

United States District Court,
E.D. Pennsylvania.

SEZ AG,

v.

SOLID STATE EQUIPMENT CORP.

June 26, 2008.

Andrew J. Patch, Douglas V. Rigler, Jeffrey M. Goehring, Young & Thompson, Arlington, VA, Philip S. Burnham, Burnham & Wiesner LLC, Voorhees, NJ, for SEZ AG.

James J. Rodgers, Dilworth Paxson L.L.P., Philadelphia, PA, for Solid State Equipment Corp.

MEMORANDUM

DALZELL, District Judge.

SEZ AG sued Solid State Equipment Corporation ("SSEC") for patent infringement. Both companies make equipment used in the production of integrated circuits. Both sides have moved for claims construction relating to SEZ's U.S. Patents Nos. 7,007,702 ('702 patent), 6,858,092 ('092 patent), and 6,435,200 ('200 patent). FN1 As neither side opted to present any testimony, we conducted no *Markman* hearing. We now construe the claims found in the patents in suit.

FN1. All three patents originate from the same patent application, and though each patent contains different claims, the specifications are the same across the patents. Therefore, when we cite to a part of the specification we will cite only to U.S. Patent No. 6,435,200.

I. Background

All of the patents in question relate to a device designed to clean or etch semiconductor wafers. These wafers are manufactured as a sheet with an integrated circuit already placed on them. The sheets are then cut into smaller pieces. During the manufacturing process the wafers are coated with various materials, and this coating is removed from the underside and edges of the wafer using a strong acid or some other cleaner. This process is called etching. The same device can also be used to clean the wafer, *i.e.*, remove unwanted contaminants. Etching and cleaning together are known generally as liquid treatment.

The preferred embodiment of the device consists of a rotary chuck made of three pieces: a base body, cover, and gas guide device. U.S. Patent 6,435, 200 Col. 4, Ln. 20-21. During the liquid treatment, the wafer is placed on top of the chuck. The center of the chuck is joined to a hollow shaft which is used to either rotate the chuck or supply gas. *Id.* Ln 24-25. Joining the base and the cover together creates an annular gap that leads from the center of the shaft towards the edge through which the supplied gas flows towards the wafer.

Id. Ln. 26-30. The gas guide device has the shape of a ring and sits at the periphery of the chuck, attached to the base body by regularly placed spacers that hold the device above the base body. *Id.* Ln. 40-44. Pins that prevent the wafer from sliding sideways off the chuck are attached to the top of the gas guide device. *Id.* Ln. 35-37. The space between the base body and gas guide device creates a channel, called the gas discharge channel, through which the supplied gas is routed away from the wafer. *Id.* Ln. 56-57.

The supplied gas flows from the hollow shaft at the center of the chuck into the annular gap between the base body and cover and then out through the gas discharge channel. *Id.* Col. 5, Ln 6-10. This flow of gas creates a cushion of air on which the wafer floats suspended above the chuck. *Id.* Col. 4, Ln. 32-34. This flow also creates a gap between the gas guide device and the wafer through which some gas could escape, but the flow of gas through the gas discharge channel creates a negative pressure that actually causes an intake of gas through the gap between the gas guide device and the wafer. *Id.* Col. 4, Ln. 32-34, Col 5, Ln. 10-14.

The liquid treatment is added to the side of the wafer facing away from the chuck. *Id.* Col. 5, Ln. 15-16. The treatment flows over the edge and onto the side of the wafer facing the chuck through the gap between the gas guide device and the wafer. *Id.* Ln. 16-17, 22-23. The treatment flows some distance past the edge of the gas guide device, but the flow of gas coming up through the annular gap between the base body and cover arrests the motion of the treatment and directs it into the gas discharge channel. *Id.* Ln. 23-29.

According to the patent, this device improves on prior etching art by permitting the treatment of a "defined, edge-side area" of the side of the wafer facing the chuck and permitting a user to change "the size of the section near the edge ... by means of suitable selection of the gas guide device." U.S. Patent No. 6,435,200, Col. 1, Ln. 66-Col. 2, Ln. 3, Col. 2, Ln. 47-49.

In the three patents associated with this device, there are a total of eleven independent claims that contain disputed terms. FN2 The parties seek construction of the following claim terms in the patents-in-suit: (1) "holding means ..." FN3, (2) "gas feed means ..." FN4, (3) "sharp edge" FN5, (4) "gas guide device" FN6, (5) "gas guide" FN7, (6) "annular groove" FN8, (7) "defined area" FN9, and (8) "holder" FN10.

FN2. U.S. Patent No. 6,435,200 Claim 1:

Device for liquid treatment of an edge area of a wafer-shaped article, comprising holding means for holding the wafer-shaped article, with a gas feed means for at least partial gas flushing of the surface of the wafer-shaped article which faces the holding means, wherein a peripheral side of the device includes a gas guide device which has an inner periphery with a sharp edge and which routes most of the flushing gas away from the edge area of the wafer-shaped article.

U.S. Patent No. 6,435,200 Claim 9:

Device for liquid treatment of an edge area of a wafer-shaped article, comprising holding means for holding the wafer-shaped article, with a gas feed means for at least partial gas flushing of the surface of the wafer-shaped article which faces the holding means, wherein a peripheral side of the device includes a gas guide device which routes most of the flushing gas away from the edge area of the wafer-shaped article; wherein a part of the holding means which is located between the gas feed means and the gas guide device

is located at a greater distance to the wafer-shaped article than the gas guide device to the wafer-shaped article;
wherein the gas guide device does not touch the wafer-shaped article; and
wherein a surface of the gas guide device facing the wafer-shaped article is parallel to main surfaces of the wafer-shaped article.

