm.com/Downloads/20170711%20ASMI%20Investor%20Technology%20Seminar%20presentation%20July%2011%202017%20revREL.pdf (last visited Feb. 4, 2018) (discussing XP8 and stating "PEALD and PECVD can be integrated on the same platform); Dragon XP8 PECVD, ASM, http://www.asm.com/solutions/products/plasma-enhanced-chemical-vapor-deposition/dragon-xp8 ("Dragon XP8 is the highest throughput single wafer PECVD tool in the industry."); Eagle XP8 PEALD, ASM, http://www.asm.com/solutions/products/plasma-enhanced-ald/eagle-xp8-peald ("The Eagle® XP8 is the highest throughput single wafer PEALD tool in the industry."). On information and belief, "[a] central robot is designed to move two wafers simultaneously to dual chamber modules" in the XP8 system. *See* Plasma Enhanced Atomic Layer Deposition – Products, ASM, http://www.asm.com/solutions/products/plasma-enhanced-ald (last visited Feb. 3, 2018); *see also* Plasma Enhanced Chemical Vapor Deposition – Products, ASM, http://www.asm.com/solutions/products/plasma-enhanced-chemical-vapor-deposition (last visited Feb. 3, 2018) ("A central robot designed to move two wafers

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simultaneously to Dual Chamber Modules (DCM) makes XP8 the highest-productivity single-wafer process tool in the industry."). Additionally, on information and belief, "EmerALD XP is a process module designed to deposit thin conformal metal and dielectric layers by atomic layer deposition (ALD)." *See* EmerALD XP ALD, ASM, http://www.asm.com/solutions/products/atomic-layer-deposition-products/emerald-xp-ald (last visited Feb. 3, 2018).

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89. On information and belief, the XP8 system and EmerALD XP products have a plasma generator for ionizing at least one gas into a gas plasma and at least one gas injector, which is adapted to inject the ionized gas into the processing chamber and onto the substrate that is supported in the chamber for processing. For example, on information and belief, the ASM Defendants' XP8 system product known as the Dragon XP8 uses "one or more gaseous reactants . . . to form a solid insulating or conducting layer on the surface of a wafer," and the layer "is then enhanced by the use of a vapor containing electrically-charged particles or plasma, at lower temperatures." *See* Plasma-Enhanced Chemical Vapor Deposition, ASM, http://www.asm.com/technology/key-technologies/plasma-enhanced-chemical-vapor-deposition (last visited Feb. 3, 2018); *see also* Plasma Enhanced Chemical Vapor Deposition – Products, ASM, http://www.asm.com/solutions/products/plasma-enhanced-chemical-vapor-deposition ("Our Plasma Enhanced Chemical Vapor Deposition product is the Dragon® XP8."). As another example, on information and belief, the ASM Defendants' XP8 system product known as the Eagle XP8 "makes use of cycling an RF-plasma to create the necessary chemical reactions in a highly controlled manner," plus "the ability to control the tuning of the film properties and a capability for pre- and post-deposition in-situ treatments." *See* Plasma-Enhanced Atomic Layer

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Deposition, ASM, http://www.asm.com/technology/key-technologies/plasma-enhanced-atomic-layer-deposition (last visited Feb. 3, 2018); *see also* Plasma Enhanced Atomic Layer Deposition – Products, ASM, http://www.asm.com/solutions/products/plasma-enhanced-ald/eagle-xp8-peald (last visited Feb. 3, 2018) ("Our Plasma Enhanced Atomic Layer Deposition product is the Eagle® XP8."). On information and belief, the EmerALD product "also has a remote plasma chamber clean capability which for many processes allows the option of maintaining chamber performance for longer periods between chamber cleans resulting in higher uptime." *See* EmerALD XP ALD, ASM, http://www.asm.com/solutions/products/atomic-layer-deposition-products/emerald-xp-ald (last visited Feb. 3, 2018). Moreover, on information and belief, the EmerALD product offers "[d]irect and remote plasma to provide extended process control capabilities," as well as "[i]n-situ chamber clean." *Id.*

