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On behalf of:

ASM IP Holding B.V.

By: Kerry S. Taylor

Adeel S. Akhtar

Nathanael R. Luman

Bridget A. Smith

KNOBBE, MARTENS, OLSON & BEAR, LLP

2040 Main Street, 14th Floor

Irvine, CA 92614

Telephone: 858-707-4000

Facsimile: 858-707-4001

Email: BoxASM2@knobbe.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ASM IP HOLDING B.V.

Petitioner,

v.

KOKUSAI ELECTRIC CORPORATION

Patent Owner

IPR2019-00369

U.S. Patent 7,808,396

**PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 7,808,396**

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OTHER AUTHORITIES

35 U.S.C. §102	4, 5, 18, 19, 21
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35 U.S.C. §112	4, 5
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37 C.F.R. §42.8	73, 74
83 Fed. Reg. 51,341 (Oct. 11, 2018)	4
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Exhibit No.	Description
1001	U.S. Patent 7,808,396 (“the ’396 patent”)
1002	File History of US 11/991,093
1003	Declaration of Alexander Glew, Ph.D.
1004	CV of Alexander Glew, Ph.D.
1005	Tencor P-20h Long Scan Profiler Operations (1996) (Tencor)
1006	KR 2003-0058863, Declaration of Jong Man Choi, and Translation (Kang)
1007	US 5,859,885 (Rusnica)
1008	US 7,079,984 (Eryurek)
1009	Declaration of Brian Crawford
1010	https://www.merriam-webster.com/dictionary/condition
1011	Complaint from <i>Hitachi Kokusai Electric Inc. v. ASM International, N.V.</i> , C.A. No. 17-cv-06880 (N.D. Cal)
1012	Certificate of Service from <i>Hitachi Kokusai Electric Inc. v. ASM International, N.V.</i> , C.A. No. 17-cv-06880 (N.D. Cal)
1013	Declaration of Bridget A. Smith
1014	Printout of https://archive.org/legal/affidavit.php
1015	Printout of https://web.archive.org/web/20041130142122/http://www.fabsurplus.com:80/
1016	Printout of https://web.archive.org/web/20041204090504/http://www.fabsurplus.com:80/equip_sale.htm
1017	Printout of http://web.archive.org/web/20040724054947/http://www.specequipment.com:80/home.html

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1018	Printout of http://web.archive.org/web/20040907232356/http://www.specequipment.com:80/inventory/index.html
1019	Printout of https://web.archive.org/web/20040908044251/http://www.specequipment.com:80/products/000273.html
1020	Printout of https://web.archive.org/web/20040908044311/http://www.specequipment.com:80/products/000278.html
1021	Printout of https://web.archive.org/web/19961229182640/http://www.tencor.com:80/
1022	Printout of https://web.archive.org/web/19970302032823/http://www.tencor.com:80/requestlit.html
1023	K.H. Baek et al., <i>Global pattern density effects on aluminum alloy etching for sub-0.25 mm technology logic devices</i> , Journal of Vacuum Science & Technology B, vol. 19 (2001) 2104–2107
1024	C. Gu, SIMS Quantification of Matrix and Impurity Species in III-Nitride Alloys (2006) (Ph.D. dissertation, North Carolina State University) and library record

ASM IP Holding B.V. (“ASM”) requests inter partes review of Claims 1–10 of US 7,808,396 (“the ’396 patent,” Ex. 1001), purportedly owned by Kokusai Electric Corporation (“Kokusai”).

I. INTRODUCTION

The ’396 patent is about the ubiquitous “signal indicators”—signal towers and sound buzzers—on substrate processing apparatuses. Ex. 1003 ¶31. Signal indicators visually and audibly indicate equipment states or process events to users. *Id.*; Ex. 1001, 1:13–17. They are old and commonplace and were standardized internationally before the ’396 patent. Ex. 1003 ¶31. The patent’s background admits that “a signal indicator has **widely** been used as a means for displaying (informing) a running state to the outside of the apparatus.” Ex. 1001, 1:11–13.¹

The background also admits that, in the prior art, users defined when and how signal indicators operate using “operation conditions.” *Id.*, 1:17–36. An operation condition is merely a predetermined condition for operating a signal indicator. *Infra* §IV.A. These operation conditions are based on running states of the substrate processing apparatus, “for example, turn light on (make sound) when the substrate processing apparatus is in A-state” Ex. 1001, 1:31–34. If an

¹ Unless stated otherwise, where text is shown in **bold**, the emphasis has been added.

operation condition is satisfied by occurrence of its associated running state, then a signal indicator will operate following the user's settings. Ex. 1003 ¶20.

The patent asserts that signal indicators alone may not adequately convey to a user **why** they are operating, that is, which operation conditions were satisfied and caused the signal indicators to operate. Ex. 1001, 1:31–46. For example, a signal-tower light may be setup to operate under any of multiple operation conditions (“for example, turn light on when the substrate apparatus is in A-state **or** B-state”). *Id.*, 1:31–36. The user may see that a running state occurred by observing the light. But the user may not fully understand, merely by looking at the light, which running state (A-state or B-state) occurred, satisfied an operation condition, and caused the light to operate. *Id.*

The '396 patent purports to solve this problem with a thoroughly quotidian approach: displaying the reasons why the signal indicators are operating on a user interface (UI) device. *Id.*, 1:47–50. It merely performs on a computer monitor what people have done with pen and paper for years. For example, if a business owner is frequently away during business hours because the owner is either at lunch, running an errand, or closed early, the owner may keep prewritten adhesive notes next to the door and stick the appropriate note on the door before departing. Visitors may see that the owner is away by observing a locked door. But the visitors may not fully appreciate why the person is away without an explanation.

The owner's notes provide that explanation and perform precisely the same function as the '396 patent's UI device.

The idea behind the patent claims is hardly new. Kang (Ex. 1006) addresses the same problem as the '396 patent and arrived at the same solution before the '396 patent. Kang and the '396 criticize prior art signal towers and sound buzzers as unable to convey adequate information about the current running state of a substrate processing apparatus. *Compare* Ex. 1006, 3 *with* Ex. 1001, 1:11–46. And both Kang and the '396 patent reached the same solution to that problem: displaying text on a monitor to explain why they are operating. *Compare* Ex. 1006, 3–5 *with* Ex. 1001, 1:54–60; 12:10–18, 12:62–67, 13:30–38, Figs. 9, 11. The '396 patent admits that signal indicators are not new and that the conditions (even combined conditions) for operating these signal indicators are not new. Ex. 1001, 1:11–36. Importantly, in view of Kang, the decision to display the cause for the operation of the signal indicators in text is not new either. Ex. 1006, 3–5.

The '396 patent issued with a first-action allowance. The PTO did not know about the prior art cited in this Petition during the original prosecution, let alone vet the claims against it. *See generally* Ex. 1002. Based on the all new art in this Petition, the Board should cancel the challenged claims.

II. PRIORITY DATE

The earliest possible priority date for purposes of determining prior art under §102(e) is September 26, 2005. The effective filing date for determining prior art under §102(b) is the PCT filing date of September 26, 2006. The pre-AIA versions of §§102 and 103 apply.

III. LEVEL OF ORDINARY SKILL IN THE ART

A person of ordinary skill in the art would have had an undergraduate degree in materials science, engineering, or a similar technical discipline, and had at least two years of experience relating to the design and development of semiconductor manufacturing devices. Alternatively, such a person may have had additional graduate education as a substitute for professional experience, or significant work experience as a substitute for formal education. Ex. 1003 ¶30.

IV. CLAIM CONSTRUCTION

Claim terms are accorded their plain and ordinary meaning applying a *Phillips*-type construction,² consistent with the PTAB's rule on claim construction. 83 Fed. Reg. 51,341 (Oct. 11, 2018).

² The Board need only construe claims to the extent necessary to resolve controversy. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017). The Board need not reach the issue of whether the claim satisfy all aspects of §112, second paragraph. See 83 Fed. Reg. at 51,343.

A. “operation conditions” (Claims 1 and 9)

Claim 1 recites “a plurality of signal indicators operating under any one of a plurality of **operation conditions**” and “a display unit for displaying the **operation conditions** ... being set independently in advance of being displayed.” Claim 9 recites “a display unit for displaying **operation conditions** that are set independently and in advance corresponding to the signal tower and the buzzer” representing “a plurality of signal indicators.”

There are multiple ordinary meanings of the lay word “conditions.” One meaning connotes a current state or circumstances. Ex. 1010 (definitions 4d and 4e, for example, “living conditions”). Another connotes a prerequisite, or “something essential to the appearance or occurrence of something else.” *Id.* (definition 2).

The specification makes clear the claimed “operation conditions” aligns with the latter meaning: they are predetermined conditions for operating the signal indicators based on the running states of the semiconductor processing apparatus. Ex. 1003 ¶38. Put simply, if an “operation condition” is satisfied because a certain running state occurs, then an associated signal indicator will operate. *Id.*; *accord* Ex. 1001, 15:20–56.

ASM reserves the right to raise challenges under §§112 and 120 under applicable standards in district court.

The specification sometimes refers to operating conditions as “factors” or “requirements” based on a set of running states. Ex. 1001, 2:50–54, 9:59–62; Ex. 1003 ¶39; *see also* Ex. 1001, 9:63–10:2, 12:10–18, 12:22–36. Figure 7 of the ’396 patent, reproduced below, shows an example set of running states:

FIG.7

RUNNING STATE OF SUBSTRATE PROCESSING APPARATUS 100

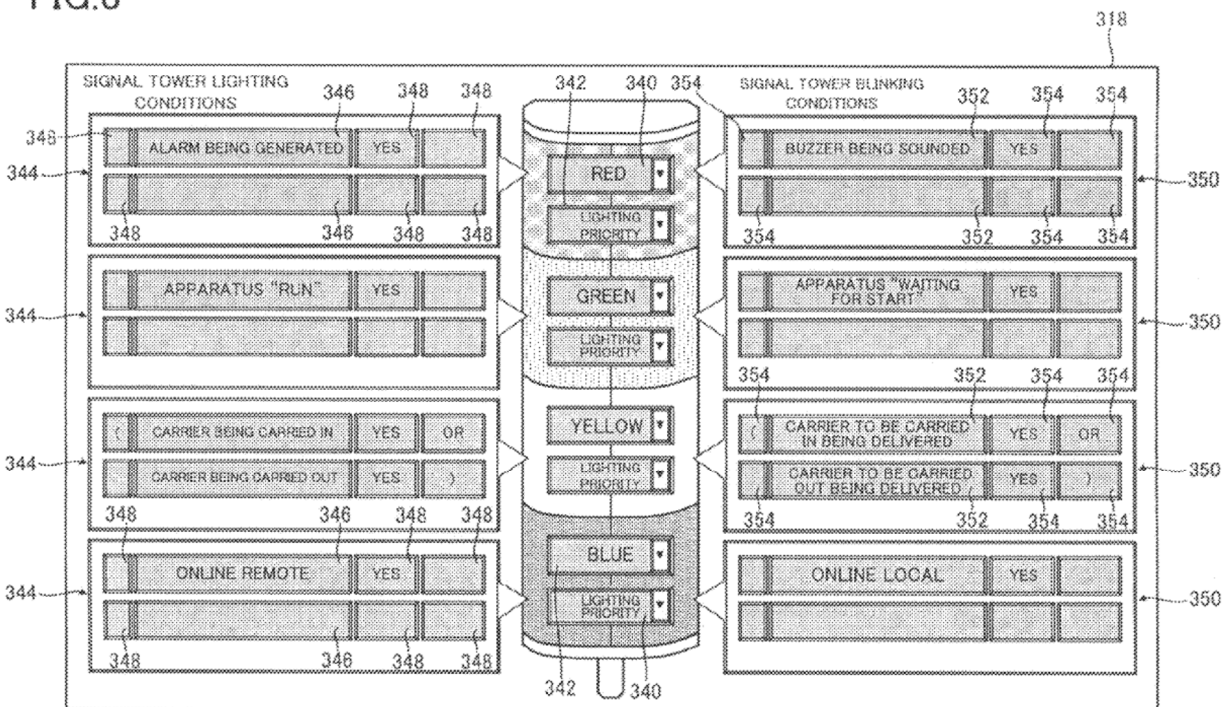
⋮
⋮
APPARATUS “RESET”
APPARATUS “WAITING FOR START”
APPARATUS “RUN”
APPARATUS “END”
APPARATUS “IDLE”
⋮
⋮

Ex. 1001, Fig. 7; *see also id.*, 9:62–10:2.

The operation conditions associate certain running states with the operation states of the signal indicators such that, when a certain running state occurs, the operation condition is satisfied, and satisfaction of the operation condition causes the associated signal indicator to operate. Ex. 1001, 15:20–56.

Figure 8, for example, shows a user interface (“first input screen 318”) displayed on display unit 314 “to set an operation condition of the signal tower” based on various running states. Ex. 1001, 10:7–8.

FIG.8



Id., Fig. 8. The left and right columns—lighting condition input sections 344 and blinking condition input sections 350—are for setting the operation conditions of the signal tower. *Id.*, Fig. 8, 10:9–11:6. The lighting conditions control when a light color on the signal tower is turned on. *Id.*, 10:47–52. The blinking conditions control when a light color on the signal tower blinks. *Id.*, 10:62–11:6. If a lighting condition or a blinking condition is satisfied, then the signal tower will operate as defined. *See generally id.*, 10:28–11:61, 12:10–18, 12:45–60, 15:60–16:3, 16:40–55, Figs. 8–11; Ex. 1003 ¶42.

Consistent with the written description of the specification, skilled artisans would have understood that “operation conditions” are predetermined conditions for operating the signal indicators based on the running states of the semiconductor processing apparatus. Ex. 1003 ¶48.

B. “operation cause” and “operation causes” (Claims 1 and 10)

Claims 1 and 10 refer to displaying “operation causes.” Claim 1 specifies that the display unit “displays whole **operation causes** which correspond[] to the signal indicators and displays with a different color **the operation cause which corresponds to the operation of the signal indicator** among the whole operation causes.” Claim 10 specifies that the display unit displays “all of **operation causes** of the signal indicators.”

As explained below, skilled artisans would have understood that the “operation causes” in Claims 1 and 10 correspond to operation conditions that are displayed, regardless of whether they are satisfied by a running state. Ex. 1003 ¶50. The term “the operation cause which corresponds to the operation of the signal indicator” in Claim 1 refers to the operation condition that was satisfied and actually caused the operation of the associated signal indicator. *Id.*; *see, e.g.*, Ex. 1001, Abstract, 1:54–60, 15:1–10, 18:16–18, 15:30–34, 15:39–49, Figs. 9, 11.

1. “operation causes” (Claim 1)

Claim 1 specifies that the display unit “displays whole **operation causes**³ which correspond[] to the signal indicators and displays with a different color the operation cause which corresponds to the operation of the signal indicator among the whole operation causes.”

