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Attorney for Plaintiff Cyber Instruments Technology, L.L.C.

UNITED STATES DISTRICT COURT

DISTRICT OF ARIZONA

Cyber Instruments Technology, L.L.C., an Arizona limited liability company, Plaintiff, v. Brooks Instrument, L.L.C., a Delaware limited liability company, Defendant.	Case No. _____ **COMPLAINT FOR PATENT INFRINGEMENT** (Jury Trial Requested)

Plaintiff Cyber Instruments Technology, LLC ("Cyber") hereby alleges against Brooks Instrument, LLC ("Brooks"):

I. THE PARTIES

1. Plaintiff Cyber Instruments Technology, LLC is an Arizona limited liability company with its principal place of business at 4920 West Dream Weaver Lane, Prescott, AZ 86305.

2. On information and belief, Brooks Instrument, LLC is a Delaware limited liability company having its principal place of business at 407 West Vine

Street, Hatfield, PA 19440. Brooks is a wholly owned subsidiary of Illinois Tool Works Inc., a Delaware corporation having its principal place of business at 155 Harlem Avenue, Glenview, IL 60025 ("ITW").

3. Cyber is the assignee of all right, title and interest in and to United States Patent No. 6,119,710 (the "'710 Patent") entitled "Method for Wide Range Gas Flow with Real Time Flow Measurement and Correction."

4. Cyber has the sole right to sue for the relief sought herein, including, without limitation, injunctive relief and monetary damages.

5. A true and correct copy of the '710 Patent is attached as Exhibit 1.

6. A true and correct copy of a website page from the United States Patent and Trademark Office website showing the assignment of the '710 Patent to Cyber is attached as Exhibit 2.

7. Upon information and belief, Brooks has directly and/or indirectly imported into the United States, made, used, sold, and/or offered for sale within the United States mass flow controllers with real time flow measurement and correction, including, but not limited to, the GF135 Mass Flow Controller.

8. Brooks' mass flow controllers with real time flow measurement and correction, such as the GF135 Mass Flow Controller, fall within the scope of at least claims 1-3, 5, 7, 9, 13-15, 19, 21, 25, 26, and 28-33 of the '710 Patent.

9. Upon information and belief, Brooks offers for sale, sells, installs, consigns, and/or services mass flow controllers with real time flow measurement and correction, such as the GF135 Mass Flow Controller, in Arizona directly and/or through sales representatives such as Banner Industries of N.E., Inc. ("Banner Industries").

10. Upon information and belief, Brooks has had actual knowledge of the '710 Patent and actual knowledge that its activities constitute either direct or indirect infringement of the '710 Patent, yet Brooks has not ceased its infringing

activities.

II. JURISDICTION AND VENUE

11. This is an action for patent infringement under the patent laws of the United States, 35 U.S.C. §271.

12. Brooks has engaged, directly and indirectly, in activities that infringe the ’710 Patent

13. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338.

14. This Court has personal jurisdiction over Brooks. Brooks has conducted and continues to conduct business within the State of Arizona. Brooks, directly and/or through intermediaries (such as distributors and retailers, including Banner Industries), imports, makes, uses, ships, distributes, offers for sale, sells, consigns, installs, and/or advertises its mass flow controllers, including the GL135 Mass Flow Controller, that infringe the ’710 Patent in the United States and the State of Arizona.

15. Venue is proper in this Court pursuant to 28 U.S.C. §§ 1391 and 1400(b).

16. Brooks consigns, sells and offers to sell mass flow controllers that infringe the ’710 Patent, such as the GF135 Mass Flow Controller, in Arizona at least through its sales representative, Banner Industries. Brooks’ website, www.brooksinstrument.com, offers to sell its products through a distributor. The website allows customers to “Find a Rep” in order to purchase products. Brooks’ website directs customers in Arizona to purchase infringing mass flow controllers, including the GL135 Mass Flow Controller, from Brooks’ sales representative in Arizona, Banner Industries, located at 8350 S. Kyrene Road, Unit 108, Tempe, AZ 85284. Upon information and belief, Banner Industries is an agent of Brooks and accepts on consignment, sells and offers to sell Brooks’ infringing mass flow

controllers, including the GL135 Mass Flow Controller, in Arizona. Brooks also provides warranty services in Arizona to purchasers of Brooks infringing mass flow controllers, including the GL135 Mass Flow Controller.