U.S. Patent No. 6,435,200 Claim 14:

A device for liquid treatment of an edge of a wafer-shaped article comprising:
holding means for holding a wafer-shaped article;
said holding means comprising gas feed means for at least partial gas flushing of a bottom surface of a disk-shaped article that faces said holding means; and
said holding means further comprising a gas guide in a periphery of said holding means that is arranged and adapted to divert gas fed from said gas feed means away from an edge of the bottom surface of the wafer-shaped article held by said holding means so that a liquid applied to a top surface of the wafer-shaped article treats the edge of the bottom surface.

U.S. Patent No. 6,858,092 Claim 1:

A process for treating a wafer-shaped article with a liquid in a defined area near a peripheral edge of the wafer-shaped article, the process comprising the steps of:
placing the wafer-shaped article onto a holder, the wafer-shaped article having a first side facing the holder, a second side opposite the first side, and a peripheral edge between the first and second sides, the defined area being on the first side;
providing a gap between the first side of the wafer-shaped article and the holder, the gap extending radially inward from the peripheral edge to a recess in the holder, the radially inward extent of the gap defining the defined area;
applying the liquid in the gap to wet and treat the defined area with the liquid, the gap being filled so that the liquid simultaneously wets the defined area and part of the holder,
wherein the recess is a channel that branches from the gap at the radially inward end of the gap, and further comprising the step of diverting the liquid that has been applied in the gap to the channel.

U.S. Patent No. 6,858,092 Claim 8:

A process for treating a wafer-shaped article with a liquid in a defined area near a peripheral edge of the wafer-shaped article, the process comprising the steps of:
placing the wafer-shaped article onto a holder, the wafer-shaped article having a first side facing the holder, a second side opposite the first side, and a peripheral edge between the first and second sides, the defined area being on the first side;
providing a gap between the first side of the wafer-shaped article and the holder, the gap extending radially inward from the peripheral edge to generally correspond to the defined area;

applying the liquid in the gap to wet and treat the defined area with the liquid, the gap being filled so that the liquid simultaneously wets the defined area and part of the holder, wherein the step of applying the liquid comprises the step of decreasing a pressure in the gap to draw the liquid into the gap from the peripheral edge of the wafer-shaped article.

U.S. Patent No. 6,858,092 Claim 16:

A process for treating a wafer-shaped article with a liquid in a defined area near a peripheral edge of the wafer-shaped article, the process comprising the steps of:
placing the wafer-shaped article onto a holder, the wafer-shaped article having a first side facing the holder, a second side opposite the first side, and a peripheral edge between the first and second sides, the defined area being on the first side;
providing a gap between the first side of the wafer-shaped article and the holder, the gap extending radially inward from the peripheral edge to a recess in the holder, the radially inward extent of the gap defining the defined area;
applying the liquid in the gap to wet and treat the defined area with the liquid, the gap being filled so that the liquid simultaneously wets the defined area and part of the holder, wherein the recess is an annular gas guide at a periphery of the holder.

U.S. Patent No. 6,858,092 Claim 23:

A process for treating a wafer-shaped article with a liquid in a defined area near a peripheral edge of the wafer-shaped article, the process comprising the steps of:
placing the wafer-shaped article onto a holder, the wafer-shaped article having a first side facing the holder, a second side opposite the first side, and a peripheral edge between the first and second sides, the defined area being on the first side;
providing a gap between the first side of the wafer-shaped article and the holder, the gap extending radially inward from the peripheral edge to generally correspond to the defined area;
applying the liquid; and
drawing the liquid into the gap by capillary forces to completely fill the gap so as to wet and treat the defined area with the liquid,
wherein the step of drawing the liquid into the gap further comprises the step of diverting all of the liquid that has been drawn into the gap to a channel that branches from the gap at the radially inward end of the gap.

U.S. Patent No. 6,858,092 Claim 31:

A process for treating a wafer-shaped article with a liquid in a defined area near a peripheral edge of the wafer-shaped article, the process comprising the steps of:
placing the wafer-shaped article onto a holder, the wafer-shaped article having a first side facing the holder, a second side opposite the first side, and a peripheral edge between the first and second sides, the defined

area being on the first side;
providing a gap between the first side of the wafer-shaped article and the holder, the gap extending radially inward from the peripheral edge to generally correspond to the defined area;
applying the liquid;
drawing the liquid into the gap by capillary forces to completely fill the gap so as to wet and treat the defined area with the liquid; and
providing an annular gas guide at a periphery of the holder to define the gap.

U.S. Patent No. 7,007,702 Claim 1:

A device for wet etching with a liquid a defined area of a first surface of a wafer-shaped article, the defined area being adjacent to a peripheral edge of the wafer-shaped article, the device comprising:
holding means for holding the wafer-shaped article with the first surface facing, within the defined area, a surface of said holding means that is parallel to the first surface, said holding means comprising gas feed means for at least partial flushing of a gas from the first surface, and a gas guide in a periphery of said holding means; and
said gas guide being arranged to be separated from the first surface by a gap and having a channel to divert most of the gas away from the defined area when the wafer-shaped article is being held by said holding means, said gap having a width that permits creation of a capillary force that causes the liquid to enter into said gap and to wet and etch the defined area of the first surface adjacent to the peripheral edge, wherein within the defined area, a surface of said gas guide facing the first surface is parallel to the first surface.

U.S. Patent No. 7,007,702 Claim 9:

A device for treating with a liquid a wafer-shaped article having a first surface, a second surface opposite the first surface, and a peripheral edge between the first and second surfaces, the device comprising:
holding means for holding the wafer-shaped article with the second surface facing said holding means, said holding means comprising gas feed means for at least partial flushing of a gas from the second surface, and a gas guide in a periphery of said holding means;
said gas guide being arranged to be separated from the second surface by a gap when the wafer-shaped article is being held by said holding means, said gap having a width that permits creation of a capillary force that causes the liquid to enter into said gap and to wet and treat a defined area of the second surface adjacent to the peripheral edge, wherein within the defined area, a surface of said gas guide facing the second surface is parallel to the second surface; and
a channel that branches from a radially inward end of said gap.