The word “cause” appears in the specification, and the specification explains that the **operation conditions** “cause ... the operation” of the signal indicators. Ex. 1001, Abstract, 1:58–59. The specification also explains how,

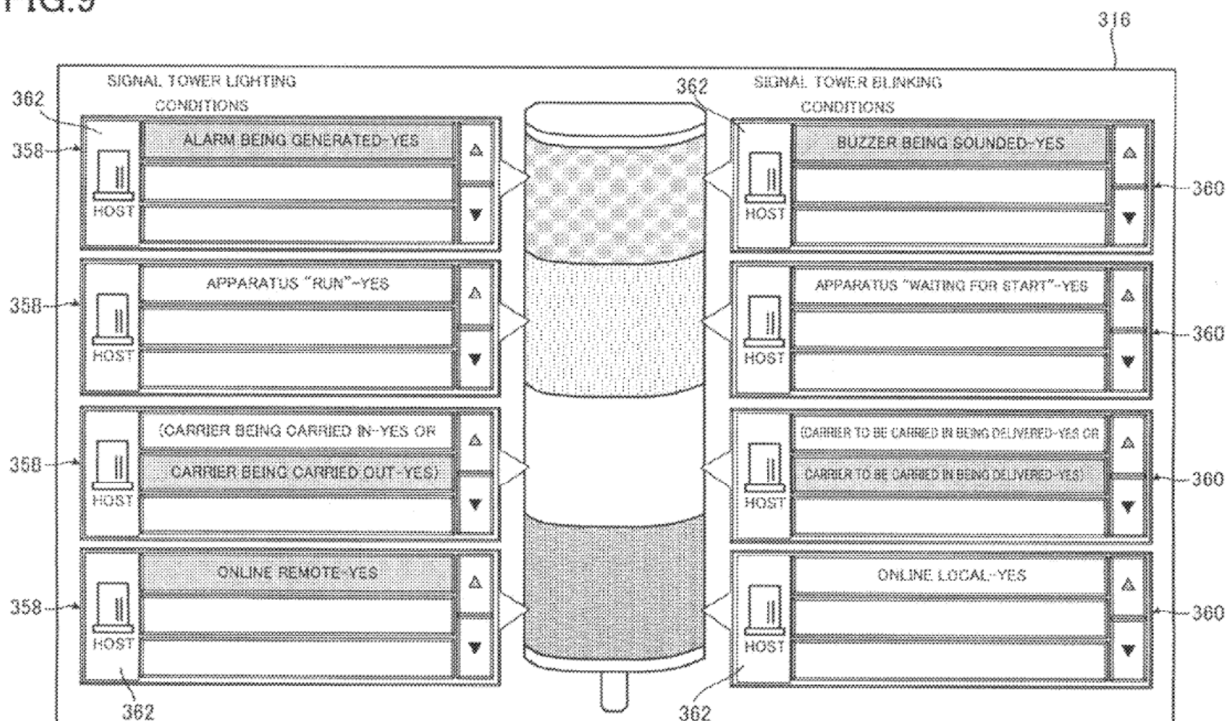
- if an operation condition has been associated with a running state, the operation condition “causes” the signal indicator to operate (or affirmatively “does not cause” the signal indicator to operate) whenever that running state occurs on the substrate processing apparatus (*e.g., id.*, 15:1–10, 15:39–48, 18:16–26);
- if no operation condition has been associated with a running state, then nothing will “cause” a signal indicator to operate when that running state occurs on the substrate processing apparatus (*e.g., id.*, 15:30–34).

³ The terms “operation cause” and “operation causes” do not appear in the specification. Nor does the word “whole.”

Therefore, as a threshold matter, skilled artisans would have understood that the “operation causes” that correspond to the signal indicators are operation conditions. Ex. 1003 ¶52. Operation conditions cause the signal indicators to operate as instructed when their associated running states occur. *Id.* And Claim 1 requires the display unit to display them.

Figures 9 and 11 show how operation conditions are displayed. The accompanying written description explains that the monitor screens 316, 374 display operation conditions in lighting, blinking, and sound condition display sections 358, 360, 376. Ex. 1001, 11:43–47, 11:59–66, 12:10–13, 12:10–13, 13:6–12; Ex. 1003 ¶54. Figure 9 is reproduced below to illustrate how monitor screen 316 displays the operation conditions setup in Figure 8, discussed above.

FIG.9



Here, the lighting state display sections 358 display “the lighting conditions” and the blinking state display sections 360 display “the blinking conditions.” Ex. 1001, 11:45–47, 11:59–61; *see also id.*, 13:6–8. The lighting conditions and blinking conditions are displayed in display sections 358, 360 on the monitor screen 316 in Figure 9, regardless of the substrate processing apparatus’s current running state. *Id.*, Fig. 9, *id.*, 11:34–37, 11:43–47, 11:59–66, 12:10–13, 13:6–12.

In light of the specification, including the use of “cause” to mean operation conditions and the written description of Figures 9 and 11 which illustrate how the display unit displays operation conditions, a person of ordinary skill in the art would have interpreted the “operation causes” of Claim 1 to be operation conditions that are displayed, regardless of whether they are satisfied by a running state. Ex. 1001, Abstract, 1:54–60, 11:43–47, 11:59–66, 12:10–13, 13:6–12, 15:1–10, 15:30–34, 15:39–49, 18:16–18.; Ex. 1003 ¶56.

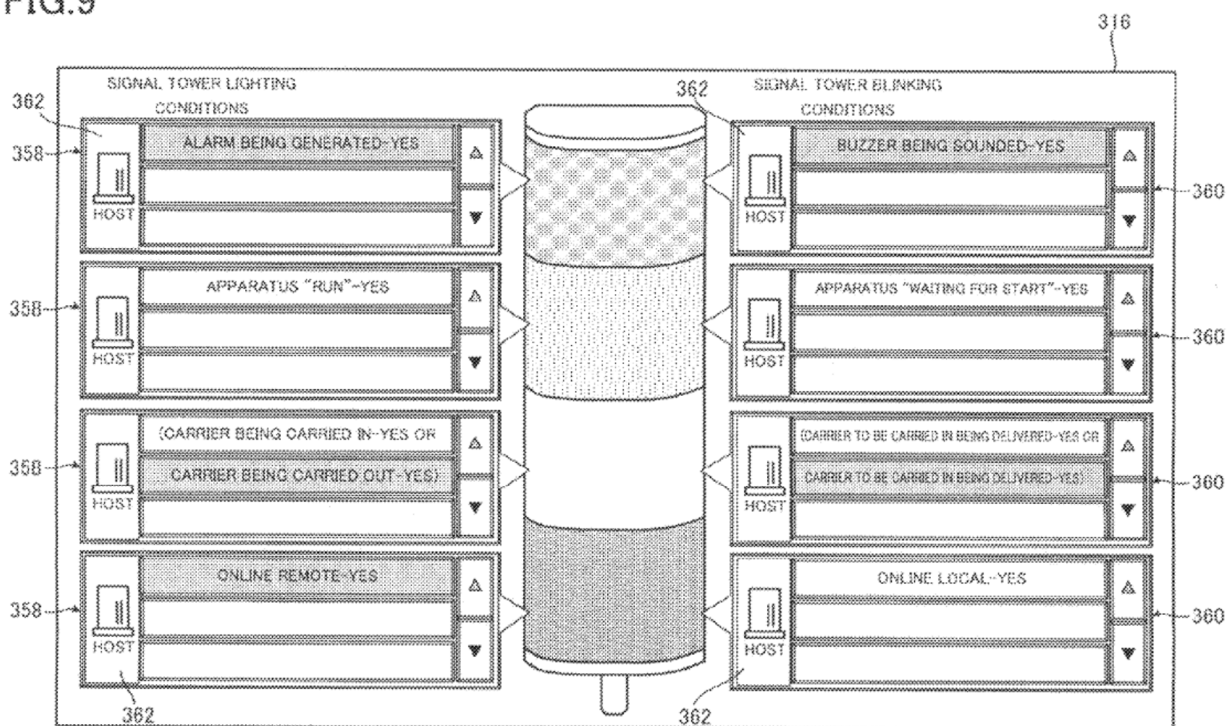
2. “the operation cause which corresponds to the operation of the signal indicator among the whole operation causes” (Claim 1)

Claim 1 specifies that the display unit “displays whole operation causes which correspond[] to the signal indicators and displays with a different color **the operation cause which corresponds to the operation of the signal indicator among the whole operation causes.**”

Although the term “operation cause” does not appear in the specification, the claim language makes clear that the operation cause is “among the whole operation

causes” and “displayed in a different color.” The reference to displaying an operation condition among other operation conditions in a different color would have led skilled artisans to Figures 9 or 11, which show how the first monitor screen 316 and second monitor screen 374 display the operation of the current signal indicator:

FIG.9



The corresponding written description of Figure 9 explains how the signal tower lighting conditions are displayed using different colors:

In the lighting state display sections 358, **the lighting conditions** set by the lighting condition input sections 344 [of Figure 8] **are respectively displayed**, and in the case where the lighting condition is **satisfied**, the satisfaction of the lighting condition is indicated. More specifically, **a background color of a part of the lighting condition**

display section 358 is displayed with a different color from that of the rest of the background part.

Ex. 1001, 11:43–47; *see also id.*, 12:10–18.

The specification includes almost identical written descriptions of how the blinking conditions (*id.*, 11:59–66) and buzzer sound conditions (*id.*, 13:6–12) are displayed. In short, the monitor screens 316, 374 display an operation condition with a different background color when its associated running state occurs, which causes the signal indicator to operate. *Id.*, 12:10–18; Ex. 1003 ¶62.

In light of the specification, including the written description of Figures 9 and 11, a person of ordinary skill in the art would have interpreted “the operation cause which corresponds to the operation of the signal indicators” as the operation condition that was satisfied by a running state and actually caused the operation of the associated signal indicator. Ex. 1001, Abstract, 1:42–45, 1:47–50, 1:54–60, 11:43–47, 11:59–66, 12:10–13, 13:6–12, 15:1–10, 15:30–34, 15:39–49, 18:16–18; Ex. 1003 ¶¶63–64.

3. “operation causes” (Claim 10)

Claim 10 specifies that “the display unit” displays “all⁴ of operation causes of the signal indicators.” Here, “operation causes” is entitled to the same

⁴ The word “all” appears a few times in the specification, but never in the context of something being displayed.

construction as in Claim 1 (§IV.B.1) because a “claim term should be construed consistently with its appearance ... in other claims of the same patent.” *Rexnord Corp. v. Laitram Corp.*, 274 F.3d 1336, 1342 (Fed. Cir. 2001); *see* Ex. 1003 ¶¶68.

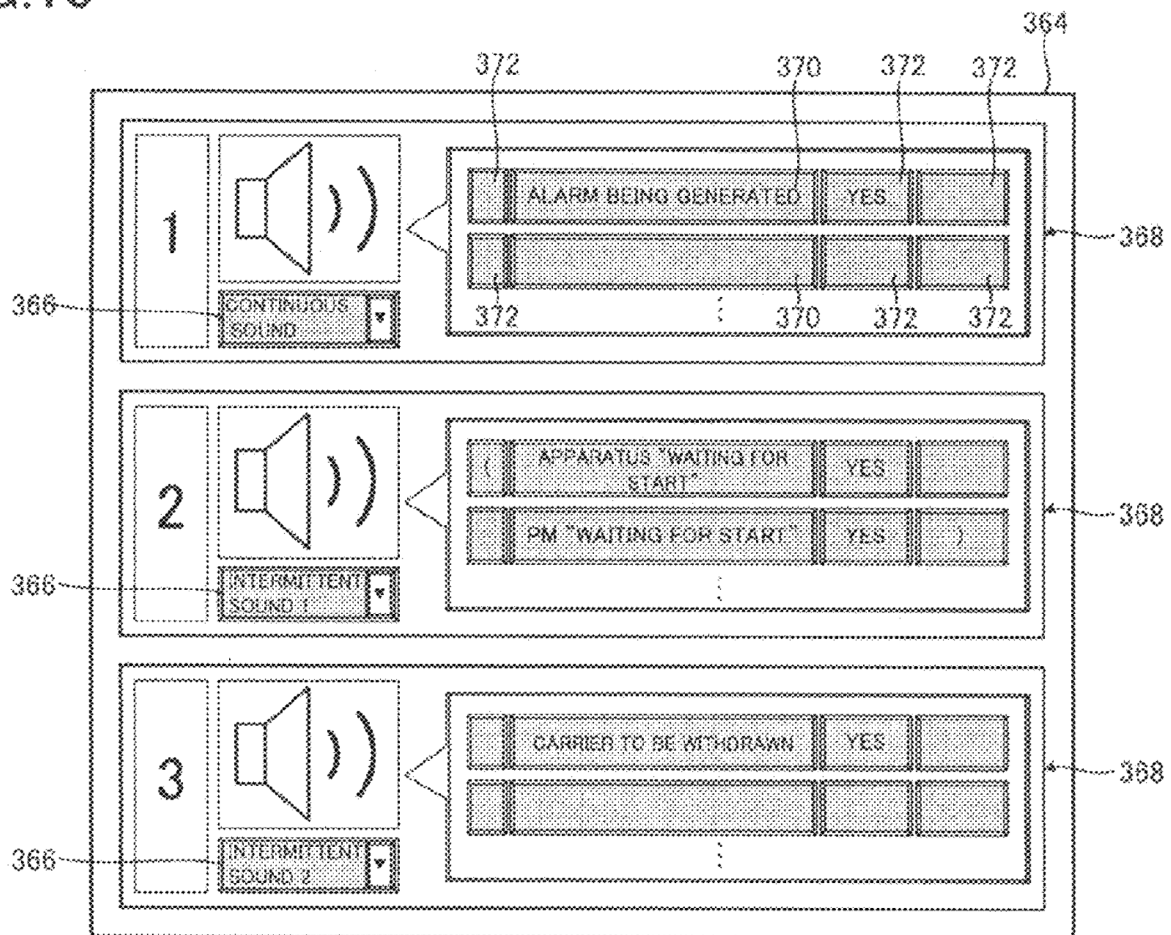
C. “wherein sound of the buzzer is recognized depending on a lighting state of the signal tower” (Claims 5–8)

Claims 5–8 depend from different base claims, but each recites the same additional limitation: “comprising a signal tower and a buzzer as the signal indicators, wherein sound of the buzzer is recognized depending on a lighting state of the signal tower.”

As written, a plain language interpretation of Claims 5–8 ostensibly denotes that recognition of “sound of the buzzer” depends on “a lighting state of the signal tower.” But the ’396 patent does not describe this configuration, so the plain language of the claim is inconsistent with the specification. Ex. 1003 ¶¶70.

A user sets the buzzer operating conditions in the second input screen 364 of Figure 10:

FIG.10

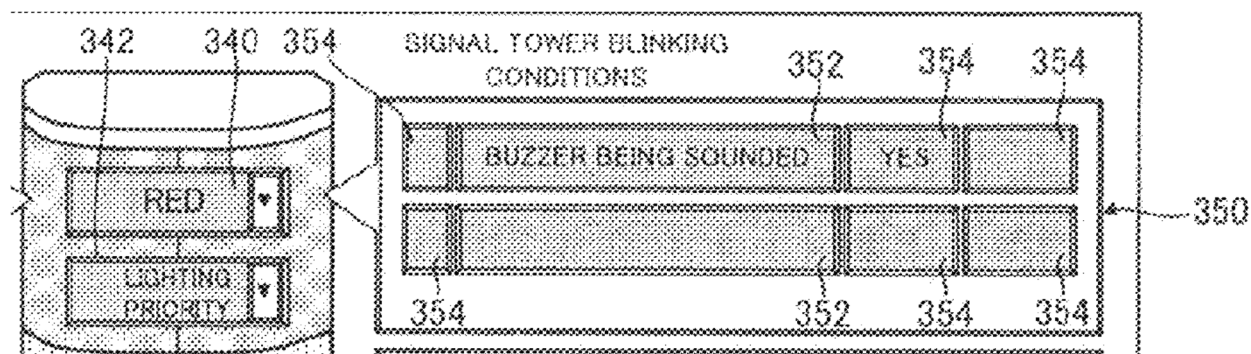


In this example, the buzzer “operation conditions” are defined in sound condition input sections 368. None of these operation conditions links sound of the buzzer with a lighting state of the signal tower (*see* Ex. 1001, 16:35–37, 16:7–11, 16:28–39, 16:63–65), nor does any other example or general description in the ’396 patent indicate or imply the sound of the buzzer depends on a lighting state. Ex. 1003 ¶73. According to the ’396 patent, the running state ALARM BEING GENERATED in the top input section 368 indicates only that an abnormality has

occurred on the apparatus; it does not indicate that the lighting state of the signal tower has changed. Ex. 1001, 16:35–37; Ex. 1003 ¶74.