17. Brooks operates a website, www.brooksinstrument.com, that can be accessed from Arizona and elsewhere and that, among other things, allows customers (and potential customers) to review Brooks' "Products," which include mass flow controllers with real time flow measurement and correction. In addition, Banner Industries operates a website, www.bannerindustries.com, that directly links to the aforementioned Brooks website.

III. FACTUAL BACKGROUND

A. The Design and Development of the Real-Time Flow Measurement and Correction Mass Flow Controller.

18. The manager of Cyber, Timothy Brown, is an expert in the field of semiconductor technologies with over 30 years of industry experience. In 1999, Mr. Brown formed Cyber's predecessor, Cyber Instruments Technology ("Cyber Instruments"), a California LLC, to focus on the idea of bringing self-calibrating mass flow controller ("MFC") technology to the semiconductor industry. Mr. Brown and Cyber Instruments applied for and obtained two patents for an innovative improved real-time auto calibrating mass flow controller valve—the '710 Patent and U.S. Patent No. 6,216,726. To substantiate the claims of these patents, Cyber Instruments dedicated significant technical effort and money to invent, design, and develop a working proof of concept prototype of an improved real-time self-calibrating mass flow controller. The prototype demonstrated performance attributes which exceeded Cyber Instruments' objectives. Between 1999 and 2000, Mr. Brown sought funding to manufacture and commercialize his improved real-time mass flow controller prototype. Unfortunately, because of existing financial conditions, the company never launched a commercial

manufacturing operation. In 2009, Mr. Brown disbanded Cyber Instruments and transferred the '710 Patent to the newly formed Cyber Instruments Technology, an Arizona LLC ("Cyber").

19. Cyber Instruments' improved real-time mass flow controller, embodied in the '710 Patent, represents a significant improvement over traditional MFCs. Many industrial processes, such as semiconductor manufacturing, rely on the accurate delivery of gasses to processing chambers. Semiconductor devices are made up of alternating layers of various materials, constructed in patterns, to create electronic circuits referred to as "chips." These chips are fabricated on thin disks called silicon "wafers." An important step in creating these chips is known as "diffusion." During diffusion, carefully controlled amounts of gases are passed over the heated wafers. A specialized valve, known as a mass flow controller, controls the amount of gas to which the silicon wafer is exposed. If the MFC goes out of calibration, the wrong amount of gas enters the chamber and the wafers are ruined. MFCs, also, are notoriously unreliable. Traditional MFCs must be periodically removed from operation and calibrated by a technician, requiring that the entire wafer fabrication line be shut down. Additionally, even with proper maintenance, MFCs have periodic operation failures that can ruin entire batches of wafers at a cost of tens of thousands of dollars.

20. To remedy the shortcomings of traditional MFCs, Cyber Instruments developed an improved real-time mass flow controller with a built-in self-calibration system that performs real-time, in-situ calibration of all gas flow operations. The Cyber Instruments innovative real-time mass flow controller, embodied in the '710 Patent, eliminates the need to shut down wafer fabrication for MFC calibration and is orders of magnitude more accurate than traditional MFCs, thus saving end-users significant time and money.