U.S. Patent No. 7,007,702 Claim 10:

A device for treating with a liquid a wafer-shaped article having a first surface, a second surface opposite the first surface, and a peripheral edge between the first and second surfaces, the device comprising:
holding means for holding the wafer-shaped article with the second surface facing said holding means, said

holding means comprising gas feed means for at least partial flushing of a gas from the second surface, and a gas guide in a periphery of said holding means;
said gas guide being arranged to be separated from the second surface by a gap when the wafer-shaped article is being held by said holding means, said gap having a width that permits creation of a capillary force that causes the liquid to enter into said gap and to wet and treat a defined area of the second surface adjacent to the peripheral edge, wherein within the defined area, a surface of said gas guide facing the second surface is parallel to the second surface;
and said gap extending radially inward from the peripheral edge to a recess in the holder, the radially inward extent of the gap defining the defined area.

FN3. This disputed claim term used in both '200 and '702 patents.

FN4. This disputed claim term used in both '200 and '702 patents.

FN5. This disputed claim term used in the '200 patent.

FN6. This disputed claim term used in the '200 patent.

FN7. This disputed claim term used in '200, '702, and '092 patents.

FN8. This disputed claim term used in the '200 patent.

FN9. This disputed claim term used in the '200, '702, and '092 patents.

FN10. This disputed claim term used in the '092 patent.

II. Principles of Claims Construction

We begin the process of claims construction by looking to the words in the claims. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed.Cir.1996). The patent's claims "define the invention to which the patentee is entitled the right to exclude." *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed.Cir.2004). "[T]he words of a claim are generally given their ordinary and customary meaning[*, i.e.*,] the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed.Cir.2005) (internal quotations omitted). We consider both the context in which the claim term appears and the other claims as a starting point of our examination. *Id.* at 1314.

We keep in mind in this enterprise that:

there is no magic formula or catechism for conducting claim construction. Nor is the court barred from

considering any particular sources or required to analyze sources in any specific sequence, as long as those sources are not used to contradict claim meaning that is unambiguous in light of the intrinsic evidence.

Id. at 1324.

A. Of Specifications and Dictionaries

Claims are not read in a vacuum. We must consider them as "part of a fully integrated written instrument, consisting principally of a specification that concludes with the claims [which] must be read in view of the specification, of which they are a part." *Id.* at 1315. "[T]he person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.* at 1313. Unless the meaning of a term is pellucid from its use in the claims, we must consider the intrinsic evidence to determine the meaning of a disputed term. *Id.* at 1314.

The specification "describe[s] the manner and process of making and using the patented invention" and is statutorily required to do so in "clear, concise, and exact terms." *Id.* at 1315, 1316 (quoting 35 U.S.C. s. 112, para. 1). The specification "is the single best guide to the meaning of a disputed term" and is usually dispositive. *Id.* at 1315. The claims should be construed "so as to be consistent with the specification, of which they are a part ." *Merck & Co. v. Teva Pharms. USA, Inc.*, 347 F.3d 1367, 1371 (Fed.Cir.2003). "The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction." *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1250 (Fed.Cir.1998). Through the specification, the inventor can give "special definition ... to a claim term ... that differs from the meaning it would otherwise possess [or use the specification to] reveal an intentional disclaimer, or disavowal, of claim scope." *Phillips*, 415 F.3d at 1316.

We use the specification "to interpret the meaning of a claim and [should be careful not to] import[] limitations from the specification into the claim. *Id.* at 1323. Drawing a clear distinction between these two can be quite difficult, especially if the patent contains very specific embodiments that consist of the clearest exposition of the patented invention. But the Federal Circuit has "expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment." *Id.* at 1323. This conclusion follows from both the language of s. 112 and from the fact that "persons of ordinary skill in the art rarely would confine their definitions of terms to the exact representations depicted in the embodiments." *Id.*

Usually the specification and prosecution history are sufficient to "resolve any ambiguity in a disputed claim term." *Vitronics*, 90 F.3d at 1583. When such evidence is insufficient, courts may consider extrinsic evidence. *Id.* Extrinsic evidence includes expert testimony, dictionaries, and learned treatises. *Phillips*, 415 F.3d at 1317.

Dictionaries, in particular, can be quite useful in interpreting claim terms, but we must be careful not to use the dictionary definitions as another means for importing limitations into the claims. *Id.* at 1320. The dictionary definition for a particular term may be narrower or broader in scope than the meaning one could derive from the way the term is used in the patent. *Id.* at 1321-22. In every instance the patent's usage of the term trumps the dictionary definition. *Id.* at 1317. The key when using dictionaries is to keep our focus fixed on the specification and make sure the dictionary definition "does not contradict any definition found in or ascertained by a reading of the patent documents." *Vitronics*, 90 F.3d 1584 n. 6.

B. Means-plus-function claim terms

The patentee can use the means-plus-function format when drafting claims terms. A claim term in this format describes some aspect or step in the claim simply by specifying the desired "function without the recital of structure, material, or acts in support thereof." 35 U.S.C. s. 112, para. 6. When the patentee uses the means-plus-function format, courts are to construe the claim as covering "the corresponding structure, material, or acts described in the specification and equivalents thereof." *Id.*

The patentee typically invokes s. 112, para. 6, by using " 'means,' particularly as used in the phrase 'means for,' " to describe the method, process, step, or structure the claim requires. *Lighting World, Inc. v. Birchwood Lighting, Inc.*, 382 F.3d 1354, 1358 (Fed.Cir.2004). Use of the word "means" creates a rebuttable presumption that s. 112, para. 6, applies. *Id.* Similarly, if the claim does not use the word "means", there is a rebuttable presumption that s. 112, para. 6 does not apply. *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1369 (Fed.Cir.2002). A party can rebut this presumption "by showing that the claim element recited a function without reciting sufficient structure for performing that function." *Watts v. XL Sys., Inc.*, 232 F.3d 877, 880 (Fed.Cir.2000). But this presumption is "one that is not readily overcome." *Depuy Spine, Inc. v. Medtronic*, 469 F.3d 1005, 1023 (Fed.Cir.2006).