And while the specification explains that the “sound control unit 404 controls the sound of the buzzer 310 based on the states received by the state receiving unit 402,” Ex. 1001, 15:1–10; *see also id.*, 18:11–15, Figs. 13–14, the specification never mentions that a **lighting** state of the signal tower is one of those possible states that ultimately determines the sound of the buzzer. Ex. 1003 ¶74.

The '396 patent does, however, disclose the **opposite** causal relationship. Figure 8 shows one example of input operation conditions in which the lighting state of the signal tower depends on the sound of the buzzer. Ex. 1003 ¶75. In Figure 8, the blinking “operation conditions” are defined in blinking condition input sections 350. Here, a user has associated a blinking operation condition BUZZER BEING SOUNDED-YES with the red light of signal tower 308:



This blinking operation condition dictates that, if the blinking operation condition is satisfied because, “yes,” the buzzer is being sounded, then the signal tower 308 will blink red, as instructed. Ex. 1003 ¶76. This example in Figure 8

(repeated in Figure 9) is the only instance in the '396 patent where “a lighting state of the signal tower” is causally linked to a “sound of the buzzer.” *Id.* And in this example, the lighting state depends on sound of the buzzer, and not the other way around, as claimed in Claims 5–8. This accompanying written description does not further elucidate this option. *Id.*

If the '396 patent provides written description support for Claims 5–8, then a logical conclusion is that these claims use “is recognized depending on” in a non-standard way. This conclusion is consistent with the specification, because the specification also uses the term “recognizing” in a non-standard way:

Particularly, in a large-scale factory or the like where plural substrate processing apparatuses are installed, there is a demand for a signal indicator capable of **recognizing** each of the running states of the substrate processing apparatuses on real-time basis.

Ex. 1001, 1:26–30; *see* Ex. 1003 ¶77. Based on this passage, skilled artisans would have appreciated that the '396 patent uses “recognizing” differently than its plain meaning would ordinarily imply. Ex. 1003 ¶78. Signal indicators are passive devices that operate as defined by operation conditions; they do not “recognize” running states. *Id.*

In light of 1) the lack of a written description of a “sound of the buzzer” that depends on “a lighting state of the signal tower”; 2) the example in Figure 8 showing the converse instance where “a lighting state of the signal tower” depends

on a “sound of the buzzer”; and 3) the non-standard use of “recognizing” in the ’396 patent specification, skilled artisans would have understood “wherein sound of the buzzer is recognized depending on a lighting state of the signal tower” simply to mean that sound of the buzzer is associated with a lighting state of the signal tower. *Id.* ¶79.

D. Construction of remaining terms and reservation of rights

ASM does not expect that the meaning of the remaining claim terms will be in dispute. ASM notes, however, that the ’396 patent has been asserted in district court litigation, *see* Ex. 1011, and Kokusai has not served its infringement contentions or claim construction positions. Should Kokusai offer a claim construction for any claim term, ASM reserves the right to offer a responsive construction (in district court or in this IPR).

V. IDENTIFICATION OF CHALLENGE

A. Identification of prior art

The following references qualify as prior art under §102.

Reference	Exhibit	Basis	Date
Kang	1006	§102(b)	Published July 7, 2003
Tencor	1005	§102(b)	Published 1996
Rusnica	1007	§102(b)	Issued January 12, 1999
Eryurek	1008	§102(e)	Filed in the United States on October 22, 2004 and claims the benefit of a provisional application filed on March 3, 2004

1. Publication of Tencor

Tencor bears a copyright date of 1996—well before the '396 patent's §102(b) date. Ex. 1005, 3. Tencor is a manual providing operating instructions for a product called the P-20H Long Scan Profiler (“the P-20H”), originally made by Tencor Instruments. Ex. 1009 ¶¶1, 4. The P-20H was sold around 1996. *Id.* ¶4. Customers purchasing the P-20H were given copies of Tencor. *Id.* ¶7. These customers included semiconductor and data storage manufacturers and research institutions. *Id.* ¶4. Thus, persons receiving a copy of Tencor were interested persons and persons of ordinary skill in the art. Ex. 1003 ¶13; *see Orion IP, LLC v. Hyundai Motor Am.*, 605 F.3d 967, 974–75 (Fed. Cir. 2010).

After Tencor's merger with KLA Instruments in 1997, Tencor's successor (KLA-Tencor) took over responsibility for the P-20H and the Tencor manual. Ex. 1009 ¶4. Before September 2005, it was KLA-Tencor's practice to provide product manuals to customers when they purchased products and to provide additional copies to customers of the product upon their request. *Id.* ¶6. In addition, in 1997, Tencor's website (*see* Ex. 1021) allowed website users to request “more information about technical manuals on disk” for “Surface Profiling and Film Stress Measurement Systems.” Ex. 1022, 3; *see also* Ex. 1013 (explaining website dates). Tencor is not marked confidential (*see generally* Ex. 1005) and KLA-Tencor did not otherwise mark the P-20H manual as confidential. *Id.* Such

distribution without restriction provides clear indicia of publication. *MIT v. AB Fortia*, 774 F.2d 1104, 1109 (Fed. Cir. 1985).

If a customer sold a product, KLA-Tencor did not restrict the customer from including product manuals with the product. *Id.* Moreover, the P-20H was available on the semiconductor equipment resale market before September 2005. Ex. 1015 (identifying SDI as a semiconductor equipment reseller); Ex. 1016, 23 (identifying two P-20H products under ID numbers 4859 and 4860); Ex. 1017 (identifying Surplus Process Equipment Corporation as a semiconductor equipment reseller); Ex. 1018, 3–4 (listing two P-20H products); Exs. 1019–1020 (product pages for the P-20H products); *see also* Ex. 1013 (explaining website dates).

Furthermore, skilled artisans were aware of the P-20H by September 2005. For example, in a 2001 journal article on etching in semiconductor devices, the authors describe using a “Profiler P20H™ from Tencor.” Ex. 1023, 2. The article regards a topic that skilled artisans would have referred to and relied on. Ex. 1003 ¶13. As another example, in 2005, a Ph.D. dissertation directly referenced Tencor. Ex. 1024, 180, 191. This provides additional evidence that Tencor was available more than one year prior to applicant’s filing date. Ex. 1003 ¶13; *see In re Epstein*, 32 F.3d 1559, 1566–67 (relying on evidence that was not itself prior art can

provide circumstantial evidence of public use or sale before the critical date);
M.P.E.P. § 2128(II)(A).

Accordingly, Tencor qualifies as a printed publication under §102(b).

2. Analogous Art

For purposes of assessing obviousness, Kang and Tencor are analogous art because they are from the same field of endeavor as the '396 patent. Ex. 1003 ¶¶14–25. The specification defines the “field of the invention” as relating to “a substrate processing apparatus for processing substrates of semiconductor devices and the like.” Ex. 1001, 1:5–7. Kang and Tencor relate to apparatuses for processing substrates of semiconductor devices. Ex. 1003 ¶14. Rusnica and Eryurek are analogous art at least because they would have logically commended themselves to an inventor’s attention when considering problems such as handling error conditions in manufacturing processes. *Id.* ¶¶15–25.

B. Identification of claims and statutory basis for each ground

ASM respectfully requests the Board cancel Claims 1–10 on the following grounds.

Ground	Reference or Combination	Basis	Claims Challenged
1	Kang in view of Tencor, and further in view of Rusnica	§103	1–3, 6–8
2	Kang in view of Tencor, and further in view of Rusnica and Eryurek	§103	4, 5
3	Tencor	§103	9

Ground	Reference or Combination	Basis	Claims Challenged
4	Kang in view of Tencor	§103	10

The expert of declaration of Dr. Alexander Glew (Ex. 1003) supports this Petition. Exhibit 1004 is a copy of Dr. Glew’s curriculum vitae.

VI. EXPLANATION WHY THE CLAIMS ARE UNPATENTABLE

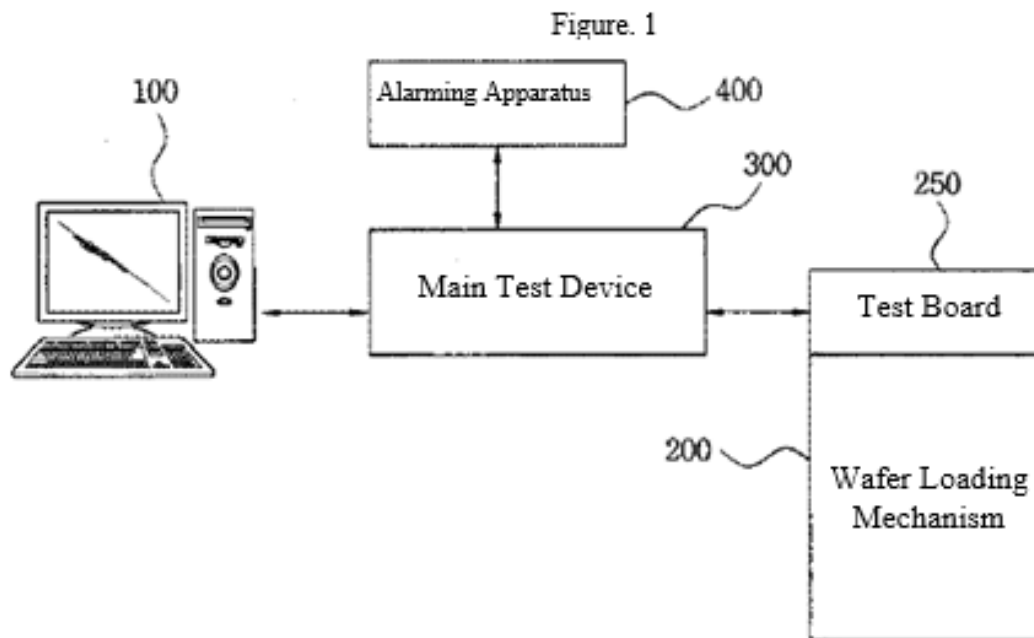
A. Ground 1: Claims 1–3 and 6–8 are obvious over Kang in view of Tencor, and further in view of Rusnica

1. Claim 1

a. a “substrate processing apparatus comprising a signal indicator for indicating a running state”

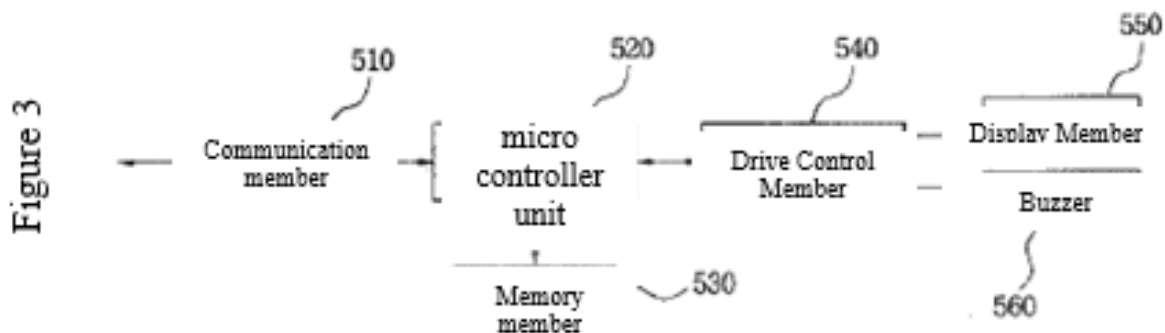
Kang discloses a substrate processing apparatus, namely, a wafer burn-in system. Ex. 1006, Abstract. A wafer burn-in system is a testing and quality control system used to identify and eliminate defective chips on a wafer before the chips are sold or integrated into larger systems. Ex. 1003 ¶83. Each tested wafer is a substrate, and therefore the wafer burn-in system is a substrate processing system. *Id.*

Figure 1 of Kang, reproduced below, “is a block diagram showing the overall configuration of the general wafer burn-in system.” Ex. 1006, 1.



Id., Fig. 1.

The wafer burn-in system of Figure 1 includes main test device (300) and alarming apparatus (400). *Id.* The main test device (300) “is the main component which performs and controls the overall test process in the wafer burn-in process” *Id.*, 2. Alarming apparatus (400) “receives the test result” and “generates a prescribed alarm ... in accordance with the test result signal received so that the on-site operator can recognize this.” *Id.* Kang shows a preferred embodiment of alarming apparatus (400) in Figure 3. *Id.*, 4. Figure 3, reproduced below, shows that the alarming apparatus includes display member (550) and buzzer (560). *See also id.*, 2, 4.



Display member (550) and buzzer (560) serve as signal indicators indicating a running state of the apparatus. Ex. 1003 ¶87. Kang explains that the alarming apparatus (400) “generates an alarm corresponding to the state of an error through the display member (550) and the buzzer (560)” Ex. 1006, 4. These states of error can relate to the state of wafer burn-in system or the wafers’ interaction with the wafer burn-in equipment and include “poor contact with the multiple pins of the test board (250), etc. as well as the alignment error of a wafer, temporary suspension of an inspection, response timeout, suspension of an inspection, measurement temperature limit exceeded, wafer ID recognition error, etc.” *Id.*, 3.

Kang states that, with the improved wafer burn-in system, “it is going to be possible at the field performing the wafer burn-in process to **identify the error state** of the wafers being tested through the operational status of the lamp, which is a component of the alarming apparatus (400), or whether or not the buzzer tone has been generated.” *Id.*, 2.

Accordingly, display member (550) and buzzer (560) serve as a plurality of signal indicators that provide visual and audible signals to a user indicating the “error state of the wafers being tested,” which is a running state because it is a state of a process (wafer testing) running in the burn-in system. Ex. 1003 ¶89.

Therefore, Kang discloses a substrate processing system (the wafer burn-in system shown in Figure 1) comprising a signal indicator (display member (550) and buzzer (560) of the alarming apparatus (400)) for indicating a running state (“error state of the wafers being tested”). Ex. 1003 ¶90. To the extent the preamble is limiting, Kang satisfies the preamble. *Id.* ¶82.

b. “a plurality of signal indicators operating under any one of a plurality of operation conditions”

Display member (550) and buzzer (560) serve as signal indicators. *Id.* ¶93. Therefore, Kang discloses that the substrate processing apparatus comprises a plurality of signal indicators of display member (550) and buzzer (560). *Id.*

“Operation conditions” are predetermined conditions for operating the signal indicators based on the running states of the semiconductor processing apparatus. *Supra* §IV.A.