B. **Brooks Makes or Imports, Uses, Sells, and/or Offers for Sale**

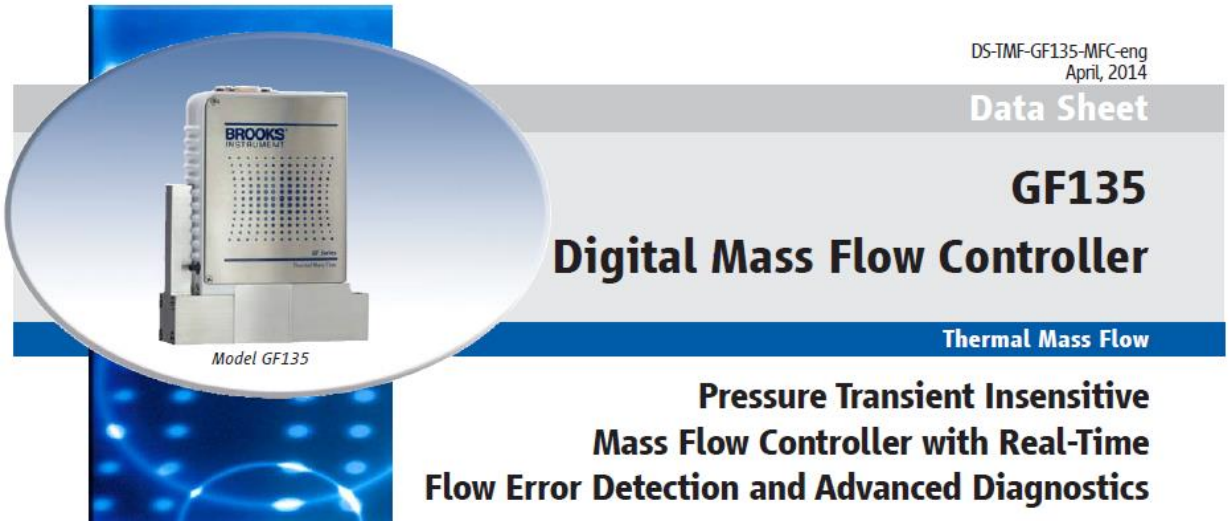
Mass Flow Controllers with Real-Time Flow Measurement and Correction Capabilities.

21. Brooks' improved real-time mass flow controllers at issue include, but are not limited to, the Brooks GF135 Series Real-Time Flow Error Detection Metal Sealed Thermal Mass Flow Controllers (the "Accused Products").

22. Upon information and belief, Brooks offers to sell, consigns and sells the Accused Products with real-time flow measurement and correction in Arizona through its sales representative and agent, Banner Industries:

http://www.brooksinstrument.com/about-us/sales-representative

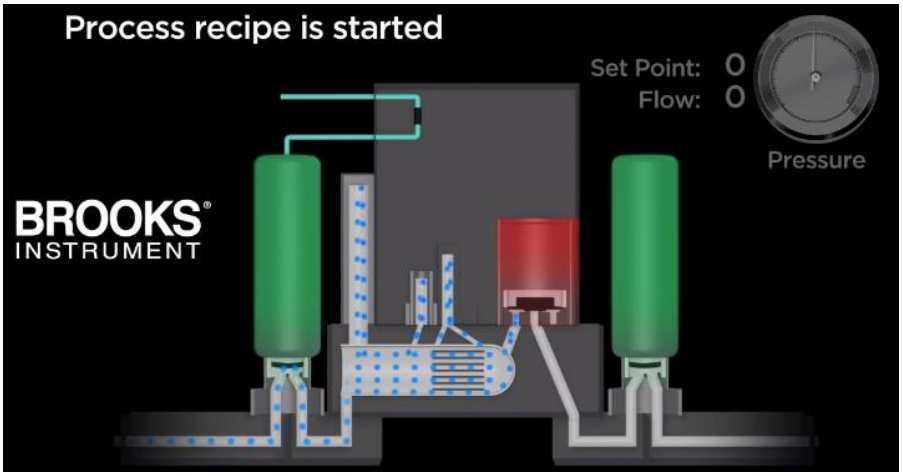
23. As show below, Brooks advertises the GF135 Mass Flow Controller, as a mass flow controller with real-time flow error detection:



http://www.brooksinstrument.com/~/media/Brooks/Documentation/Products/Mass%20Flow%20Controllers/Metal%20Sealed/GF135/mass-flow-controller-data-sheet-GF135.pdf?la=en

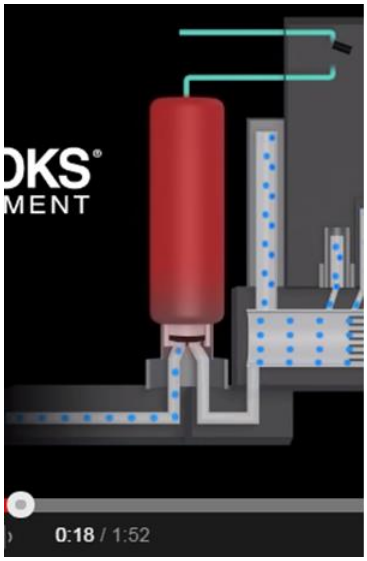
24. The GF135 "Installation & Operation Manual" further instructs purchases how to install and use the GF135 Mass Flow Controller. (*See* http://www.brooksinstrument.com/~/media/Brooks/Documentation/Products/Mass%20Flow%20Controllers/Metal%20Sealed/GF100/mass-flow-controller-installation-manual-GF100-GF101-GF120-GF121.pdf?la=en).