In construing a means-plus-function claim, courts must first identify the "claimed function", and then identify "the structure in the written description necessary to perform that function." *Micro Chemical, Inc. v. Great Plains Chem. Co., Inc.*, 194 F.3d 1250, 1258 (Fed.Cir.1999). "A means-plus-function claim encompasses all structures in the specification corresponding to that element and equivalent structures." *Id.* When examining the specification to identify the necessary structure, we are obliged not to limit the means-plus-function claim "by adopting a function different from that explicitly recited in the claim. Nor does the statute permit incorporation of structure from the written description beyond that necessary to perform the claimed function." *Id.* Also, "when multiple embodiments in the specification correspond to the claimed function, proper application of s. 112, para. 6 generally reads the claim element to embrace each of those embodiments." *Id.*

III. Analysis

In this case, some of the disputed claim terms are found in multiple patents. All three of the patents-in-suit relate to the same device, and the parties agree that any term asserted in more than one of the patents would have the same meaning across patents. Therefore, we shall organize our analysis around the disputed claim terms rather than the patents in which each claim is found. As the parties have not attached the prosecution history as an exhibit to either of their briefs or offered any expert testimony, we will rely only on the patent and any treatises or dictionaries we find useful.

A. "holding means ..."

Both patents '200 and '702 use the phrase "holding means for holding the wafer-shaped article" or simply "holding means". U.S. Patent No. 6,435,200, Claims 1, 4, 5, 9, 10, 11, 13, 14; U.S. Patent No. 7,007,702, Claims 1, 5, 9, 10. As none of the claims recite a structure sufficient to perform the recited function, we presume s. 112, para. 6 applies, and the parties agree. SEZ contends that "holding means" is "a rotary chuck that supports the wafer using a vacuum or the wafer floats on an air cushion and is prevented from sliding off sideways by lateral guide elements, and equivalent structures", while SSEC argues that it is "portions of chuck 1 that hold the wafer". SEZ Corrected Br. at 1; SSEC Mem. at 8. With these suggestions in mind, we

start to the two step process of construing this means-plus-function claim.

1. Identification of the Function

The first step in constructing a means-plus-function claim is to identify the claimed function. The parties state that they agree that the identified function of the "holding means" is to hold a wafer FN11. Pl.'s Mem. at 5; Def.'s Mem. at 8. But this agreement is only superficial. In truth, they contest what exactly the phrase "holding a wafer" encompasses. SSEC argues that SEZ's identification of structure imports a set of unclaimed functions, *i.e.*, supporting the wafer on a cushion of gas or a vacuum and preventing the lateral displacement of the wafer, violating the rules of construction we are obliged to apply. Def.'s Mem. at 9. Although framed as an argument about the corresponding structure, this is really an argument about what exactly "holding the wafer" encompasses. We therefore must determine whether these other functions fall within the ambit of "holding a wafer".

FN11. SEZ formulates this a "holding the wafer" and SSEC formulates this a "holding the wafer shaped article".

The present dispute centers on the meaning of the word *hold*, and to properly construe this particular claim, we must decide which of its myriad meanings to attribute to the word here. We will start our analysis with the dictionary because we seek resolve an ambiguity in the meaning of *hold* as it is used in the statement of the claimed function, which does not makes reference to a specific, technical or idiosyncratic usage, but the usual customary meaning of the word *hold*. Here, we will use the dictionary definitions to list the possible options available to us, and focus on the specification to determine which possible definition the written description justifies, ever mindful that the "definition found in or ascertained by a reading of the patent" always trumps the dictionary. *Vitronics*, 90 F.3d 1584 n. 6. Thus, we note that *hold* has a plethora of meanings, but as used in the phrase "holding a wafer" it can mean either "[t]o keep from getting away; to keep fast, grasp" and "[t]o keep from falling, to sustain or support in or with the hand, arms, etc." VII OXFORD ENGLISH DICTIONARY at 295-296 (2d ed.1989).

SSEC's argument that "supporting the wafer on a cushion of gas or vacuum" imports an unclaimed function into the term "holding means" cannot derive from either possible definition of the word "hold" in the phrase "holding a wafer". "Supporting the wafer" in this manner means providing vertical support to the wafer, and this meaning is consistent with either possible definition of the word *hold*. If the function of "holding means" cannot include vertically supporting the wafer so it does not fall, then the "holding means" can have no function at all. We note that the words "on a cushion of gas or a vacuum" as used in our paraphrase of SEZ's suggested construction of "holding means" is not part of the function of "holding means", but rather are structures used to accomplished the function in question—a topic we will return to shortly.

The specification also does not support SSEC's argument that "preventing the lateral displacement of the wafer" imports an unclaimed function into the identified function of the "holding means". Returning to the meaning of *u*, we note that the former meaning would permit both vertical and horizontal support, whereas the latter arguably is limited to vertical support. Nothing in the claims or specification explicitly excludes the possibility that the function of "holding a wafer" encompasses preventing lateral displacement. In fact, if one examines the other claims, one finds quite the opposite. Two dependent claims in the '200 patent specifically enumerate structures for preventing lateral displacement, and both claims refine the meaning of the term "holding means". U.S. Patent No. 6,435,200 Claim 10 (providing for a "holding means compris[ing] at least

two guide elements which border a periphery of the wafer-shaped article") and Claim 11 (for a "holding means within the gas feed means touch[ing] the wafer-shaped article"). These claims specify ways in which the holding means can prevent lateral displacement, suggesting that the function of the "holding means" involves preventing both unwanted vertical and horizontal motion. Furthermore, the portion of the specification explicitly related to "holding means" includes language suggesting both vertical and horizontal support features, *e.g.*, "wafer floats on a cushion of air" (vertical) and "lateral guide elements" to prevent the wafer from sliding off sideways" (horizontal). This language certainly does not explicitly exclude the prevention of lateral displacement from the meaning of "holding a wafer".