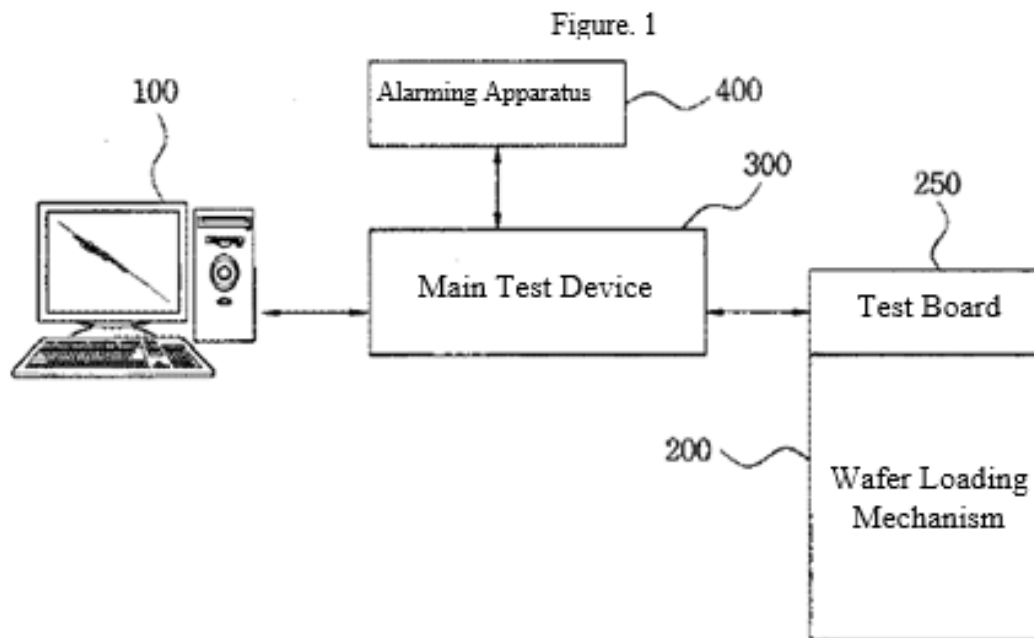
Kang’s display member (550) and buzzer (560) operate under any one of a plurality of operation conditions. In Kang, a user defines “operating conditions” or “conditions for the generation of an alarm corresponding to the detected error state,” Ex. 1006, 3, *see also id.*, 4, and Kang uses similar terminology as the ’396

patent: “conditions for the generation of an alarm ... are the operating conditions to operate the display member (550) and the buzzer (560)” *Id.*, 4. Kang’s “operating conditions” are operation conditions because they are predetermined conditions (setup by a user) for operating the signal indicators (display member (550) and buzzer (560)) based on the running states (error states) of the semiconductor processing apparatus (wafer burn-in system). Ex. 1003 ¶¶95.

Therefore, Kang discloses a plurality of signal indicators (display member (550) and buzzer (560)) operating under any one of a plurality of operation conditions (“operating states”). Ex. 1006, Abstract, 4–5, Fig. 4(S515). Kang discloses this limitation. Ex. 1003 ¶¶92, 97.

c. “a display unit for displaying the operation conditions of the signal indicators, the operation conditions being set independently in advance of being displayed”

Kang’s “overall configuration of the general wafer burn-in system” in Figure 1, reproduced below, includes a display unit embodied in workstation (100) and the display means (monitor) of main test device (300). Ex. 1006, 2, Fig. 1. Kang explains that a user sets the “operating conditions” for generating an alarm using workstation (100). *Id.*, 2–4. Kang also discloses that the “conditions for the generation of an alarm [are] **set up in advance by the operator.**” *Id.*, 4.



Kang's operating conditions are "the conditions for the generation of an alarm corresponding to the detected error state" *Id.*, 3.

Accordingly, Kang teaches a display unit (embodied in workstation (100) and the display means (monitor) of main test device (300)) for displaying the operation conditions ("operating conditions") of the signal indicators (display member (550) and buzzer (560)), the operation conditions being set independently in advance of being displayed ("conditions for the generation of an alarm [are] set up in advance by the operator."). Ex. 1003 ¶101.

Although Kang discloses that the operating conditions are later displayed as messages on main test device (300) during processing, *infra* §VI.A.1.e; Ex. 1006, Abstract, 3–4; Ex. 1003 ¶¶85, 87, 89–90, Kang does not expressly state that the

operating conditions setup with workstation (100) are afterwards “displayed” on workstation (100), for example, to confirm the setup. In any event, displaying those entered operating conditions on workstation (100) after setup would have been highly obvious, if not inevitable. Ex. 1003 ¶102. Workstation (100), with a computer monitor as shown above, would display data after it is entered. *See id.* Displaying data after entry would have desirably and predictably allowed a user to confirm that the data were entered correctly and to allow the user to edit such data. *Id.* Tencor confirms that displaying set operating conditions on a setup screen was a known, desirable, and predictable prior art teaching.

i. Teachings of Tencor

Tencor embodies an operation manual for a substrate processing apparatus called a “Long Scan Profiler” for inspecting and analyzing wafer surfaces. Ex. 1005, 12. Tencor discloses that the apparatus can include a signal light tower, “a highly visible indicator of [the] tool’s status.” *Id.*, 17, 238. “The multi-light device can be used to signal that an instrument is in production or to indicate the reason that it is not in production.” *Id.*, 238. The signal light tower has both “tower lights” and a “tower voice” with “sound capability.” *Id.* 242. Tencor does not expressly uses the word “buzzer.” Nevertheless, the tower voice is consistent with how the ’396 patent characterizes a buzzer: a “device for making continuous sound, intermittent sound, or **voice**.” Ex. 1001, 1:14–15; *see also id.*, 7:48–50.

Therefore, like Kang, Tencor also discloses a substrate processing apparatus (a long scan profiler for substrates) comprising signal indicators (including tower lights and tower voice). Ex. 1003 ¶104.

Tencor's discloses that the substrate processing apparatus includes a video monitor. Ex. 1005, 3, 14. A "Signal Light Tower Configuration Editor Utility window" (hereinafter, the "Tower UI") is displayed on the video monitor. *Id.*, 239 Fig. 12-3. The Tower UI is reproduced below with color annotations.

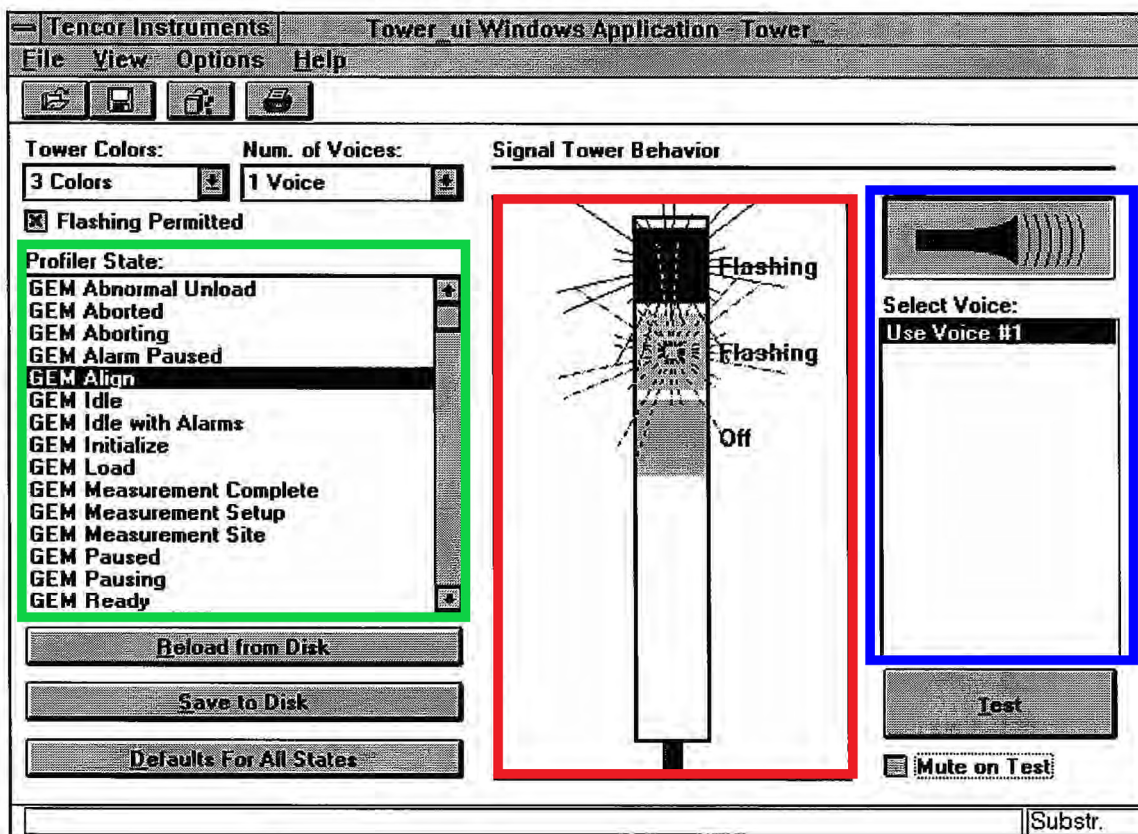


Figure 12-3 Signal Light Tower Configuration Editor Window
TOWER UI

Id., 239 Fig. 12-3.

The green box shows a list of possible running states (“Profiler State[s]”) as a “list box”. *Id.*, 242. The red box indicates a virtual representation of the signal light tower for displaying “the proper behavior as appropriate for the settings that are current for that Profiler state.” *Id.*, 241. The blue box indicates a “two-state button” for “voice custom control” of the “tower voice.” *Id.*, 242.

With settings in the green, red, and blue boxes, the Tower UI allows a user to define and display “the behavior of the signal tower”—how the Tencor substrate processing apparatus responds with lights and voice—for each Profiler State. *Id.*, 242; Ex. 1003 ¶107. Figure 11-2 shows that each possible running state (“Profiler State”) has an associated “Signal Tower Behavior.” Ex. 1005, 239 Fig. 12-3.

The Profiler States in Tencor are operation conditions because they are predetermined conditions for operating the signal indicators (the tower lights and tower voice) based on the running states of the semiconductor processing apparatus. *See supra* §IV.A; Ex. 1003 ¶108. For example, if a Profiler State is satisfied (for example, because the Tencor apparatus transitions to a GEM Align state), then an associated signal indicator (the tower lights and/or tower voice) will operate, as specified by the Signal Tower Behavior set in the Tower UI. Ex. 1003 ¶108.

Furthermore, each of the operation conditions (the Profiler States) in Tencor are set independently in advance of being displayed in the Tower UI. *Id.* ¶109.

For example, all Profiler States have “factory default settings.” Ex. 1005, 241, 243. And all Profiler States can be independently customized by a user and later reviewed or customized further. *Id.*, 242–243.

Thus, Tencor (like Kang) discloses a display unit (a video monitor, which displays the Tower UI) for displaying the operation conditions (Profiler States) of the signal indicators (the tower lights and tower voice), the operation conditions being set independently in advance of being displayed. Ex. 1003 ¶109. Tencor also satisfies this limitation. *Id.*

ii. Motivation to combine and reasonable expectation of success

Kang of course would have displayed entered operation conditions. Tencor also teaches a display, suitable for use in Kang, that displays operation conditions, and it would have been obvious to modify Kang to incorporate it. Ex. 1003 ¶110.

Skilled artisans would have been motivated to incorporate Tencor’s Tower UI in Kang’s workstation (100). *Id.* Kang teaches the need for a computer-implemented interface that allows an operator to assign behaviors for display member (550) and buzzer (560) for various types and states of errors occurring during the burn-in process. Ex. 1006, Abstract, 4–5, Fig. 4(S515). Tencor teaches a computer-implemented interface for doing this. With the Tower UI, a user can click through a list of Profiler States that occur during wafer processing and assign different behaviors for the “tower lights” and “tower voice” for each Profiler State.

Ex. 1005, 239, 241–243; Ex. 1003 ¶110. Skilled artisans would have been motivated to implement Tencor’s Tower UI in Kang’s workstation (100) because it provides an easy-to-use, graphically driven interface for assigning signal tower behaviors for various running states. Ex. 1003 ¶110.

Skilled artisans would have had a reasonable expectation of success in combining the elements of Kang and Tencor. *Id.* ¶111. The combination uses software design and programming techniques known to skilled artisans. *Id.* With Tencor’s guidance, skilled artisans would have used known software programming methods to design a computer-implemented interface to click through a list of errors that occur during the burn-in process and assign different operating conditions for display member (550) and buzzer (560) using simple design elements like those in the color-annotated boxes above. *Id.* And the result would have been predictable because Tencor successfully implemented this design in a display unit for displaying operation conditions of signal indicators. *Id.*

In light of the motivation to combine and the reasonable expectation of success, it would have been obvious to combine Kang and Tencor.

d. “wherein the display unit displays whole operation causes which correspond[] to the signal indicators”

In Claim 1, “operation causes” are operation conditions that are displayed, regardless of whether they are satisfied by a running state. *Supra* §IV.B.1.

Section VI.A.1.c explains that the combined apparatus of Kang and Tencor includes a display unit embodied in Kang’s workstation (100) and the display means (monitor) of main test device (300) that displays a Tower UI for defining “Profiler States” corresponding to the errors that occur during the burn-in process.

In Kang, the “operating conditions” entered at workstation (100), and later displayed as messages, are operation conditions. *Supra* §§VI.A.1.b–VI.A.1.c; Ex. 1003 ¶95.

Because Kang does not actually depict the interface for entering and displaying the operating conditions on workstation (100), however, Kang does not expressly disclose that workstation (100) displays these operating conditions immediately after setup (although they are displayed as messages, on main test device (300), *infra* §VI.A.1.e). The interface of the combined apparatus of Kang and Tencor, however, teaches this configuration. To facilitate discussion, the annotated Tower UI of Tencor is reproduced again below.

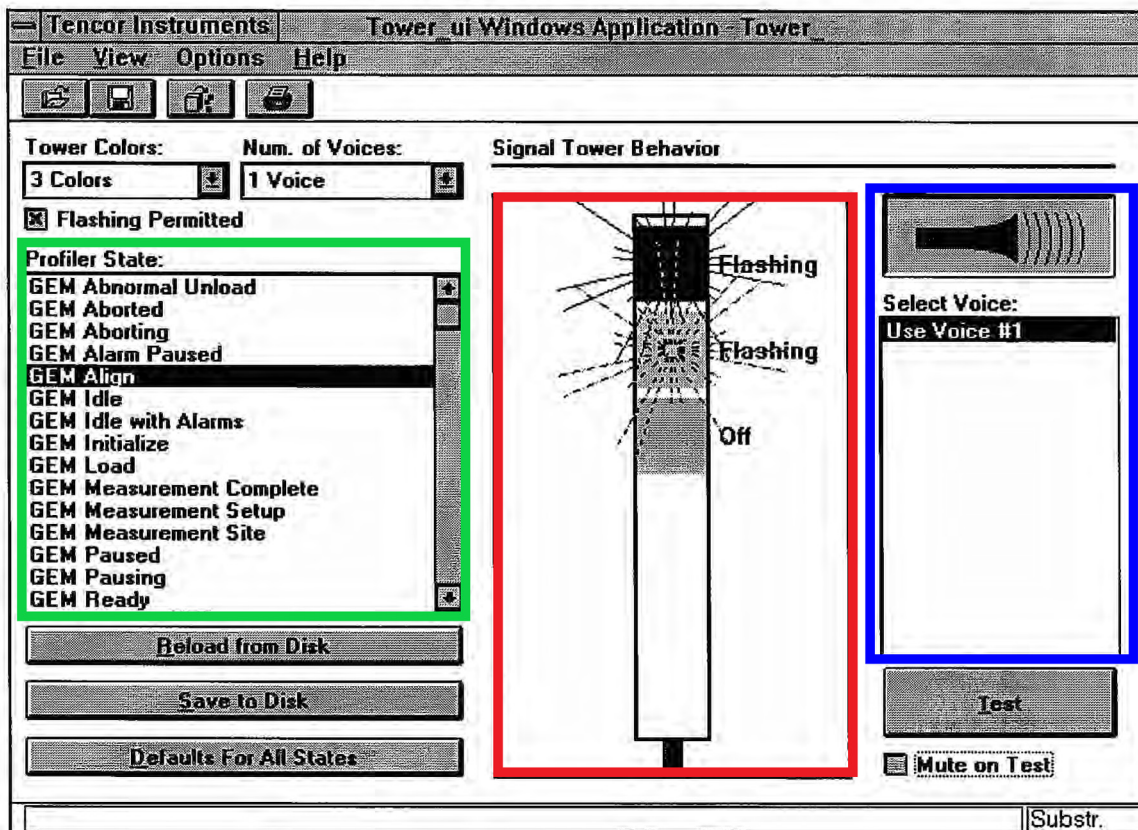


Figure 12-3 Signal Light Tower Configuration Editor Window

Ex. 1005, 239 Fig. 12-3.