90. On information and belief, the housing in the XP8 system and EmerALD XP products include a cover in which the gas injector is supported, and the gas injector includes a plurality of orifices through which the ionized gas is delivered into the processing chamber. *See, e.g.*, Enabling Advanced Wafer Processing with New Materials, ASM, Semicon West: Analyst and Investor Technology Seminar at 10 (July 11, 2017), http://www.asm.com/Downloads/20170711%20ASMI%20Investor%20Technology%20Seminar%20presentation%20July%2011%202017%20revREL.pdf (last visited Feb. 3, 2018) (noting the EmerALD XP's "[s]howerhead reactor"); *see also* EmerALD XP ALD, ASM, http://www.asm.com/solutions/products/atomic-layer-deposition-products/emerald-xp-ald (last visited Feb. 7, 2018) ("The EmerALD reactor chamber uses a showerhead-process gas distribution method to assure uniform gas delivery to the wafer surface. EmerALD also has a remote plasma chamber clean capability which for many processes allows the option of maintaining chamber performance for longer periods between chamber cleans resulting in higher uptime.").

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91. The ASM Defendants have been aware of the '627 patent and its infringement since at least the filing of this Complaint.

92. On information and belief, the ASM Defendants indirectly infringe the '627 patent under 35 U.S.C. § 271(b) by actively and knowingly inducing others to make, use, sell, offer for sale, or import the Accused Products, including but not limited to the XP8 system and EmerALD XP products, that embody or use the inventions claimed in the '627 patent. At least these products, as provided by the ASM Defendants to their customers and used as intended and instructed, infringe the '627 patent. The ASM Defendants sold and/or offered for sale one or more of the Accused Products, including but not limited to the XP8 system and EmerALD XP products, and are continuing to do so, to customers with the specific intent to actively encourage them to use one or more of the Accused Products, including but not limited to the XP8 system and EmerALD XP products in the United States in a manner that the ASM Defendants know to be infringing.

93. For example, among other things, on information and belief, the ASM Defendants' acts of inducement include: providing the Accused Products to customers and intending them to make, use, offer to sell, sell, and/or import the Accused Products; advertising the Accused Products in the United States to encourage customers to use the patented invention of the '627 patent by operating the Accused Products in accordance with the ASM Defendants' specifications, installation materials, and instruction materials; and encouraging customers to communicate directly with the ASM Defendants' representatives and providing information about the Accused Products for purposes of customer support and training, technical assistance, design, product and part replacement, sales, and marketing of the Accused Products.

94. More specifically, the ASM Defendants "offer complete programs for all of [their] products" with "theory and hands-on sessions" that "assist [customers] until [they] become comfortable and confident with [their] wafer processing system." *See, e.g.*, ASM Customer Training, http://www.asm.com/support/customer-training (last visited Feb. 1, 2018).

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On information and belief, the ASM Defendants previously provided "product training classes" at ASM sites for the Accused Products. *See id.* For example, the XP8 product training class has included "[i]nformal lectures, demonstrations and practical exercises" that provide customers with "in-depth coverage and hands-on practice in learning the individual functions associated with XP8™ system user interface." *See* ASM XP8 Part 1 Maintenance Training: Course Overview, https://training2.asm.com/training/include/desc/XP8-Part1.pdf (last visited Feb. 1, 2018); *see also* ASM XP8 Part 2 Maintenance Training: Course Overview, https://training2.asm.com/training/include/desc/XP8-Part2.pdf (last visited Feb. 1, 2018); EmerALD Part 1/Part 2 Equipment Training: Course Overview, https://training2.asm.com/training/include/desc/EmerALD-P1-P2.pdf (last visited Feb. 1, 2018).