We find no reason to exclude "preventing lateral displacement" from the meaning of the function of the "holding means"; indeed, we find significant support in the specification that "preventing lateral displacement" is an aspect of "holding a wafer". Thus, we identify the function of the holding means as providing vertical support to the wafer *and* preventing its lateral displacement.

2. Identification of the Corresponding Structure

We now turn to the second step in the means-plus-function claims construction process, *i.e.*, identifying the structure in the written description that corresponds with the identified function of the "holding means". SEZ identifies the corresponding structure as "a rotary chuck that supports the wafer using a vacuum or the wafer floats on an air cushion and is prevented from sliding off sideways by lateral guide elements, and equivalent structures." SEZ Corrected Br. at 1. SEZ derives the corresponding structure from the portion of the specification that explicitly discusses "holding means", which states that:

The holding means (chuck) is used to hold the wafer for [wet etching or cleaning]. Here holding can be done using a vacuum or the wafer floats on an air cushion and is prevented from sliding off sideways by lateral guide elements.

The wafer can also be held by the gas which flows past on the bottom of the wafer forming a negative pressure (also called the Bernoulli effect) by which the wafer experiences a force in the direction of the chuck. The wafer is touched by an elevated part of the chuck within the gas feed device, by which the wafer is prevented from sliding off sideways.

U.S. Patent No. 6,435,200 Col. 2, Ln. 13-22.

On the other hand, SSEC asserts that the appropriate corresponding structure consists of "the portions of chuck 1 that hold the wafer." FN12 SSEC Mem. at 8. SSEC derives its corresponding structure from the written description of the preferred embodiment and its associated illustration. U.S. Patent No. 6,435,200 Col. 4 Ln. 20 to Col. 5 Ln. 29. SSEC's only argument that we should look to the description of preferred embodiment rather than the most general description of the holding means is based on SSEC's assertion that SEZ was importing unclaimed functions into its statement of the corresponding structure. But we have disposed of this argument above. We see no other reason to limit the meaning of the claim term to the preferred embodiment when there is a more general description available in the specification that conforms with the identified function. *See Micro Chemical*, 194 F.3d at 1258.

FN12. Chuck 1 refers to the Fig. 1 in all three patents which "schematically shows an axial section of the means (chuck 1) including a wafer which is located on it." U.S. Patent 6,435,200 Col. 4, Ln. 9-10.

The parties disagree about whether the "holding means" can consist of the entire rotary chuck or must be only a portion of the chuck. SSEC argues that since portions of the specification indicate that there are parts of the chuck that are not involved in holding the wafer, then the "holding means" cannot be the chuck as a whole, but must be "the portions of the chuck" that serve that function. This is precisely what the specification shows. The most general description of the invention states that:

the invention in its general embodiment proposes a device for liquid treatment of a defined section of a wafer-shaped article ... with a means for holding the wafer-shaped article, with a gas feed means for at least partial gas flushing of the surface of the wafer-shaped article which faces the means, in which on the peripheral side there is a gas guide device which routes most of the flushing gas in the edge area of the wafer-shaped article away from the latter.

U.S. Patent No. 6,435,200 Col. 2 Ln. 4-12. Here the specification describes the invention as having both a "means for holding the wafer-shaped article" and a distinct "gas feed means". The specification also states that the "means for holding the wafer-shaped article" has in it the "gas guide device", suggesting that the two are part of the same structure. The preferred embodiment also shows that the parts of the chuck, *i.e.*, base, body cover, gas guide, when oriented in a specific way to one another and operating in tandem, act as the "holding means". *Id.* Col. 4, Ln. 20-40. Since the chuck itself can have multiple functions, and its various parts can operate as the "holding means" or "gas feed means", the "holding means" must be *portions* of the chuck that are designed in a particular way, namely so that the chuck can vertically support the wafer and prevent its lateral displacement.

Now we turn to identifying those structures necessary to support the wafer vertically and horizontally. We find three structures presented in the specification that can provide horizontal support, *i.e.*, prevent lateral displacement, namely "lateral guide elements", "an elevated part of the chuck within the gas feed device", and "guide elements" which are described as "pins". *Id.* Col. 2 Ln. 16, Col. 2 Ln. 21, Col. 4, Ln. 36. We read the latter two descriptions to be a more specific versions of the "lateral guide elements". Therefore, there are no "equivalent structures" to the "lateral guide elements" that are presented in the specification.

As for vertical support we again find three different structures in the specification. There is the vacuum, the cushion of air, and the flow of gas past the bottom of the wafer. *Id.* Col. 14-15, 17-20. But this last embodiment of the "holding means" uses the flow of gas toward the wafer to create an upward pressure on the wafer, and the flow out of the chuck to create a negative pressure, or partial vacuum, that pulls the wafer towards the chuck, thereby creating a "gas cushion" that will support the wafer. *Id.* Col. 4, 32-34. This is a more specific limitation on a cushion of air, and as such does not describe a distinct structure necessary to accomplish the function of holding a wafer. Thus, the necessary structures for vertical support of the wafer are a vacuum or cushion of air.

In sum, the "holding means for holding a wafer-shaped article" consists of portions of a rotary chuck that supports the wafer vertically using a vacuum or a cushion of air, and prevents lateral displacement using lateral guide elements.

B. "gas feed means ..."

The next contested claim term is "gas feed means for at least partial gas flushing of the surface of the wafer-shaped article which faces the holding means". U.S. Patent No. 6,435,200 Claim 1. This term is found in the

'200 and '702 patents. The claims in these patents recite no structure associated with the claimed function, and, therefore, this disputed term is in the means-plus-function format. 35 U.S.C. s. 112, para. 6. As both sides are in agreement on this point, we move to the obligatory two-step analysis.