The Profiler States in the green list box are also operation conditions. *Supra* §**Error! Reference source not found.** The green list box shows the green list box displays the whole Profiler States, regardless of whether they are satisfied by a particular running state occurring. Ex. 1003 ¶116.

Therefore, the combined apparatus of Kang and Tencor incorporating Tencor's display unit (video monitor, which displays the Tower UI) displays whole operation causes—that is, whole operation conditions (Profiler States) that are

displayed, regardless of whether satisfied by a running state—of the signal indicators and meets this limitation. Ex. 1003 ¶116.

- e. **“wherein the display unit ... displays with a different color the operation cause which corresponds to the operation of the signal indicator among the whole operation causes”**

“[T]he operation cause which corresponds to the operation of the signal indicator” is the operation condition that was satisfied by a running state and actually caused the operation of the associated signal indicator. *Supra* §IV.B.2.

Kang discloses that, while display member (550) and buzzer (560) are operating because of a detected error state, the “detected error state can be **displayed in the form of a message**” Ex. 1006, Abstract; *see also id.*, 3–4. The “micro controller (520) generates an error state message corresponding to the state and type of the error detected at the step (S507) described above ... and the main test device (300) displays this error state message on the display means (monitor) on the operator can check it (Step S517).” *Id.*, 5. Kang explains the messages correspond to the operation of the signal indicators:

As a result, the alarming apparatus of the present invention (500) configured as described above receives the test result signal provided by the main test device, detects the state and type of error of all wafers, and **generates an alarm corresponding to the state of an error through the display member (550) and the buzzer (560)** in accordance with the conditions for the generation of an alarm set up in advance by the operator. In addition, it **generates a message for the**

detected error state and sends it to the main test device (300) to have it displayed.

Id., 4.

An error state message generated by micro controller (520) represents “the operation cause which corresponds to the operation of the signal indicator” because it is an operation condition (operating condition based on an error state) that was satisfied by a running state (“the detected error state”) and actually caused the operation of the associated signal indicator (display member (550) and/or buzzer (560)). Ex. 1003 ¶122.

Therefore, the combined apparatus of Kang and Tencor includes a display unit that displays the operation cause which corresponds to the operation of the signal indicator (the error state message) among the whole operation causes (the errors that occur during the burn-in process, displayed as in Tencor’s Profiler States). *Id.* ¶123.

Kang does not expressly state, however, that the display unit displays the error state message **with a different color**.

i. Teachings of Rusnica

It would have been obvious to combine the apparatus of Kang and Tencor with Rusnica to arrive at the claimed configuration. Ex. 1003 ¶130. Rusnica relates to “a display system for understanding the status of a complex process and its components, and more particularly, to a system that presents a large quantity of

information in a manner that is readily absorbed and easily understood.” Ex. 1007, 1:9–13. More specifically, Rusnica relates to conveying information to operators for improved fault management: “[f]ault management, the identification of and response to abnormal conditions, is a major component of a human’s role in many complex tactical environments such as process control, flight decks and air traffic control.” *Id.*, 1:15–18.

Rusnica teaches that “[o]perator performance literature is full of cases where operators failed to correctly find, integrate, and interpret typical alarm messages in order to identify and respond to disturbances.” *Id.*, 1:67–2:3. To remedy this deficiency, Rusnica teaches displaying alarm messages on a display with different colors to help operators assimilate the presented status: “multiple levels of **color coding** ... ease operator assimilation of the information and make it readily understandable.” *Id.*, 19:8–10. For example, Rusnica teaches displaying information using different colors depending on whether that information is representative of normal or abnormal states, such as those requiring operator intervention. *See, e.g., id.*, 15:4–40 (teaching displaying normal conditions in green and abnormal conditions in yellow or red).

ii. Motivation to combine and reasonable expectation of success

Kang teaches that the alarming apparatus (400) is typically composed of multiple lamps including green, yellow and red lamps” and it “drives each lamp

selectively ... depending on an error detected.” Ex. 1006, 2. An operator sets “the status of lighting of each lamp in the display member (550) ... depending on the state and type of an error occurred in the burn-in process,” and the “drive control member (540) operates the green, yellow and red lamps equipped in the display member (550) selectively on the basis of the control signal of the micro controller unit (540)” *Id.*, 4. Kang further teaches that lamps and buzzers alone may not adequately convey information to a user or operator and therefore “a detected error state can be displayed in the form of a message as well.” *Id.*, 3.

Considering Rusnica, it would have been obvious to modify the error messages in Kang such that each displayed message is displayed, for example, in the color corresponding to its associated lamp color or other appropriate different color. Ex. 1003 ¶126. After all, Rusnica recognized that “multiple levels of color coding ... ease operator assimilation of the information and make it readily understandable.” Ex. 1007, 19:8–10. The modified configuration would have desirably allowed an operator 1) to assess the error on the wafer burn-in system initially based on the displayed lamp color of display member (550); and 2) after arriving at workstation (100), to contextualize the error message quickly, based on the display unit, and without needing to refer to the displayed lamp color. Ex. 1003 ¶127. The modification would have improved operator assimilation of the error in a demanding manufacturing environment. *Id.*

Skilled artisans would have had a reasonable expectation of success in combining the elements of Kang (as modified by Tencor) and Rusnica. *Id.* ¶128. The combination uses software design and programming techniques known to skilled artisans. *Id.* And the result would have been predictable because Rusnica successfully implemented color coded error messages, a technique well within the abilities of skilled artisans. *Id.*

In view of this motivation to combine Kang and Tencor with Rusnica and reasonable expectation of success, it would have been obvious to combine these references. *Id.* ¶129. The combination of Kang, Tencor, and Rusnica teaches that the display unit (of Kang as modified by Tencor) can display with a different color (e.g., corresponding to the currently displayed lamp color of display member (550)) the operation cause which corresponds to the operation of the signal indicator (the error state message) among the whole operation causes (the errors that occur during the burn-in process, displayed as in Tencor's Profiler States) and satisfies this limitation. *Id.*

Accordingly, Kang, Tencor, and Rusnica teach all limitations of Claim 1, and it would have been obvious to combine the reference teachings. *Id.* ¶130. Claim 1 is obvious over Kang in view of Tencor, and further in view of Rusnica. *Id.*

2. Claim 2

Claim 2 depends from Claim 1 (§VI.A.1). Claim 2 recites the additional limitation: “wherein the display unit comprises a setting screen for setting priority to the operation conditions, and the signal indicators operate in accordance with the priority order.”

Kang discloses that the substrate processing apparatus comprises a display unit (embodied in workstation (100) and the display means (monitor) of main test device (300)) and a plurality of signal indicators, namely, display member (550) and buzzer (560). Kang also discloses that workstation (100) includes a setting screen for setting the operating conditions. Ex. 1006, 4 para 4.

Kang does not expressly disclose that the signal indicators operate in accordance with a priority set in the setting screen because Kang does not show the display unit’s interfaces. Nevertheless, the combined apparatus of Kang, Tencor, and Rusnica applied to base Claim 1 includes an appropriate video monitor and user interface that satisfies Claim 2.

Tencor explains that, on the Tower UI (representing a setting screen for entering settings for the light tower and tower voice), the virtual “Signal Light Tower allows you to specify any of the five lights: red, yellow, green, blue, and white.” Ex. 1005, 241; Ex. 1003 ¶133. Tencor discloses that “[y]ou can set these

lights independently of each other. Lights can be turned off, constantly on, or set to flashing.” Ex. 1005, 241.

You can edit the tower behavior by using the mouse. If you click on a given light, the light toggles its state. This means that if the light was off, it goes to flashing next. If the light was flashing, it goes to on next. **If the light was flashing, it turns off any other light since this control prevents illegal behavior such as two lights being on at the same time.**

Id.

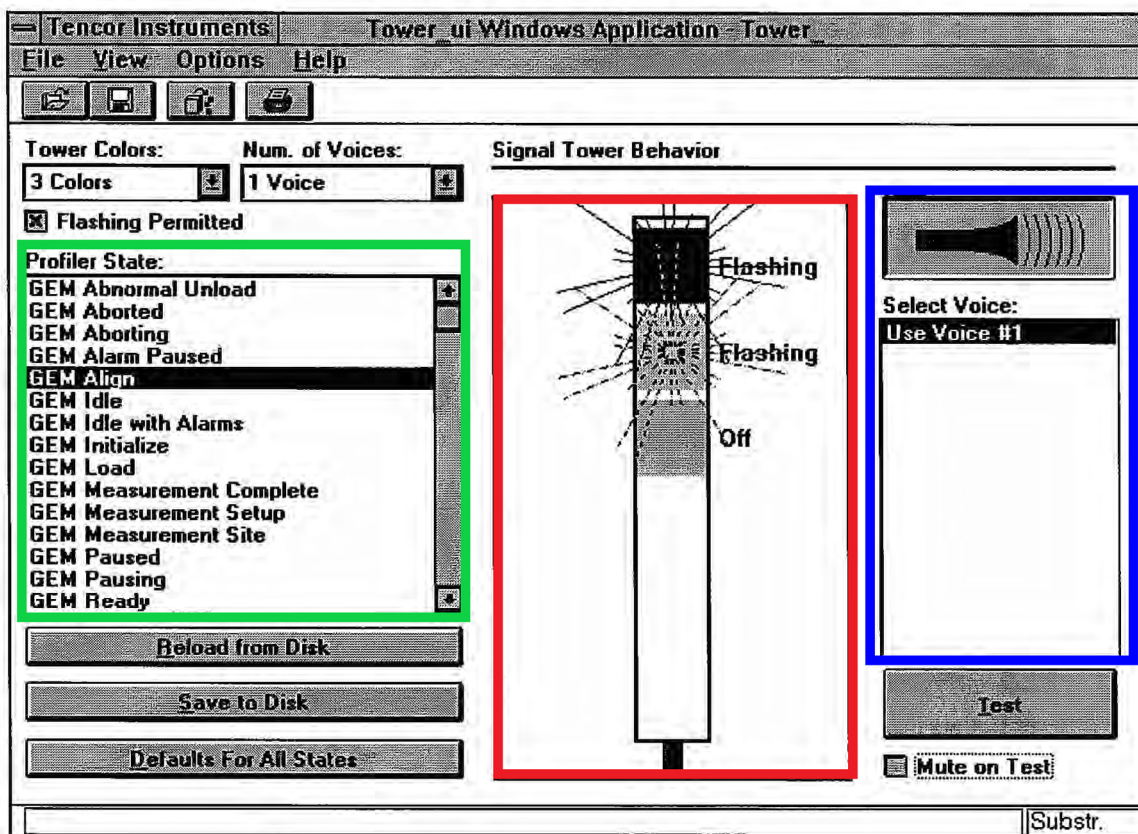


Figure 12-3 Signal Light Tower Configuration Editor Window

Id., 239 Fig. 12-3.

The red box shows the virtual signal light tower with three colored lights. *Id.*, Fig. 12-3 (see the solid green highlighted box). Here, for the Profiler State “GEM Align,” the signal tower is configured such that the top and middle lights are “Flashing” and the bottom light is “Off.” Ex. 1003 ¶135. If a user clicked the middle flashing light one more time, the middle flashing light would change to solid “On” and the red flashing light would change to “Off” (like the bottom light). *Id.* In Tencor, the solid “On” state for the last color light selected has **priority** over all other light states, which “prevents illegal behavior such as two lights being on at the same time.” *Id.*, 241; Ex. 1003 ¶135.

“The voice custom control is a two-state button (Fig. 12-3). It toggles between on and off. When ... it is in the *on* state, an appropriate picture shows a speaker with sound waves.” Ex. 1005, 242. When the voice option is in the *off* state, another picture shows a speaker without sound waves.” *Id.*, 242. The tower voice can support up to 16 voices in the “*on*” state. *Id.* The “*off*” state has **priority** over all possible voices, because the “*off*” state prevents **any** voice from operating. Ex. 1003 ¶136.

The signal indicators (tower lights and tower voice) corresponding with their virtual counterparts on the Tower UI operate in accordance with the priority order dictated by the window. Tencor states that “[y]ou can test a state after editing it by

selecting the Test button. This action immediately places the tower into that state so that you can see and hear what the state appears like.” Ex. 1005, 242.

Thus, Tencor discloses that the display unit applied to base Claim 1 comprises a setting screen (which displays the Tower UI) for setting priority to the operation conditions (in each Profiler State, the solid light “On” state for the last color light selected has priority over all other light states and the voice “off” state has priority over all possible voices), and the signal indicators operate in accordance with the priority order (the tower lights and tower voice operate as dictated by the conditions set in the window). Ex. 1003 ¶138.

Accordingly, the combination of Kang, Tencor, and Rusnica teaches the additional limitation of Claim 2, and it would have been obvious to combine the reference teachings. Ex. 1003 ¶139. Claim 2 is obvious over Kang in view of Tencor, and further in view of Rusnica. *Id.* ¶140.

3. Claim 3

Claim 3 depends from Claim 1 (§VI.A.1). Claim 3 recites the additional limitation: “wherein the signal indicators operate under instructions from **the host computer**, and the display unit displays presence or absence of the instructions from the host computer with different colors.”

The term “the host computer” lacks an antecedent because base Claim 1 does not recite “a host computer.” This Petition addresses Claim 3 as if it were

written “wherein the signal indicators operate under instructions from **a host computer**, and the display unit displays presence or absence of the instructions from the host computer with different colors.” ASM reserves the right to challenge the definiteness of claim 3, as written, in another forum.

Kang discloses that the substrate processing apparatus (wafer burn-in system) comprises a plurality of signal indicators, namely, display member (550) and buzzer (560) and a display unit (embodied in workstation (100) and the display means (monitor) of main test device (300)).

Kang further discloses that an operator uses workstation (100) to setup the “operating conditions” for generating an alarm using workstation (100). Ex. 1006, 2–4.

[T]he conditions for the generation of an alarm ... are the operating conditions to operate the display member (550) and the buzzer (560), and thus, in the present invention, the operator can set up the conditions for the generation of an alarm depending on the type and state of an error occurred in the burn-in process through the workstation (100). In other words, the operator can set up freely the status of lighting of each lamp in the display member (550) and the type and time of buzzer tones generated through the buzzer (560) depending on the state and type of an error occurred in the burn-in process.