95. In addition, on information and belief, the ASM Defendants also engage in extensive communications and onsite visits with customers in the course of selling and offering to sell the Accused Products. These communications and visits include, on information and belief, exchanging information with potential customers concerning their product needs and the capabilities of the Accused Products, as well as demonstrations of the Accused Products to assure the customer that the ASM Defendants' Accused Products meet the customer's technical specifications. These communications and visits also include, on information and belief, the installation of equipment at customer sites to facilitate evaluation of the Accused Products before, during, and/or after customers have made a purchase commitment. On information and belief, the ASM Defendants further support the installation of the Accused Products by having engineers and other representatives travel to a customer site or otherwise assist the customer to set-up the Accused Product and make them ready for use and operation. On information and belief, the ASM Defendants perform ongoing support and maintenance of the Accused Products at customer sites. On information and belief, the foregoing activities by the ASM Defendants result in the Accused Products being configured to perform and function in a manner that infringes HiKE's and KSEC's asserted patents.

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96. Additionally, the ASM Defendants "offer a full range of support options worldwide" and "offer standard and tailored service and spares programs." *See* ASM Technical Service and Spares Support, http://www.asm.com/support/technical-service-and-spares-support (last visited Feb. 1, 2018). Such programs include the PerforMAX: Bank of Hours Program that provides customers "with a fixed number of 'banked' ASM service labor hours" to be used "for tasks such as repair and qualification, on-the-job training, tool relocation and preventative maintenance services" for the Accused Products (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-bank-of-hours-program); the PerforMAX: Engineer On-Site Program that provides "on-site operational and support expertise for your ASM equipment," including the Accused Products, by "measuring and managing system performance metrics, and sharing equipment and best-known wafer processing methods" (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-engineer-on-site-program); the PerforMAX: Full Service Program (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-full-service-program); the PerforMAX: Performance Maintenance Program that "enables [a customer] to become an expert in the services needed to deliver high productivity from [their] ASM processing equipment," including the Accused Products (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-performance-maintenance-program); the PerforMAX: Productivity Enhancement Program that "utilizes ASM field and factory expertise to perform site evaluations and to analyze [customers'] site and equipment performance" (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-service-programs/performax-productivity-enhancement-program); and the PerforMAX: Consumables Consignment Program that provides customers "with on-site stocking of genuine ASM consumable parts" (*see* http://www.asm.com/support/technical-service-and-spares-support/performax-spares-programs). The ASM Defendants further provide customers with

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"Field Support Services" to meet "local service and support requirements" for the Accused Products at locations across the globe, including the U.S. *See* ASM Field Support Services, http://www.asm.com/support/field-support-services (last visited Feb. 1, 2018). Moreover, the ASM Defendants "offer equipment product performance upgrades" for the Accused Products to "extend the life and investment of [customers'] equipment." *See* ASM Product Performance Upgrade, http://www.asm.com/support/product-performance-upgrade (last visited Feb. 1, 2018). The ASM Defendants also actively and knowingly encourage customers to use one or more of the Accused Products by way of "product presentations and demonstrations" with opportunities to "evalut[e] equipment on site" in order to encourage customers to "reach[] a sufficient level of confidence in the product's performance and compatibility with the customer's requirements to place an order." *See* ASM 2016 Statutory Annual Report at 98, http://www.asm.com/Downloads/2016_Statutory_annual_report.pdf (last visited Feb. 1, 2018). Further, the ASM Defendants maintain regional sales and service offices in the U.S., including the "Regional Sales/Service Office" located in San Jose, CA, for sale and service of the Accused Products. *See id.* at 176.

97. On information and belief, the ASM Defendants have also contributed to and/or are contributing to the infringement of the '627 patent by making, using, importing, offering for sale, and/or selling one or more of the Accused Products, including but not limited to the XP8 system and EmerALD XP products. The ASM Defendants have made and/or sold such products with knowledge that they are especially designed for use in a patented system and/or apparatus for use in a patented process and are not a staple article of commerce suitable for substantial non-infringing use. For example, among other things, on information and belief, the ASM Defendants actively and knowingly sell such products and provide customer support, installation and instruction material, and other documentation to customers for such products' use as a component of a patented system and/or apparatus for use in a patented process. On information and belief, the ASM Defendants' customers have used and continue to use such products in the

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United States in this manner and infringed the ’627 patent.