Again, the parties agree about the claimed function: "at least partial gas flushing of the surface of the wafer-shaped article which faces the holding means." SSEC Mem. at 9; SEZ Resp. at 7-8. But unlike their contention that they agreed about the function of the "holding means", their agreement here is more than skin deep. Thus, we turn to identifying the corresponding structure in the specification.

Unsurprisingly, the two sides are at odds as to the corresponding structure. SSEC argues that it is "annular gas channel 5 and annular nozzle 6" as presented in the preferred embodiment. SSEC Mem. at 9-10. SEZ, on the other hand, contends that the "gas feed means" is "one or more nozzles or annular nozzles or channels or gaps". SEZ Resp. at 9.

We must reject SSEC's identification of the corresponding structure because we find more general descriptions of the corresponding structure in the specification and see no reason to limit the structure to the preferred embodiment. The specification states that the

gas feed means can consist of one or more nozzles or an annular nozzle. These nozzles should be attached symmetrically to the center of the chuck in order to enable uniform gas flow over the entire periphery.

U.S. Patent No. 6,435,200 Col. 2, Ln. 30-33. Also, patent '200 presents the "gas feed means" and "gas guide device" in combination as "defin [ing] an inverted U-shaped channel for gas." Id. Claim 18. The preferred embodiment describes the "gas feed means" as an "annular channel" created when the cover and the base body are joined together, and "which on the top (the side facing the wafer) discharges into an annular gap, the annular nozzle 6." Id. Col. 4, Ln. 29-30. Each of these embodiments involves either a configuration of channels, nozzles (or an annular nozzle), or gaps between pieces of the chuck, all of which allow for at least partial flushing of the surface of the wafer-shaped article which faces the holding means. As this statement of the corresponding structure includes all of the necessary structures for accomplishing the identified function, we adopt it as the meaning of "gas feed means".

C. "sharp edge"

The next disputed term is "sharp edge". We find this claim term within the description of gas guide device in claim 1 of the '200 patent, which states, "the device includes a gas guide device which has an inner periphery with a sharp edge and which routes most of the flushing gas away from the edge area of the wafer-shaped article." U.S. Patent No. 6,435,200 Claim 1. SEZ contends that this term should be given its customary, dictionary definition, *i.e.*, "an edge that is not obtuse or rounded". SEZ Mem. at 7. SSEC, on the other hand, argues that the patentee gave the term "sharp edge" an idiosyncratic definition, and points to the specification where it states that "[i]n another embodiment the gas guide device on its inner periphery has a sharp edge (edge angle less than 60 (deg))." U.S. Patent No. 6,435,200 Col. 3, Ln. 6-7. SSEC contends that "sharp edge" should have the more limited meaning of "an edge less than 60 (deg)". SSEC Mem. at 11.

We must determine whether the patentee was using the language in the specification as "an intentional disclaimer, or disavowal, of claim scope," or if, instead, the sixty degree limitation is a particular embodiment, and restricting the claim term thus would amount to "importing limitations from the specification into the claim. Phillips, 415 F.3d at 1316, 1323. We find that the most consistent reading of the

claims and written description of the invention obliges us to interpret "sharp edge" as having the broader suggested meaning.

"Sharp edge" is part of one version of the gas guide device. If we compare Claims 1 through 8 with the specification we see that they track one another and what is claimed is the embodiments of the device described in the specification. *Compare* U.S. Patent No. 6,435,200 Claims 1-8 *with* Col. 2, Ln. 34 to Col. 3, Ln. 37. Claim 1 presents a "gas guide device which has an inner periphery with a sharp edge". Each of the following claims are dependent on this initial presentation of the gas guide device. FN13 To this Claims 2 adds that "the gas guide device has the shape of a ring." Claim 3, which is dependent on Claim 2, specifies that the ring "has an inner diameter which is smaller than the outside diameter of the wafer-shaped article and an outside diameter which is at least the same size as the outside diameter of the wafer-shaped article." Claim 4 goes back to Claim 1 and adds that "the gas guide device is formed by an annular groove which is concentric to the periphery of the holding means."

FN13. "[A] claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference *all* the limitations of the claim to which it refers." 35 U.S.C. s. 112, para. 4 (emphasis added).

These claims track the specification almost word for word. In the specification, one embodiment describes the gas guide device as having the shape of a ring with inner and outer diameters specified relative to the wafer, another as "an annular groove which is concentric to the periphery of the means", and finally one that has a "a sharp edge (edge less than 60 (deg.))" on "its inner periphery". *Id.* Col. 2, Ln. 56 to Col 3, Ln 7.

What is confusing is that the claims require a sharp edge at the inner periphery regardless of whether the gas guide device is an annular groove in the holding means or a ring with inner and outer diameters specified relative to the wafer-shaped article. Yet the specification mentions the sharp edge after it describes these shapes, and states that this is a feature of the gas guide device "[i]n another embodiment". *Id.* Col. 3, Ln. 6. Had the specification, like the claims, first asserted that the gas guide device had a sharp edge at its periphery and included a parenthetical limiting the edge angle to less than sixty degrees, then such a parenthetical would indeed operate as an explicit limit of the claim scope. But here, where the specification describes the sharp edge of less than sixty degrees as part of a different embodiment than all those that came before, the reading that "stays true to the claim language and most naturally aligns with the patent's description of the invention" would interpret the phrase "sharp edge" as used in the specification as a particular embodiment of the gas guide device and more limited than the phrase "sharp edge" as used in the claims. *Renishaw*, 158 F.3d at 1250. Therefore, we construe "sharp edge" in Claim 1 of the '200 patent to mean an edge that is not obtuse or rounded.