Id., 4.

Workstation (100) is a host computer because it hosts the entry of conditions and commands for implementing the wafer burn-in process. Ex. 1003 ¶142.

Accordingly, Kang discloses that the signal indicators (display member (550) and buzzer (560)) operate under instructions (such as whether to light a lamp or cause a sound) from a host computer (workstation (100)). *Id.* ¶143.

Kang does not expressly disclose that the display unit (embodied in workstation (100) and the display means (monitor) of main test device (300)) displays presence or absence of the instructions (such as whether to light a lamp or cause a sound) from the host computer with different colors because Kang does not show the user interfaces. Nevertheless, the combined apparatus of Kang, Tencor, and Rusnica applied to base Claim 1 includes an appropriate video monitor and user interface that satisfies Claim 2.

Tencor teaches a Tower UI that displays presence or absence of instructions, for example, 1) to light a lamp or cause a sound or 2) whether there is no activation of the lamp or sound. Figure 11-2 of Tencor is reproduced below with color annotations to illustrate.

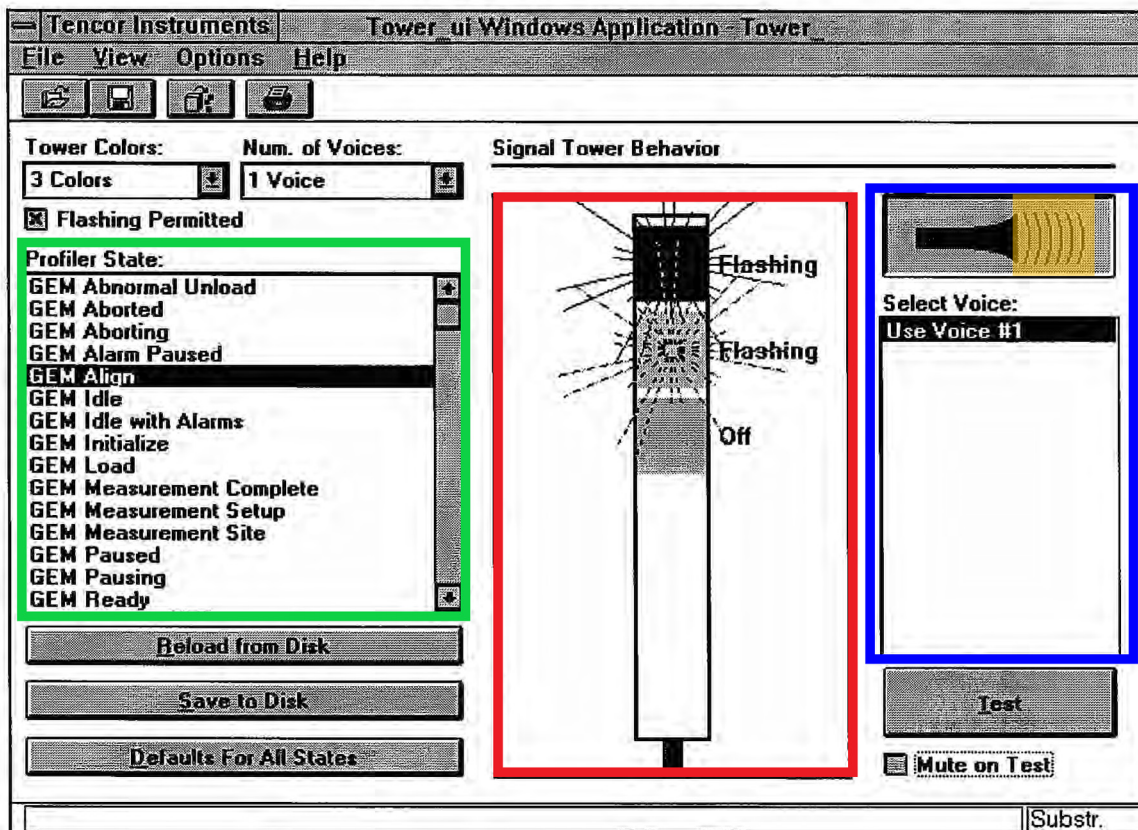


Figure 12-3 Signal Light Tower Configuration Editor Window

Ex. 1005, 239 Fig. 12-3.

Again, the red box indicates a virtual representation of the signal light tower for displaying “the proper behavior as appropriate for the settings that are current Profiler state” *Id.*, 241. The blue box indicates a “two-state button” for “voice custom control” of the “tower voice.” *Id.*, 242.

Tencor discloses that a user can set the lights of the signal light tower “independently of each other. Lights can be turned off, constantly on, or set to flashing.” *Id.*, 241.

You can edit the tower behavior by using the mouse. If you click on a given light, the light toggles its state. This means that if the light was

off, it goes to flashing next. If the light was flashing, it goes to on next. If the light was flashing, it turns off any other light

Id.

In addition, “[a]ll lights can be turned off or cleared simultaneously.” *Id.* “To reach the state where all lights are set to off, click on a blank space, away from any light or just go to the light that is on and toggle its state until the light is off.”

Id.

In the example above, for the Profiler State “GEM Align,” the signal tower is configured such that the red and yellow lights are flashing and the green light is off. Ex. 1003 ¶145.

“The voice custom control is a two-state button (Fig. 12-3). It toggles between on and off. When ... it is in the *on* state, an appropriate picture shows a speaker with sound waves.” Ex. 1005, 242. The orange highlighted box indicates the picture of the soundwaves above. *See id.*, 239 Fig. 12-3. “When the voice option is in the *off* state, another picture shows a speaker without sound waves.” *Id.*, 242. Here, for the Profiler State “GEM Align,” the tower voice is configured such that it is in the on state (with a picture of soundwaves next to the speaker). *See id.*, 239 Fig. 12-3.

Tencor displays presence or absence of the instructions from the host computer with different colors. The Tencor apparatus has a PC compatible

processor that translates input from a user (like mouse movement and clicks and keyboard entries) into corresponding actions on a video monitor. Ex. 1003 ¶146. When a user hovers a mouse icon over a Profiler State and clicks the mouse, for example, the PC compatible processor translates the input into changes on the window. *Id.* In the example of Figure 11-2, Tencor displays the presence of instructions from the PC compatible processor to light the red light in a flashing state with a certain configuration of **black pixels**; it displays the presence of instructions to light the yellow light in a flashing state with a different configuration of **black pixels**; it displays the presence of instructions not to light the green light (or an absence of instructions to light the green light) with **white pixels**; it displays the presence of instructions to cause a sound with a **black color** (of the soundwaves); it displays the presence of instructions not to cause a sound (or an absence of instructions to cause a sound) with a **white color** (no soundwaves). *Id.*

To the extent Kokusai argues that black and white are not colors, Rusnica further teaches implementing other colors to show these presence or absence of instructions to better convey information about a state. *See supra* **Error! Reference source not found.** Based on the teachings of Rusnica, skilled artisans would have logically implemented changes to the green light using a green color, changes to the red light using a red color, and so forth, with a reasonable

expectation of success when using a color monitor, which were commonplace by the time of the '396 patent. Ex. 1003 ¶¶147–148.

Accordingly, the combination of Kang, Tencor, and Rusnica teaches the additional limitation of Claim 3, and it would have been obvious to combine the reference teachings. Ex. 1003 ¶149. Claim 3 is obvious over Kang in view of Tencor, and further in view of Rusnica. *Id.*

4. Claims 6–8

Claim 6 depends from base Claim 1 and intervening Claim 3. Claim 7 depends from base Claim 1 and intervening Claim 2. Claim 8 depends directly from base Claim 1. Ground 1 addresses the base claims in §§VI.A.1–VI.A.3. Claims 6–8 recites the additional limitation: “comprising a signal tower and a buzzer as the signal indicators, wherein sound of the buzzer is recognized **depending on** a lighting state of the signal tower.”

The “sound of the buzzer is recognized depending on a lighting state of the signal tower” means that sound of the buzzer is associated with a lighting state of the signal tower. *Supra* §IV.C.

Kang discloses the plurality of signal indicators include display member (550) and buzzer (560). There can be no serious dispute that display member (550) is a signal tower. The '396 patent states that a signal tower is a “device for lighting or blinking lamps of plural colors aligned by color” Ex. 1001, 1:16–17. Kang

discloses that the display member is “composed of a number of lamps each of which has a different color” Ex. 1006, Abstract; *see also id.*, 4. Indeed, Kang emphasizes that an “alarming apparatus (400) is **typically** composed of multiple lamps including green, yellow and red lamps” *Id.*, 2. Consistent with the ’396 patent, display member (550) is a signal tower. And buzzer (560) is certainly a buzzer within the scope of the claim.

Kang discloses or at least suggests the additional limitations of Claims 6–8. First, Kang states that, in prior art wafer burn-in systems without error message capabilities, “the state and type of ... an error [of the burn-in process] are distinguished only by the **combination** of the operational status of the display member (400) and the buzzer (450),” although Kang recognizes that a user may have difficulty doing so accurately. *Id.*, 3. Because Kang discloses a wafer burn-in system comprising a display member (400) and a buzzer (450) whose combined operations indicate an error, in Kang sound of the buzzer (450) is associated with a lighting state of the signal tower (display member 400). Ex. 1003 ¶153.

It also would have been obvious to configure Kang’s wafer burn-in system such that a user can better recognize the buzzer sound depending on a lighting state of the signal tower based on Kang’s own teachings. *Id.* ¶154. Kang describes combining lamp states and buzzer sounds: “the operator can set up freely the status of lighting of each lamp in the display member (550) and the type and time

of buzzer tones generated through the buzzer (560) depending on the state and type of an error occurred in the burn-in process.” Ex. 1006, 4.

The operator would have been motivated to select a combination of lamp state and buzzer sound that would have allowed the operator or other users to recognize accurately the error that occurred in the burn-in process. Ex. 1003 ¶154. For example, a user would have reasonably recognized a buzzer sound occurring when the lamp color is yellow to signify a different (and likely less serious) error than the same buzzer sound occurring when the lamp color is red. *Id.*

Skilled artisans would have had a reasonable expectation of success in selecting a combination of lamp state and buzzer sound that would have allowed the operator or other users to recognize accurately the error that occurred in the burn-in process because it would have been reasonable and predictable to select appropriate combinations that communicate the error effectively. *Id.*

The combination of Kang, Tencor, and Rusnica teaches the additional limitations of Claims 6–8, and it would have been obvious to combine the reference teachings. Ex. 1003 ¶155. Claims 6–8 are obvious over Kang in view of Tencor, and further in view of Rusnica. *Id.*

B. Ground 2: Claims 4 and 5 are obvious over Kang in view of Tencor, and further in view of Rusnica and Eryurek

1. Claim 4

Claim 4 depends from Claim 3 (§VI.A.3). Claim 4 recites the additional limitation: “wherein **the setting screen** is set by independently inputting a logical formula and brackets in one frame.”

Base Claim 1 and intervening Claim 3 do not recite “a setting screen.” Therefore, the term “the setting screen” lacks antecedent basis. This Petition addresses Claim 4 as if it were written “wherein **a setting screen** is set by independently inputting a logical formula and brackets in one frame.” ASM reserves the right to challenge the definiteness of Claim 4, as written, in another forum.

Kang discloses that the substrate processing apparatus comprises a display unit (embodied in workstation (100) and the display means (monitor) of main test device (300)) and that the workstation (100) comprises a setting screen. But Kang does not expressly disclose that setting screen is set by independently inputting a logical formula and brackets because Kang does not show the interfaces. *Supra* §VI.A.2

Tencor, however, discloses a display unit that comprises a setting screen (a video monitor, which displays the Tower UI). *Id.*

Tencor explains that, on the Tower UI, a user enters the settings for each Profiler State graphically, using virtual tower lights and voice control buttons. Ex. 1005, 239, 241–243. Tencor does not disclose entering the settings textually using logical Boolean and IF/THEN expressions and grouping brackets. Although Tencor does not expressly disclose it, however, skilled artisans would have understood that the Tencor PC compatible processor translates the graphical instructions into corresponding logical expressions in the underlying computer code. Ex. 1003 ¶158.

a. Teachings of Eryurek

Including a more textual-based user interface would have been an obvious modification of Kang, Tencor, and Rusnica in view of Eryurek.

Eryurek discloses a “system that detects abnormal conditions associated with a process plant.” Ex. 1008, Abstract. Figure 38, reproduced below with color annotations, depicts a configuration screen that enables a user to create a rule for a “rules engine development and execution system” that “enables a user to create and apply rules to statistical process monitoring data collected from a process plant.” *Id.*, 7:16–23.

FIG. 38

The screenshot shows a software interface for creating a new rule. The window is titled "Add New Rule". At the top, there is a "Rule Name" field containing "Boiler 1 Check". Below this is the "If" clause, which is highlighted in yellow. It contains four conditions, each with a checkbox on the left and a bracket on the right. The conditions are: 1) Device: PT-101, SPM Block: SPM 1, SPM Data Type: Mean, Compare: <=, Value: 102. 2) Device: PT-102, SPM Block: SPM 3, SPM Data Type: Std. Dev, Compare: >=, Value: 1.234. 3) Device: FT-201, SPM Block: SPM 2, SPM Data Type: Status, Compare: =, Value: Mean Chan. 4) Device: FT-201, SPM Block: SPM 4, SPM Data Type: Status, Compare: =, Value: Mean Chan. The conditions are grouped by logical operators: "And" and "Or". The "Then" clause is highlighted in blue and contains an "Alert Name" field (Boiler 1 Failed), a "Severity" dropdown (Failed), and a "Description" text area containing the text "Boiler 1 must be shut down and serviced to avoid the entire process shutting down." At the bottom are "OK" and "Cancel" buttons.

The Eryurek system sets alerts using logical Boolean (green boxes) and IF (yellow highlighting)/THEN (blue highlighting) expressions to specify the conditions causing an alert. *See generally id.*, 36:4–37:4.

Eryurek also teaches using brackets to group conditions in the “IF” clause of an IF/THEN expression. *Id.*, 36:34–45. The operator clicks checkboxes to indicate the starting or ending brackets for a logical group. One set of starting and

ending brackets is indicated above red boxes; another set of starting and ending brackets is indicated with orange boxes.

Therefore, Eryurek teaches the additional limitations of Claim 4. For example, Eryurek teaches a setting screen (like the configuration screen 300) is set by independently inputting a logical formula (logical Boolean and IF/THEN formulas) and brackets (activate by checkboxes) in one frame (as shown in Figure 38). Ex. 1003 ¶163.

b. Motivation to combine and reasonable expectation of success

Skilled artisans would have been motivated to combine the wafer burn-in system of Kang as modified by Tencor and Rusnica with the configuration screen of Eryurek to allow a user to define more sophisticated and complex equipment state groups (corresponding to groups for error type and state in Kang). Ex. 1003 ¶161. Tencor teaches graphically assigning appropriate light tower and tower voice settings to each Profiler State. Ex. 1005, 239 Fig. 12-3. But skilled artisans that it would appreciate the benefit in assigning flexible and combined conditions, which the '396 patent admits were known in the prior art (Ex. 1001, 1:21–25, 1:31–36, 1:42–46). For example, a skilled artisan readily would have envisioned the benefit in setting a condition like: IF {[the Profiler State is GEM Aborted] AND [the light state has been red and “On” for 15 minutes]} THEN {operate voice #5, which instructs an operator to seek assistance immediately}. Ex. 1003 ¶161.