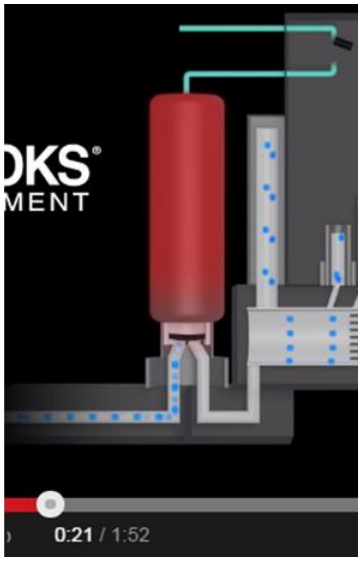
25. As shown in the screen capture from the Brooks GF135 illustration video, the Brooks GF135 Mass Flow Controller charges a calibration volume (the leftmost gray cylinder) with a process gas (blue dots).



https://www.youtube.com/watch?v=wF0x7GW5nzI&feature=youtu.be

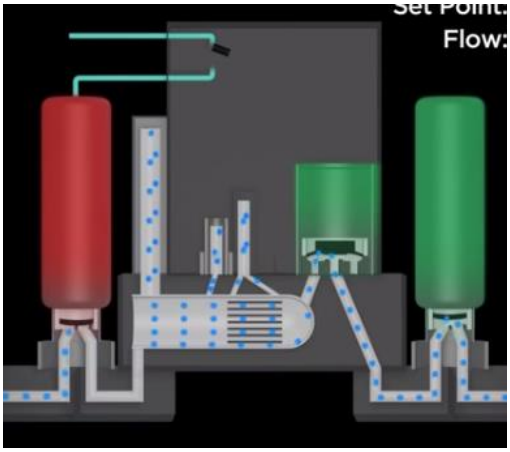
26. The Brooks GF135 illustration video next depicts the GF135 Mass Flow Controller starting a flow of the process gas from the calibration volume into a flow path.





https://www.youtube.com/watch?v=wF0x7GW5nzI&feature=youtu.be

27. As explained in the GF135 Mass Flow Controller data sheet, during gas flow, "a highly accurate pressure measurement is taken while the gas is being depleted from the inlet volume and an advanced signal processing algorithm calculates ROD [Rate of Decay] flow rate in real time." As can further be seen from the following screenshot from the GF135 illustration video, the Brooks GF135 Mass Flow Controller utilizes a thermal mass flow meter that includes a bypass capillary as its primary mass flow sensor downstream of the calibration volume.



https://www.youtube.com/watch?v=wF0x7GW5nzI&feature=youtu.be

28. As illustrated by the following excerpt from the GF135 Installation and Operation Manual, the capillary thermal mass flow sensors in the GF135 Mass Flow Controller generate sensor signals representative of mass flow, which are then used to compute the measured mass flow. The mass flow is proportional to the temperature differences of the temperature dependent resistance windings on the bypass capillary.

3-2 Theory of Operation for Flow Measurement

The thermal mass flow measurement system consists of two components: the restrictor or bypass and the flow sensor. Figure 3-1 is diagram of the flow stream through the device, with an enlarged view of the flow sensor. Gas flow entering the device is separated into two paths; one straight through the restrictor and the other through the flow sensor. This is represented in Figure 3-1, where the total flow A+B enters the device and is separated into streams A and B. The streams are joined again at the far side of the restrictor.

The separation of the flow streams is caused by the restrictor. During flow conditions, there will be a pressure differential across the restrictor that forces gas to flow in the sensor.

The pressure difference caused by the restrictor varies linearly with total flow rate. The sensor has the same linear pressure difference versus flow relationship. The ratio of sensor flow to the flow through the restrictor remains constant over the range of the device (A/B = constant). The full scale flow rate of the device is established by selecting a restrictor with the correct pressure differential for the desired flow.

The flow sensor is a very narrow, thin-walled Hastelloy tube. Onto this tube are built upstream and downstream temperature sensing and heating elements. During no-flow conditions, the amount of heat reaching each temperature sensor is equal, so temperatures T1 and T2 (Figure 3-1) are equal. Gas flowing through the tube carries heat away from the upstream temperature sensor and toward the downstream sensor. The temperature difference, T2 – T1, is directly proportional to the gas mass flow.