D. "annular groove"

Although allegedly a disputed term, searching through the briefs we find no disagreement between the parties about it. Thus, we construe it as having its customary meaning, *i.e.*, ring-shaped channel or hollow.

E. "gas guide device" or "gas guide"

All three patents-in-suit use the term "gas guide device" or "gas guide" in their claims. The parties agree that the two terms are synonymous, and we treat them as such.

As we noted above, the "gas guide device" is described at length in the specification and many of the claims are dedicated to claiming the subtle differences in structure found in the distinct embodiments. SSEC argues that "gas guide device" means "a single, integral structure that forms (1) an annular gap between itself and the wafer and (2) an annular gas discharge channel which routes flushing gas away from the annular gap." SSEC Mem. at 11. SEZ contends that "gas guide device" means "a device that guides or diverts the flow of gas". SEZ Mem. at 6.

Neither of these meanings is adequate. SSEC lifts its suggested meaning directly from the preferred embodiment without considering that the claims that assert a version of the "gas guide device" that do not comport with this meaning, *e.g.*,

wherein said gas feed means and said gas guide together define an inverted U-shaped channel for a gas, the gas contacting the bottom surface of the wafer-shaped article at an apex of said inverted U-shaped channel and radially inward from the edge of the wafer-shaped article.

U.S. Patent No. 6,435,200 Claim 18. Several dependent claims also refer to an "annular gas guide" or to where the "gas guide is annular", strongly suggesting that the "gas guide device" is not necessarily annular. *E.g.*, U.S. Patent No. 6,435,200 Claim 15; U.S. Patent No. 6,858,092 Claim 31. Given that SSEC's suggested meaning is limited to an annular gap and annular discharge channel, the above claim would not be covered. Thus, SSEC's suggested meaning will not do.

Where SSEC's suggested meaning is too narrow, SEZ's suggested meaning seems too broad. Both sides agree that s. 112, para. 6 does not apply to the term "gas guide device", so the patentee has to recite structure in the claims. Yet, if "gas guide device" were to mean "a device that guides or diverts the flow of gas", then we are left with no structure at all, but have only the function the said device is supposed to serve. It is possible that a person of ordinary skill in the art would read "gas guide device" broadly and understand how to make this part of the invention without more direction. But the overall purpose of the invention- *i.e.*, liquid treatment of a defined section of a wafer-shaped article-can only be accomplished through the combination of the holding means, gas feed means, and gas guide device. *Id.* Col. 2, Ln. 4-12. And the patent declares that its advance on the prior art centers on the gas guide device and how it is structured. U.S. Patent No. 6,435,200 Col. 2, Ln. 46-48 ("The advantage of the invention over the prior art is that the size of the section near the edge can be any size desired by means of the suitable selection of the gas guide device."). It seems strange for the patent to leave such a central component of the invention-indeed, the portion of the invention that the patent declares as an essential aspect of the advancement on prior art-defined without reference to any structure whatsoever.

This difficulty arises because of the interrelated nature of the holding means, gas feed means, and gas guide device, and further examining the context within which the term "gas guide device" appears resolves our problems. As we have discussed above, the holding means and gas feed means are both part of the chuck. The holding means consists of the portions of the chuck that permit the chuck to hold the wafer aloft on a cushion of air. These structures can be, and indeed the preferred embodiments describes them as, including some of the same channels and nozzles that make up the gas feed means. These channels and nozzles provide the gas that both holds the wafer, and also the gas that flushes the side of the wafer that faces the chuck. This flushing prevents the liquid treatment from reaching farther than desired onto the side of the wafer facing the chuck.

The sole purpose of the gas guide device is to direct the gas emanating from the gas feed means (and holding means) away from the wafer. The claims and specifications enumerate several different ways one can make this work, *e.g.*, an annular groove on the periphery of the holding means consisting of a series of holes leading outside the holding means, or a ring attached to the top of the chuck with a gap between the chuck and the ring created by spacers. U.S. Patent No. 6,435,200 Claims 2-4, Col. 255-58, Col. 3, Ln. 1-5. All of these different permutations of the "gas guide device" have a few things in common. First, the gas guide device, by necessity, is at the periphery of the holding means. U.S. Patent No. 6,435,200 Col. 2, Ln. 4-12 ("the invention in its general embodiment proposes a device ... with a means for holding the wafer-shaped article ... in which on the peripheral side there is a gas guide device"); *see also* U.S. Patent No. 6,435,200 Claims 1, 9, 14; U.S. Patent No. 6,858,092 Claim 31; U.S. Patent No. 7,700,702 Claims 1, 9, 10. Second, there must be a single or series of channels, holes, or nozzles that direct the flow of air away from the wafer edge, usually outside the chuck-the patent reveals no other options for directing the flow of the gas. *Id.* Col. 2, Ln. 34-40, Ln. 65-67, Col. 3 Ln. 1-43. Thus, we construe "gas guide device" and "gas guide" to mean a device attached to or part of the periphery of the chuck that directs the flow of gas emanating from the gas feed means away from the chuck through a single channel, hole, or nozzle or a series of them.

F. "defined area"

The parties dispute the meaning of the term "defined area" which is found in the '092 and '702 patents. SSEC contends that "defined area" is "the area designated as d in figure 3, *i.e.*, the wetted area of the wafer that extends beyond the inner edge of the gas guide." SSEC Mem. at 14. SEZ argues that "defined area" should have its customary meaning: "an area whose limits are fixed or marked." SEZ Resp. at 10. We note as an initial matter that we cannot and will not limit the meaning of the term to the relevant structure described in the preferred embodiment.