Even more simply, skilled artisans would have recognized that the end users would have had different preferences: some would have preferred the more graphical interface of Tencor, and others would have preferred the more textual interface of Eryurek. *Id.* Skilled artisans would certainly have been motivated to accommodate personal preferences for data entry. *Id.*

And skilled artisans would have had a reasonable expectation of success in the combination. *Id.* ¶162. Logical computer programming techniques were old and well known by the time of the '396 patent and within the capacity of skilled artisans. *Id.* Eryurek shows that suitable textual based user interfaces for entering flexible logical conditions for these programs were predictable and used successfully in the art by the relevant date. *Id.*

The combination of Kang, Tencor, Rusnica, and Eyurek teaches the additional limitation of Claims 6–8, and in view of this motivation to combine and reasonable expectation of success, it would have been obvious to combine the reference teachings. Ex. 1003 ¶163. Claim 4 is obvious over Kang in view of Tencor, and further in view of Rusnica and Eryurek. *Id.* ¶164.

2. Claim 5

Claim 5 depends from Claim 4 (§VI.B.1). Claim 5 recites the additional limitation: “comprising a signal tower and a buzzer as the signal indicators,

wherein sound of the buzzer is recognized depending on a lighting state of the signal tower.”

This is the same limitation recited in Claims 6–8. For the reasons in §VI.A.4, the combination of Kang, Tencor, Rusnica, and Eryurek teaches the additional limitation of Claim 5, and it would have been obvious to combine the reference teachings. *See also Supra* §§VI.A.1, VI.B.1; Ex. 1003 ¶166. Claim 5 is obvious over Kang in view of Tencor, and further in view of Rusnica and Eryurek. *Id.* ¶167.

C. Ground 3: Claim 9 is obvious over Tencor

- 1. a “substrate processing apparatus comprising a signal tower and a buzzer as a plurality of signal indicators for indicating a running state”**

Tencor discloses a substrate processing apparatus (a Long Scan Profiler for substrates) comprising a signal tower (“tower lights”) and a buzzer (“tower voice”) as a plurality of signal indicators for indicating a running state (“a highly visible indicator of a tool’s status”). *Supra* §**Error! Reference source not found.** To the extent the preamble is limiting, Tencor satisfies the preamble. Ex. 1003 ¶¶169–170.

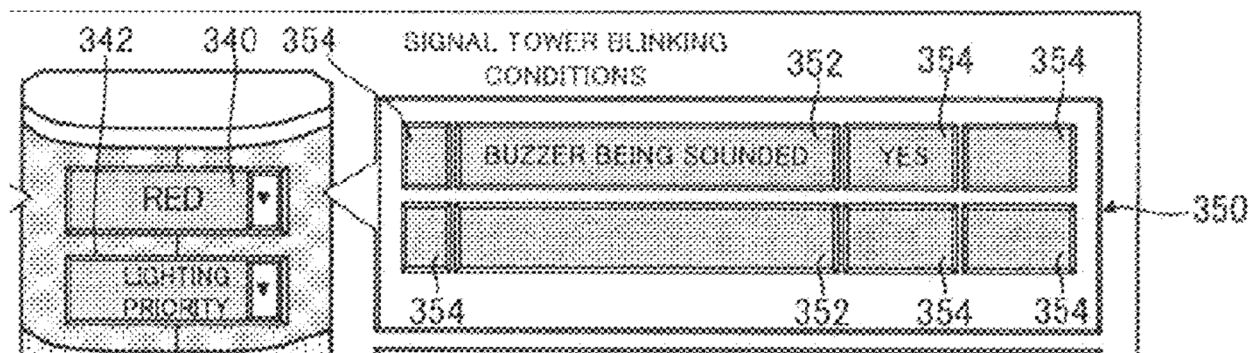
- 2. “a display unit displaying operation conditions that are set independently and in advance corresponding to the signal tower and the buzzer”**

Tencor discloses a display unit (a video monitor, which displays the Tower

UI) for displaying operation conditions (Profiler States) that are set independently and in advance (by factory default or user customization) corresponding to the signal tower and the buzzer (the tower lights and the tower voice). *Supra* §**Error!**
Reference source not found.. Tencor satisfies this limitation. Ex. 1003 ¶¶173–175.

3. “wherein the display unit sets sound of the buzzer as the operation condition of the signal tower”

The **single** instance in the '396 patent of causal connection between a buzzer sound and a signal tower state appears in the upper right blinking condition input section 350 of Figure 8 and the associated upper right blinking states display section 360 of Figure 9. There is no accompanying written description.



Ex. 1001, Fig. 8.

Here, a user has associated the blinking operation condition 360 of BUZZER BEING SOUNDED-YES with a virtual representation of the red light of signal tower 308. This blinking operation condition 360 dictates that, if the operation condition is satisfied because, “yes,” the buzzer is being sounded, then the signal

tower 308 (a signal indicator) will blink red, as instructed. Ex. 1003 ¶178.

Tencor does not expressly show a Profiler State corresponding to the tower voice in the list box. Therefore, Tencor does not expressly show a Profiler State would have allowed the Tower UI to set a sound of the tower voice as a condition for operating the tower lights.

Nevertheless, Tencor shows that other Profiler States exist, and it would have been obvious to modify the list box with one or more Profiler States corresponding with tower voice states based on Tencor’s own teachings regarding operating the tower lights in response to an alarm state. Ex. 1003 ¶179.

a. Additional suggestions of Tencor

Tencor teaches that the tower lights behave differently depending on whether an error is set or cleared. Ex. 1005, 242. For example, Tencor states that a light state can be “Yellow, flashing” when an “alarm is not acknowledged and needs assistance ...” and that the light state can be “Red, steady” when an “alarm has been acknowledged but not corrected.” *Id.*

Tencor also teaches that the list box shows an incomplete list of all possible Profiler States because the list box has a scroll bar that allows a user to scroll through additional, undisplayed Profiler States. *Id.*, 239 Fig. 12-3.

b. Motivation to modify Tencor and reasonable expectation of success

Skilled artisans would have been motivated to modify Tencor to modify the

list box with one or more Profiler States corresponding with tower voice states. With dozens of manufacturing apparatuses—each with a buzzer frequently demanding attention—the cacophony can be overwhelming. Ex. 1003 ¶182. Unacknowledged buzzers can be annoying or distracting to operators trying to work on other manufacturing apparatuses. *Id.* While waiting for a process technician to resolve the condition that caused the buzzer, equipment operators frequently “clear” the buzzer while the signal light continues operating. *Id.* The ’396 patent acknowledges that a “worker” can “manually stop[]” a continuously sounding buzzer. Ex. 1001, 15:39–43.

Modifying the list box to include Profiler States corresponding with tower voice states would have beneficially allowed a user to define a behavior for those Profiler States to escalate a condition of the tower lights, depending on whether a tower voice state had been cleared or acknowledged. Ex. 1003 ¶183. The modification would have predictably allowed process technicians to recognize at a glance when an error condition exists on the Tencor equipment and needs to be resolved urgently, even though the tower voice is not operating (because an equipment operator had cleared the tower voice before the process technician arrived). *Id.*

Moreover, skilled artisans would have had a reasonable expectation of success in doing so. As noted above, Tencor already teaches that the behavior of

the tower lights can be escalated depending on whether an error is set or cleared. Tencor states that a light state can be “Yellow, flashing” when an “alarm is not acknowledged and needs assistance ...” and that the light state can be escalated to “Red, steady” when an “alarm has been acknowledged but not corrected.” Ex. 1005, 242.

By applying Tencor’s teaching of Profiler States that correspond with setting and clearing of an alarm, skilled artisans would have predictably modified the list box to include Profiler States corresponding with setting and clearing of the tower voice. Ex. 1003 ¶185. The modification would have allowed a user to escalate the behavior of the tower lights depending on whether the tower voice had been cleared or acknowledged. *Id.* As noted above, Tencor already teaches that the behavior of the tower lights can be set depending on whether an error is set, acknowledged, or corrected. Ex. 1005, 242.

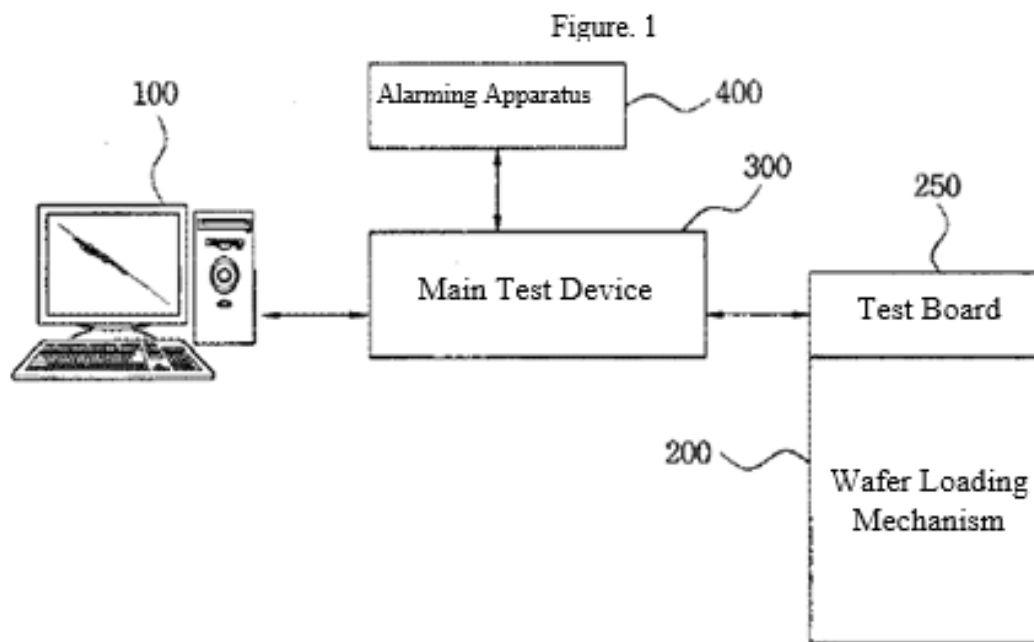
Accordingly, Tencor teaches or at least suggests all limitations of Claim 9, and based on these teachings, it would have been obvious to modify Tencor to arrive at the claimed configuration. Ex. 1003 ¶186. Claim 9 is obvious over Tencor. *Id.*

D. Ground 4: Claim 10 is obvious over Kang in view of Tencor

- 1. a “substrate processing system comprising a substrate processing apparatus and a plurality of signal indicators indicating a running state and a host computer connected to the substrate processing apparatus via a communication line”**

To the extent the preamble is limiting, Kang satisfies it. *Id.* ¶195. Kang describes a “wafer burn-in system.” Ex. 1006, Abstract. Each tested wafer is a substrate, and therefore the wafer burn-in system is a substrate processing system. Ex. 1003 ¶188.

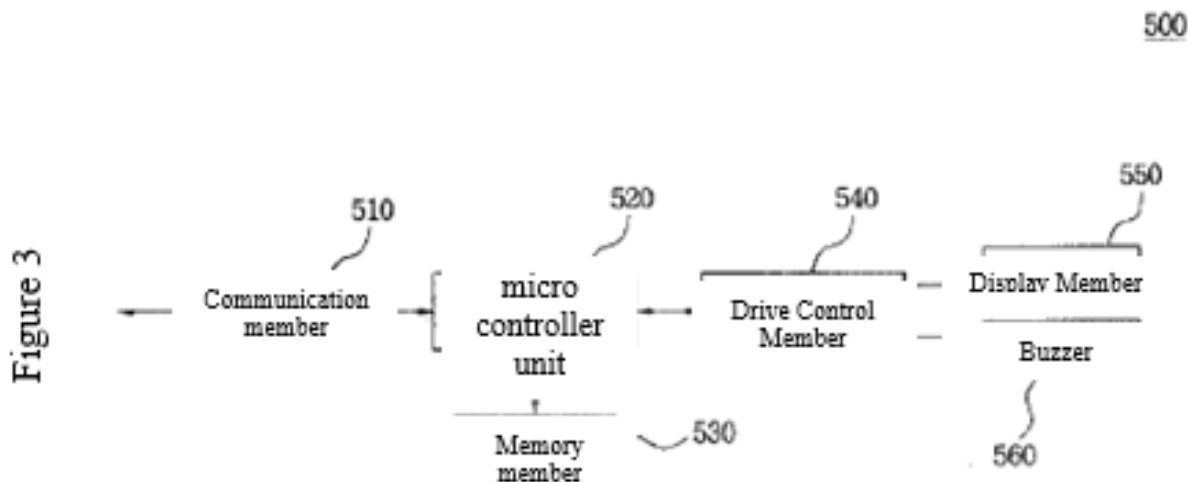
Figure 1 of Kang, reproduced below, “is a block diagram showing the overall configuration of the general wafer burn-in system.” Ex. 1006, 1.



The wafer burn-in system of Figure 1 includes main test device (300). *Id.*, Fig. 1. Kang’s substrate processing system Main test device (300) “is the main

component which performs and controls the overall test process in the wafer burn-in process” *Id.*, 2. Accordingly, main test device (300) is a substrate processing apparatus. Ex. 1003 ¶190.

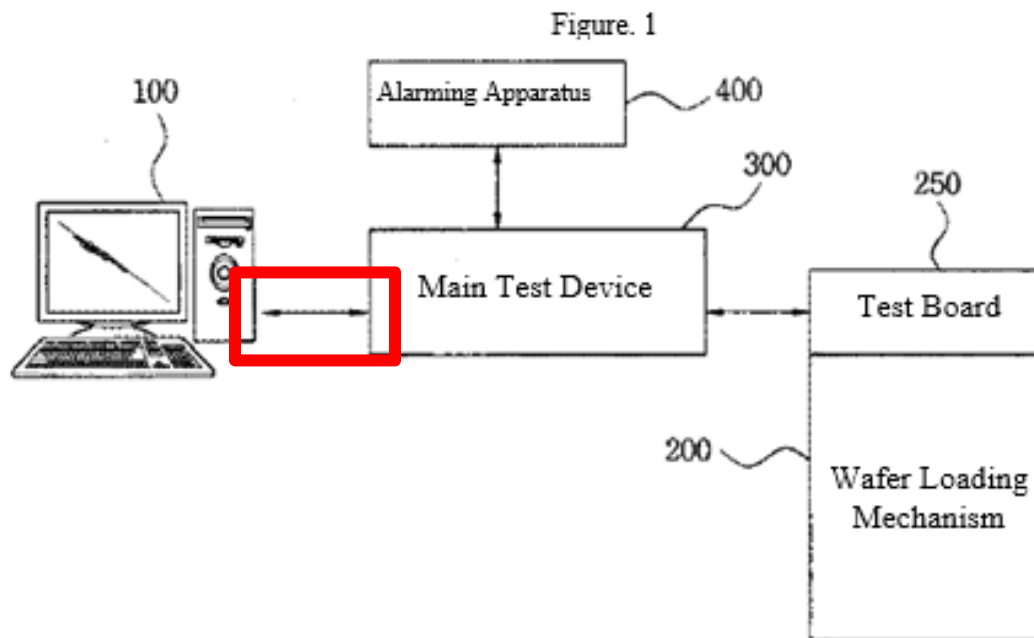
The wafer burn-in system of Figure 1 also includes alarming apparatus (400). Ex. 1006, Fig. 1. Alarming apparatus (400) “receives the test result” and “generates a prescribed alarm **informing the error state** of the wafer in accordance with the test result signal received so that the on-site operator can recognize this.” *Id.*, 2. Kang shows a preferred embodiment of alarming apparatus (400) in Figure 3. *Id.*, 4. Figure 3, reproduced below, shows that the alarming apparatus includes display member (550) and buzzer (560). *See also id.*, 2, 4.