GF100 Series operating principles are described in Figure 3-1.

3-1

http://www.brooksinstrument.com/~/media/Brooks/Documentation/Products/Mass%20Flow%20Controllers/Metal%20Sealed/GF100/mass-flow-controller-installation-manual-GF100-GF101-GF120-GF121.pdf?la=en

29. The GF135 Mass Flow Controller repeatedly utilizes sensors downstream of the calibration volume to take pressure measurements and, using the pressure measurements data, to compute a measured mass flow rate through a flow restrictor path. Brooks states on its website that the GF135 Mass Flow Controller "allows semiconductor manufacturers to verify process gas accuracy, check valve leak-by and monitor sensor stability in real time without removing the flow controller from the gas line." The GF135 data sheet further states that the GF135 "has patent pending real-time flow error detection" and that it uses the pressure sensor to calculate "flow at various set points during wafer processing." This, according to the GF135 data sheet, allows the GF135 Mass Flow Controller to provide "automated monitoring of flow rate changes."

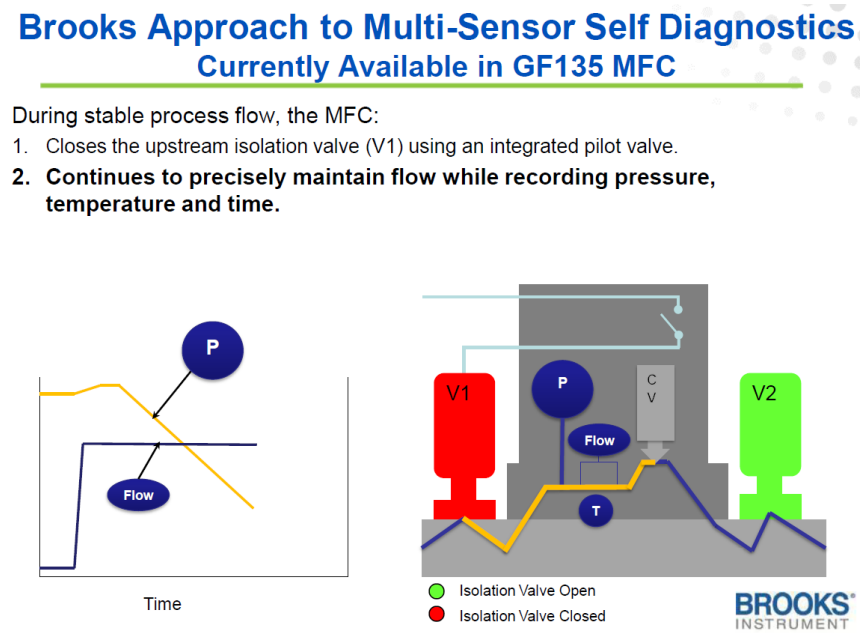
30. The GF135 Mass Flow Controller repeatedly and in real-time measures the pressure and temperature of the gas in the calibration volume while the device is in operation. As explained in the GF135 data sheet:

> During wafer processing, the [GF135] automatically takes flow error detection readings at each new process set point and compares the result to the baseline. The proprietary ROD [Rate of Decay] measurement technique momentarily stops the upstream delivery of gas from the tool supply while maintaining flow into the process chamber at the requested flow rate. A highly accurate pressure measurement is taken while the gas is being depleted form the inlet volume and an advanced signal processing algorithm calculates ROD flow rate in real time. Before the flow to the process is affected by the diminishing pressure, the upstream supply is re-established with no perturbation to the delivered flow.

http://www.brooksinstrument.com/~/media/Brooks/Documentation/Products/Mass%20Flow%20Controllers/Metal%20Sealed/GF135/mass-flow-controller-data-sheet-GF135.pdf?la=en