In every instance, the term "defined area" is qualified by a phrase placing said area near the edge of the wafer. "Defined area" appears in five different claims in the '092 and '702 patents. U.S. Patent No. 6,959,092 Claims 1, 8, 16, 23, 31; U.S. Patent No. 7,007,702 Claims 1, 9, 10. In each relevant claim in the '092 patent, the first use of "defined area" is always followed by the phrase "near the peripheral edge of the wafer-shaped article". *Id.* Claims 1, 8, 16, 23, 31. In each of the '702 patent claims containing the term "defined area", the first use of the term is followed by the phrase "adjacent to a peripheral edge". U.S. Patent No. 7,007,702 Claims 1, 9, 10. Thus, this is argument for argument's sake; nonetheless, we must construe this term.

The term "defined area" cannot be restricted to the edge area of the wafer. Qualifying or limiting phrases used to modify a term imply that the modification is not part of the term's inherent meaning. Phillips, 415 F.3d at 1314 ("To take a simple example, the claim in this case refers to "steel baffles", which strongly implies that the term "baffles" does not inherently mean objects made of steel."). Here, every time the term "defined area" appears it is initially modified by a phrase placing said "defined area" at the edge of the wafer, strongly implying that "defined area" does not inherently mean an area at the edge of the wafer. Thus, we will construe the term "defined area" to mean an area whose limits are fixed or marked. But we note that the claims themselves call for this area, in every instance, to be at or near the edge of the wafer.

G. "holder"

The final term that we must construe is "holder", a term that appears nowhere in the specifications, and only in the '702 and '092 patents' claims. We are asked only to construe the term in the '092 patent. SSEC wants us to construe the term holder to be co-extensive with the term "holding means". SSEC Mem. at 16.

Unsurprisingly, SEZ disagrees and argues that it should have a broader meaning, namely, "a device that holds the wafer in position for processing". SEZ Mem. at 8.

The best way to construe this term is to examine the '092 claims alongside the claims of its related patents. The '092 patent claims the process for etching or cleaning the wafer whereas the '702 and '200 patents claim the structures involved in this process. A person of ordinary skill in the art would understand that the '092 patent would cover the process that the structures in the '702 and '092 patents use to accomplish the overall task of liquid treatment. Claim 1 of the '092 patent states that it claims

A process for treating a wafer-shaped article with a liquid in a defined area near a peripheral edge of the wafer-shaped article, the process comprising the steps of:

placing the wafer-shaped article onto a holder, the wafer-shaped article having a first side facing the holder, a second side opposite the first side, and a peripheral edge between the first and second sides, the defined area being on the first side;

providing a gap between the first side of the wafer-shaped article and the holder, the gap extending radially inward from the peripheral edge to a recess in the holder, the radially inward extent of the gap defining the defined area;

applying the liquid in the gap to wet and treat the defined area with the liquid, the gap being filled so that the liquid simultaneously wets the defined area and part of the holder,

wherein the recess is a channel that branches from the gap at the radially inward end of the gap, and further comprising the step of diverting the liquid

A person of ordinary skill in the art would read this claim as presenting the process used to etch the wafer in the Claim 1 of the '702 patent, which reads in pertinent part,

said gas guide being arranged to be separated from the first surface by a gap and having a channel to divert most of the gas away from the defined area when the wafer-shaped article is being held by said holding means, said gap having a width that permits creation of a capillary force that causes the liquid to enter into said gap and to wet and etch the defined area of the first surface adjacent to the peripheral edge, wherein within the defined area, a surface of said gas guide facing the first surface is parallel to the first surface.

The '092 patent process clearly covers how the '702 structure actually etches or cleans the wafer-shaped article. Yet it is the "gas guide", and not the "holding means", that the process would wet when the liquid entered the gap. As we have noted earlier, the holding means, gas guide, and gas feed means can all be part of the chuck upon which the wafer-shaped article rests. The most consistent reading of the term "holder" as it used in the '092 patent would include all parts of the chuck, and not simply the "holding means". Thus, we shall construe the term "holder" to mean the chuck upon which the wafer is placed for processing.

ORDER

AND NOW, this 26th day of June, 2008, upon consideration of the parties' respective motions for claims construction (docket entry #), the plaintiff's corrected brief, the parties' responses and replies, and for the reasons articulated in the accompanying Memorandum, it is hereby ORDERED that:

1. The defendant's motion for claims construction is DENIED;
2. The plaintiff's motion for claims construction is GRANTED IN PART and DENIED IN PART as follows;
3. The claim term "holding means ..." as used in U.S. Patent Nos. 6,435,200 and 7,007,702 IS a means for holding a wafer-shaped article consisting of portions of a rotary chuck that supports the wafer vertically using a vacuum or a cushion of air, and prevents lateral displacement using lateral guide elements;
4. The claim term "gas feed means ..." as used in U.S. Patent Nos. 6,435,200 and 7,007,702 IS a means for at least partial flushing of the wafer-shaped article which faces the holding means consisting of a configuration of channels, nozzles, an annular nozzle, or gaps between pieces of the chuck;
5. The claim term "gas guide device" or "gas guide" as used in U.S. Patent Nos. 6,435,200, 6,858,092, and 7,007,702 IS a device attached or part of the periphery of the chuck that directs the flow of gas emanating from the gas feed means away from the chuck through a single channel, hole, or nozzle, or a series of them;
6. The claim term "sharp edge" as used in U.S. Patent No. 6,435,200 IS an edge that is not obtuse or rounded;
7. The claim term "annular groove" as used in U.S. Patent No. 6,435,200 IS a ring-shaped channel or hollow;
8. The claim term "defined area" as used in U.S. Patent Nos. 6,858,092 and 7,007,702 IS an area whose limits are fixed or marked;
9. The claim term "holder" as used in U.S. Patent Nos. 6,858,092 IS the chuck upon which the wafer is placed for processing;
10. The parties shall CONVENE in Chambers (Room 10613) for a preliminary settlement conference on July 18, 2008 at 10:00 a.m., and a representative of each party with plenary settlement authority shall be AVAILABLE by phone;
11. Further scheduling shall ABIDE resolution of the preliminary settlement conference.

E.D.Pa.,2008.

SEZ AG v. Solid State Equipment Corp.

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