98. Moreover, on information and belief, Defendant ASM International takes active steps to induce infringement of at least claim 11 the ’627 patent by Defendant ASM America, knowing that those steps will induce, encourage, and facilitate direct infringement by Defendant ASM America. On information and belief, such active steps include, but are not limited to, manufacturing the Accused Products and their components, configuring the Accused Products and their components, providing Defendant ASM America with instructions on use of the Accused Products and their components, encouraging Defendant ASM America to make and/or use the Accused Products and their components, selling the Accused Product and their components. On information and belief, Defendant ASM International knew or should have known that such activities induce Defendant ASM America to infringe at least claim 11 of the ’627 patent at least the filing of this Complaint.

99. On information and belief, Defendant ASM International also contributes to the infringement of at least claim 11 of the ’627 patent by Defendant ASM America. Acts by Defendant ASM International that contribute to the infringement by Defendant ASM American include providing the Accused Products, components, and related parts that comprise the substrate processing apparatus in the manner described above. The Accused Products, components, and related parts are especially adapted for use in the infringing products, and they have no substantial non-infringing uses. On information and belief, Defendant ASM International knew or should have known that such activities contribute to Defendant ASM America’s infringement of at least claim 11 of the ’627 patent at least the filing of this Complaint.

100. As a result of the ASM Defendants’ infringement of the ’627 patent, KSEC has suffered and continues to suffer damages. KSEC is entitled to recover from the ASM Defendants the damages adequate to compensate for such infringement in an amount to be determined at trial.

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101. The ASM Defendants' acts of infringement of the '627 patent herein have been committed and are being committed with full knowledge of KSEC's rights in the patent. On information and belief, the ASM Defendants have acted and are continuing to act despite knowing that their actions constituted direct and/or indirect infringement of a valid patent, and they knew or should have known of this infringement since at least the filing of this Complaint. The ASM Defendants' acts constitute willful and deliberate infringement, entitling KSEC to enhanced damages under 35 U.S.C. § 284 and reasonable attorneys' fees and costs because this is an exceptional case under 35 U.S.C. § 285.

102. The ASM Defendants' acts of infringement have caused and will continue to cause irreparable harm to KSEC for which there is no adequate remedy at law, thereby entitling KSEC to injunctive relief.

PRAYER FOR RELIEF

Wherefore, Defendants respectfully requests the following relief:

A. That this Court adjudge and decree that the ASM Defendants have infringed, directly and/or indirectly, the Asserted Patents;

B. That this Court adjudge and decree that the ASM Defendants' infringement of the Asserted patents has been willful;

C. Damages to compensate HiKE and KSEC for the ASM Defendants' infringement pursuant to 35 U.S.C. § 284 in an amount to be determined at trial;

D. Damages for post-trial, pre-judgment infringement by the ASM Defendants;

E. Pre-judgment interest on all amounts awarded and post-judgment interest at the maximum lawful rate;

F. Enhanced damages against the ASM Defendants in accordance with 35 U.S.C. § 284;

G. That this Court permanently enjoin the ASM Defendants and their officers, agents, servants, employees, attorneys and all persons acting in concert or participation with the

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ASM Defendants who receive actual notice of the Court's order from directly or indirectly making, using, selling, or offering to sell in the United States or importing into the United States any product that embodies or practices one or more claims of the Asserted patents, or attempting, causing, or assisting any of the aforementioned acts;

H. Alternatively, that this Court award HiKE and KSEC damages for the ASM Defendants' post-judgment infringement;

I. That this case be declared as exceptional under 35 U.S.C. § 285 and that HiKE and KSEC be awarded their reasonable attorneys' fees and costs in this action;

J. That HiKE and KSEC be awarded their costs and disbursements in this action; and

K. That HiKE and KSEC be granted such other and further relief as this Court deems just and proper.

DEMAND FOR JURY TRIAL

Pursuant to Rule 38 of the Federal Rules of Civil Procedure, HiKE and KSEC demand a trial by jury as to all issues so triable.

DATED this 20th day of February, 2018.

Respectfully submitted,

STOLL STOLL BERNE LOKTING & SHLACHTER P.C.

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