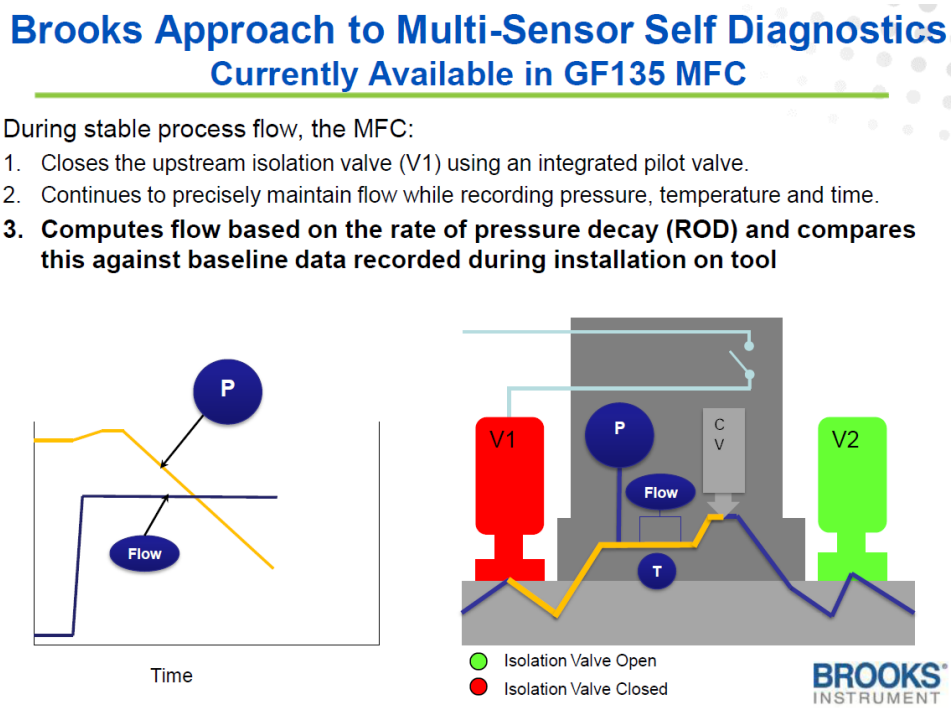
31. The process described above is further shown in the following screen

clip from a July 8, 2015 Brooks Presentation:



http://met-ri.lolipop.jp/SW2014/Variability%20Control/VC%20PDF/SW2014_Bill%20Valentine_Brooks%20Instrument.pdf

32. As explained above in paragraphs 30-31, and as shown below, the GF135 uses the time rate of change, denoted by "ROD" (rate of pressure decay), of the measured pressure to compute mass flow.



http://met-ri.lolipop.jp/SW2014/Variability%20Control/VC%20PDF/SW2014_Bill%20Valentine_Brooks%20Instrument.pdf

33. As show above in the figure following paragraph 32, the GF135 Mass Flow Controller determines whether there is any discrepancy between the actual (calibration cycle) mass flow rate and the measured (from the thermal capillary sensor used in normal process operation) mass flow rate by comparing the time rate of pressure change (ROD) of the calibration volume to the GF135 installation baseline. The data sheet for the GF135 further explains that:

> [b]y calculating flow at various set points during wafer processing, the MFC detects any sensor or bypass clogging. It also detects if a sensor offset is developing since the effects of clogging and drift manifest themselves differently at different set points. The same method is used when the MFC is given a zero set point to calculate valve leak.

http://www.brooksinstrument.com/~/media/Brooks/Documentation/Products/Mass%20Flow%20Controllers/Metal%20Sealed/GF135/mass-flow-controller-data-sheet-GF135.pdf?la=en.

34. Finally, whenever a discrepancy is found, "[t]he MFC can report the valve leak, sensor offset and flow offset to the tool through a documented interface protocol, as well as auto-correcting itself if the user enables that feature." Additionally, "the MFC stores this data for one year and can report on the changes using the historical data."

35. As described above, Brooks GF135 Mass Flow Controller practices at least one claim of the '710 Patent.

COUNT I: PATENT INFRINGEMENT OF THE '710 PATENT

36. Paragraphs 1-35 are incorporated by references as if fully stated herein.

37. Brooks has been and is now directly infringing and/or indirectly infringing the '710 Patent by way of inducement and/or contributory infringement, literally and/or under the Doctrine of Equivalents, in violation of 35

U.S.C. § 271, including by importing into the United States or making, using, selling, consigning, and/or offering for sale in the United States infringing products, namely the Accused Products and/or related services using the Accused Products. As explained in paragraphs 38-44 below, these Accused Products and related services are covered by at least one claim of the '710 Patent, including, but not limited to, Claims 1-3, 5, 7, 9, 13-15, 19, 21, 25, 26, and 28-33. The Accused Products have been designed, marketed, and sold to control mass flow with real time flow measurement and correction and have no substantial non-infringing use.

38. Upon information and belief, Brooks derives revenue, directly and indirectly, from the activities relating to the Accused Products, including their importation, manufacture, use, sale and offer for sale.

39. The Accused Products measure mass flow in a gas delivery system that provides real time flow measurement and correction.

40. The Accused Products, and in particular the GF135 Mass Flow Controller, charge a calibration volume with a process gas, as outline in paragraph 25 above.

41. As shown above in paragraph 26, the Accused Products, and in particular the GF135 Mass Flow Controller, start a flow of process gas from the calibration volume into a flow path.

42. As show above in paragraphs 27-31, during gas flow, the Accused Products, and in particular the GF135 Mass Flow Controller, repeatedly use at least one sensor downstream of the calibration volume to take pressure measurements and perform a computation process using data including the pressure measurements to compute a measured mass flow rate through a flow restrictor in the path.

43. As show in paragraphs 30-33, the Accused Products, and in particular the GF135 Mass Flow Controller, repeatedly perform operations comprising:

measuring pressure and determining the temperature of the gas in the calibration volume, using a time rate of change of the measured pressure and the determined temperature to compute an actual mass flow rate of gas flowing from the calibration volume, and determining whether there is any discrepancy between the actual mass flow rate and the measured mass flow rate.

44. As shown above in paragraph 34, whenever a discrepancy is found, the Accused Products, and in particular the GF135 Mass Flow Controller, correct the computational process such that the measured mass flow rate matches the actual mass flow rate thereby eliminating the discrepancy.

45. Upon information and belief, Brooks has activated and used the Accused Products, and in particular the GF135 Mass Flow Controller, in an infringing manner at least through testing the Accused Products to determine performance and other product specification.

46. Upon information and belief, Brooks has had actual knowledge of the '710 Patent and actual knowledge that its activities constitute either direct or indirect infringement of the '710 Patent, yet it has not ceased infringing activities. Brooks' infringement of the '710 Patent has been and continues to be willful and deliberate. Brooks also has knowledge of the '710 Patent by way of this complaint and, to the extent it does not cease infringing activities; Brooks' infringement is and continues to be willful and deliberate.

47. Brooks has and continues to indirectly infringe the '710 Patent by inducing infringement by others, in accordance with 35 U.S.C. § 271(b) in this District and elsewhere in the United States.

48. Upon information and belief, Brooks, its manufacturers, resellers, distributors, and end-users of the Accused Products each have engaged in and currently engage in activities that constitute direct infringement of one or more claims of the '710 Patent.

49. For example and without limitation, as explained in paragraphs 21-34 above, operation and use of the Accused Products infringes one or more claims of the ’710 Patent. The use and operation of these Accused Products by Brooks, its resellers, manufacturers, distributors, and/or end-user customers constitutes a direct infringement of one or more claims of the ’710 Patent.

50. Brooks’ affirmative acts of selling, offering to sell, or consigning the Accused Products, causing the Accused Products to be manufactured, and providing instruction manuals and support services for the Accused Products (as show above in paragraph 24) have induced and continue to induce Brooks’ manufacturers, resellers, distributors and end-user customers to make or use the Accused Products in their normal and customary way to infringe the ’710 Patent.

51. Through its manufacture and sale or consignment of the Accused Products, Brooks specifically intends that its manufacturers, resellers, distributors, and end-user customers directly infringe one or more claims of the ’710 Patent. Brooks has knowledge of the ’710 Patent and actually induces others, such as resellers, manufacturers, distributors, and end-user customers, to directly infringe, by using, making, selling, consigning, exporting, supplying and/or distributing within the United States the Accused Products, such as resellers, distributors and end-user customers. Brooks is aware that such actions induce actual infringement. Further, Brooks remains aware that these normal and customary activities would infringe the ’710 Patent.

52. For example and without limitation, in connection with its sale, offering to sell, consignment, importation into the United States, and distribution within the United States of the Accused Products, as show in paragraphs 21-24, Brooks willfully provides manuals and support services to resellers, distributors and end-user customers regarding the use and operation of Accused Products in a way that infringes the ’710 Patent. When resellers, distributors and end-user

customers follow instructions and/or support services provided by Brooks regarding the use of the Accused Products, they directly infringe the '710 Patent. Brooks knows or should know that by willfully providing such instructions and support services, the resellers, distributors, and end-user customers, in following those instructions and support services, directly infringe the '710 Patent.

53. Accordingly, Brooks has performed and continues to perform the acts that constitute induced infringement, and that induce actual infringement, with the knowledge of the '710 Patent and with the knowledge or willful blindness to the fact that the induced acts constitute direct infringement.

54. Brooks indirectly infringes one or more claims of the '710 Patent by contributing to infringement by others, such as manufacturers, resellers, distributors, and end-user customers, in accordance with 35 U.S.C. § 271(c).

55. As explained above, Brooks, its manufacturers, resellers, distributors, and end-user customers of the Accused Products each use and operate the Accused Products in a manner that directly infringes one or more claims of the '710 Patent.

56. As shown in paragraphs 21-34 above, the Accused Products incorporate functionality that directly infringes one or more claims of the '710 Patent, and the associated hardware and software that Brooks configures, installs, and includes in the Accused Products to perform the function of measuring mass flow in a gas delivery system directly infringe one or more claims of the '710 Patent. On information and belief, these functions cannot operate in an acceptable manner absent the hardware and software that Brooks configures, installs, and includes in the Accused Products for the specific purpose of performing such functions. On information and belief, Brooks has designed, manufactured, had manufactured, configured, and installed such software and hardware in the Accused Products to entice users of the Accused

Products in a manner that directly infringes one or more claims of the ’710 Patent.

57. The functionality and associated hardware and software of the Accused Products, as described in paragraphs 21-34 above, do not constitute staple articles or commodities of commerce. Moreover, use of the functionality and associated hardware and software of the Accused Products is required for the operation of the Accused Products. Any other use of the functionality and associated hardware and software of the Accused Products would be unusual, far-fetched, illusory, impractical, occasional, aberrant, or experimental.

58. The functionality and associated hardware and software of the Accused Products, as described in paragraphs 21-34 above, are all material parts of the invention of the ’710 Patent, are especially made for the infringing manufacture, sale, and use of the Accused Products, and have no substantial non-infringing use.

59. Accordingly, Brooks offers to sell or sells within the United States a component of a patented machine, manufacture, combination, or composition, or a material or apparatus for use in practicing the ’710 Patent, constituting a material part of the invention, knowing the same to be especially made or especially adapted for use in an infringement of the ‘710 Patent, and not a staple article or commodity of commerce suitable for substantial non-infringing use.

60. Brooks, by way of its infringing activities outline above, has caused and continues to cause Cyber to suffer damages, the exact amount to be determined at trial

PRAYER FOR RELIEF

61. WHEREFOR, Cyber requests the Court grant the following relief in their favor and against Brooks:

62. A judgment in favor of Cyber that Brooks has infringed, directly and indirectly, by way of inducement and/or contributory infringement, literally and/or

under the doctrine of equivalents, one or more claims of the '710 Patent;

63. A preliminary and permanent injunction, enjoining Brooks and their officers, directors, agents, servants, employees, affiliates, divisions, branches, subsidiaries, parents, and all others acting in concert or privity with any of them from infringing, inducing the infringement of, or contributing to the infringement of the '710 Patent;

64. An award of damages to which Cyber is entitled under 35 U.S.C. § 284 for Brooks' past infringement and any continuing or infringement post-trial up until the date Brooks is finally and permanently enjoined from further infringement and a final judgment is entered, including both compensatory damages and treble damages for willful infringement;

65. A judgment and order requiring Brooks to pay the costs of this action (including all disbursements), as well as attorneys' fees as provided by 35 U.S.C. § 285;

66. A judgment and order requiring that, in the event a permanent injunction preventing future infringement is not granted, Brooks pay to Cyber compulsory ongoing licensing fees, as determined by the Court in equity; and

67. Such other and further relief in law or in equity to which Cyber may be justly entitled.

DEMAND FOR JURY TRIAL

Cyber demands a trial by jury of any and all issues triable of right before a jury, except for future patent infringement, which is an issue in equity to be determined by the Court.

DATED: JULY 14 2016

/s/ Albert L. Underhill

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