Display member (550) and buzzer (560) are a plurality of signal indicators indicating a running state. Ex. 1003 ¶192. Kang explains that the alarming apparatus (400) “generates an alarm corresponding to the state of an error through

the display member (550) and the buzzer (560)” Ex. 1006, 4. More specifically, Kang states that “it is going to be possible at the field performing the wafer burn-in process to **identify the error state of the wafers being tested** through the operational status of the lamp, which is a component of the alarming apparatus (400), or whether or not the buzzer tone has been generated.” Ex. 1006, 2. Accordingly, display member (550) and buzzer (560) are a plurality of signal indicators that provide visual and audible signals to a user indicating the “error state of the wafers being tested,” which is a running state of the apparatus because it is a state of a process (wafer testing) running in the burn-in system. Ex. 1003 ¶192.

Figure 1 shows that the wafer burn-in system also includes a workstation (100). Ex. 1006, Fig. 1. The workstation (100) “is a means to control the implementation of the wafer burn-in process by entering the conditions and commands for the implementation of the wafer burn-in process and thus providing them to the main test device (300) ... and monitor the progress of the process according to this.” *Id.*, 2. Workstation (100) is a host computer because it hosts the entry of conditions and commands for implementing the wafer burn-in process. Ex. 1003 ¶193. Figure 1 shows that workstation (100) is connected to main test device (300) by a communication line, highlighted by the red box annotation below.



Therefore, Kang discloses a substrate processing system (the wafer burn-in system shown in Figure 1) comprising a substrate processing apparatus (main test device (300)) and a plurality of signal indicators (display member (550) and buzzer (560) of the alarming apparatus (400)) indicating a running state (“error state of the wafers being tested”) and a host computer (workstation (100)) connected to the substrate processing apparatus (main test device (300)) via a communication line (as shown in Figure 1). Ex. 1003 ¶194.

2. **“wherein the display unit displays, in the case where the signal indicators operate under instructions from the host computer, all of operation causes of the signal indicators and displays the instructions from the host computer with a different color”**

The body of claim 10 introduces **“the display unit.”** This term lacks an antecedent because the preamble never recites **“a display unit.”** This Petition

addresses claim 10 as if it were written “wherein **a display unit** displays, in the case where the signal indicators operate under instructions from the host computer, all of operation causes of the signal indicators and displays the instructions from the host computer with a different color.” ASM reserves the right to challenge the definiteness of claim 10, as written, in another forum.

Kang’s “overall configuration of the general wafer burn-in system” in Figure 1 includes a display unit embodied in workstation (100) and the display means (monitor) of main test device (300). Ex. 1006, Fig. 1.

In Kang, the signal indicators (display member (550) and buzzer (560)) **always** operate under instructions from the host computer (workstation (100)). Specifically, Kang discloses that an operator uses workstation (100) to setup the “operating conditions” for generating an alarm using workstation (100). Ex. 1006, 2–4.

[T]he conditions for the generation of an alarm ... are the operating conditions to operate the display member (550) and the buzzer (560), and thus, in the present invention, the operator can set up the conditions for the generation of an alarm depending on the type and state of an error occurred in the burn-in process through the workstation (100). In other words, the operator can set up freely the status of lighting of each lamp in the display member (550) and the type and time of buzzer tones generated through the buzzer (560)

depending on the state and type of an error occurred in the burn-in process.

Id., 4.

Accordingly, Kang discloses that the signal indicators (display member (550) and buzzer (560) of alarming apparatus (400)) operate under instructions (to setup the operating conditions) from the host computer (workstation (100)). Ex. 1003 ¶200.

Skilled artisans would have understood the “operation causes” of Claim 10 to be operation conditions that are displayed, regardless of whether they are satisfied by a running state. *Supra* §IV.B.3.

Kang discloses that, while display member (550) and buzzer (560) are operating because of a detected error state, the “detected error state can be **displayed in the form of a message**” Ex. 1006, Abstract; *see also id.*, 3–4. The “micro controller (520) generates an error state message corresponding to the state and type of the error detected at the step (S507) described above ... and the main test device (300) displays this error state message on the display means (monitor) so the operator can check it (Step S517).” *Id.*, 5. Kang explains the messages correspond to the signal indicators:

As a result, the alarming apparatus of the present invention (500) configured as described above receives the test result signal provided by the main test device, detects the state and type of error of all

wafers, and **generates an alarm corresponding to the state of an error through the display member (550) and the buzzer (560)** in accordance with the conditions for the generation of an alarm set up in advance by the operator. In addition, it **generates a message for the detected error state** and sends it to the main test device (300) to have it displayed.

Id., 4.

The error state messages generated by micro controller (520) represent operation causes because they are operation conditions (operating conditions based on detected error states) that are displayed. Ex. 1003 ¶203. Of course, Kang displays all such error state messages. *Id.*

Therefore, Kang discloses that the display unit (embodied in workstation (100) and the display means (monitor) of main test device (300)) displays, in the case (it is always the case) where the signal indicators (display member (550) and/or buzzer (560)) operate under instructions (to setup the operating conditions) from the host computer (workstation (100)), all of operation causes (all of the error state messages) of the signal indicators. *Id.* ¶204.

Kang does not expressly state that the display unit displays the instructions (to setup the operating conditions) from the host computer (workstation (100)) with a different color because Kang does not explicitly show a user interface.

a. Teachings of Tencor

Nevertheless, the claimed configuration would have been obvious in view of Tencor, which teaches an apparatus including an appropriate video monitor and user interface. *Id.* ¶206.

This Petition analyzes Tencor in Ground 1. Tencor discloses a display unit (a video monitor, which displays the Tower UI). *Supra* §**Error! Reference source not found.** To facilitate discussion, the Tower UI is reproduced again below with color annotations.

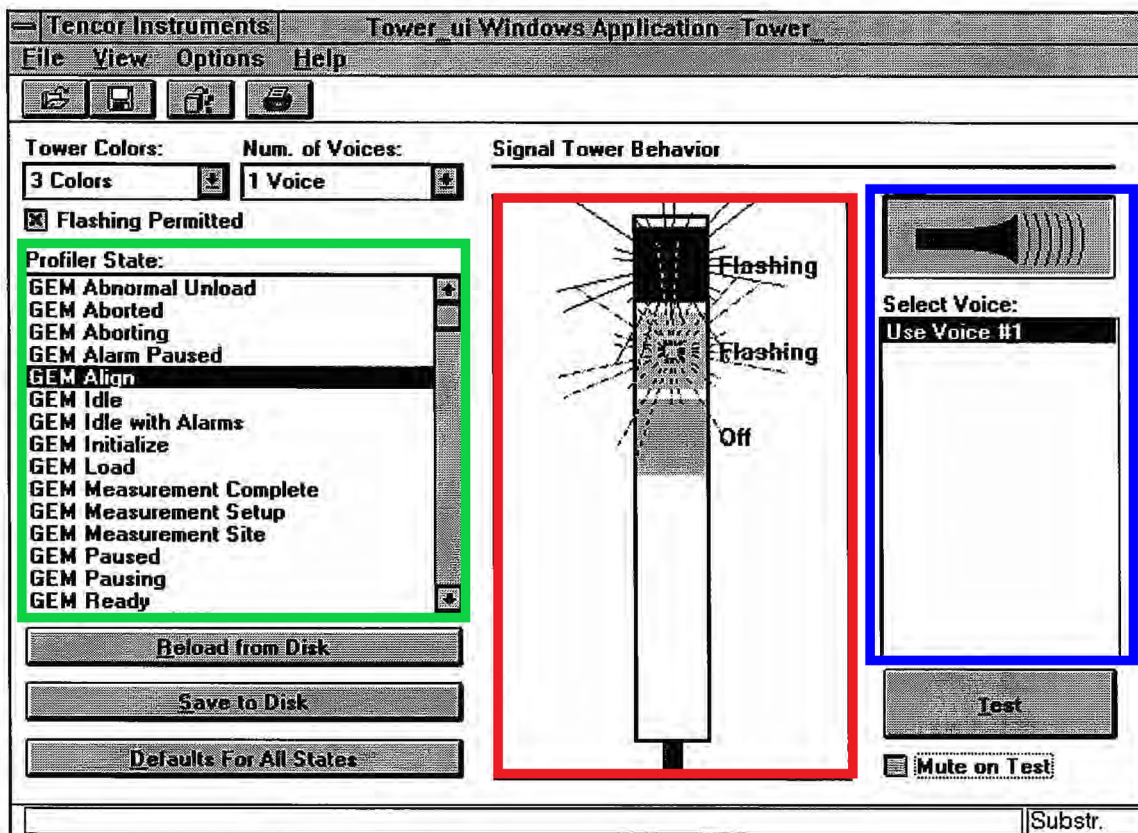


Figure 12-3 Signal Light Tower Configuration Editor Window

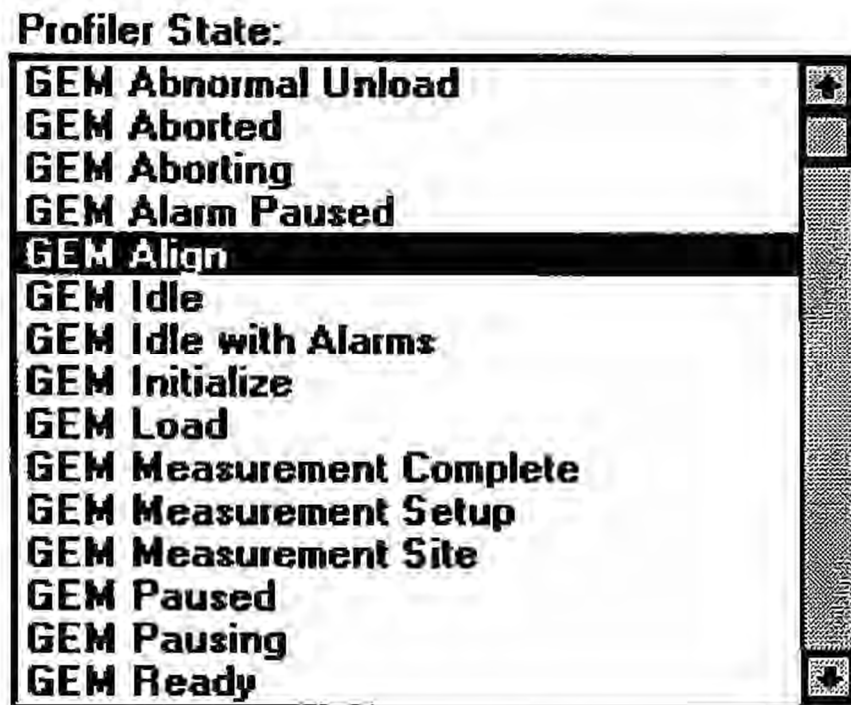
Ex. 1005, 239 Fig. 12-3.

Tencor discloses displaying instructions from a host computer with a different color. Like all computers, the PC compatible processor of the Tencor apparatus translates input from a user (like mouse movement and clicks and keyboard entries) into corresponding actions on a video monitor. Ex. 1005, 14, 19–22, 24, 30–44, 54–65; Ex. 1003 ¶208. The PC compatible processor is a host computer because it hosts the entry of conditions and commands to setup and operate the Tencor apparatus. Ex. 1003 ¶208. Tencor explains that

The list box [in the green box] on the Signal Light Tower window contains a descriptive list (Fig. 12-3). You can edit the behavior of the signal tower for a particular state by **selecting that state from the list box**. At that point, the current behavior for that state is shown with two custom controls, one for the tower voice and one for the tower lights.

Ex. 1005, 242.

When a user hovers a mouse icon over a Profiler State in the list box and clicks the mouse, the PC compatible processor translates the input selection and changes the Tower UI display. *Id.* For example, the clicked Profiler State is shown with a black background and white letters, while the remaining equipment states are shown with a white background and black letters:



Ex. 1005, 239, Fig. 12-3 (excerpt).

Therefore, Tencor also teaches the display unit (the video monitor, which displays the Tower UI) displays the instructions (to edit the “current behavior” of a Profiler State) from the host computer (the PC compatible processor) with a different color (the clicked Profiler State, currently being edited, is shown with a different color than other possible Profiler States). Ex. 1003 ¶211.

b. Motivation to combine and reasonable expectation of success

Although Kang does not expressly state that the workstation (100) displays the entered operating conditions, a display that does not display entered data is of little use to anyone. Tencor teaches a comparable display that displays operation

conditions, and it would have been obvious to combine Kang and Tencor for the same reasons in §VI.A.1.c.ii. Ex. 1003 ¶212.

To summarize, the combination of Kang and Tencor teaches the claim elements as follows:

- a display unit (embodied in workstation (100) and the display means (monitor) of main test device (300)) as modified to include a computer-implemented interface like the Tower UI of Tencor);
- the signal indicators (display member (550) and buzzer (560) of Kang) operate under instructions (user instructions to setup operating conditions for an error in Kang, which correspond to Tencor's Profiler States) from the host computer (workstation (100) of Kang);
- the display unit displays all of operation causes of the signal indicators (the display unit embodied in workstation (100) and the display means (monitor) of main test device (300) displays all error messages); and
- the display unit displays the instructions from the host computer (to edit the "current behavior" of a Profiler State, which corresponds to the user instructions to setup operating conditions for an error in Kang) with a different color (white text on a black background vs. black text on a white background).

As established in Section VI.A.1.c.ii, the combination of Kang and Tencor would have been obvious to provide an easy-to-use user interface for assigning different operating conditions for display member (550) and buzzer (560) to various types and states of errors (corresponding to Tencor's Profiler States) occurring during the burn-in process. Ex. 1003 ¶214.

Accordingly, Kang and Tencor teach all limitations of Claim 10, and it would have been obvious to combine the reference teachings. *Id.* ¶215. Claim 10 is obvious over Kang in view of Tencor. *Id.*

VII. MANDATORY NOTICES, FEES, AND STANDING

A. Real Party-In-Interest (37 C.F.R. §42.8(b)(1))

The real party-in-interest is ASM IP Holding B.V. The parent corporation for ASM IP Holding B.V. is ASM International N.V. The following entities have a financial interest in, or could be substantially affected by the outcome of, this proceeding: ASM International N.V. and ASM America, Inc.

B. Related Matters (37 C.F.R. §42.8(b)(2))

The '396 patent has been asserted in a patent infringement lawsuit in the Northern District of California against ASM International, N.V. and ASM America, Inc. (No. 5:17-cv-06880). That lawsuit may affect, or be affected by, any decisions in this proceeding.

C. Lead and Backup Counsel (37 C.F.R. §42.8(b)(3))

Lead Counsel	Back-up Counsel
Kerry Taylor (Reg. No. 43,947) 2kst@knobbe.com BoxASM@knobbe.com	Adeel S. Akhtar (Reg. No. 41,394) 2asa@knobbe.com
	Nathanael R. Luman (Reg. No. 63,160) 2nrl@knobbe.com
Postal and Hand-Delivery Address: Knobbe, Martens, Olson & Bear, LLP 2040 Main Street, 14th Floor Irvine, CA 92614 Telephone: (858)707-4000 Facsimile: (858)707-4001	Bridget A. Smith (Reg. No. 63,574) 2bzs@knobbe.com
	Postal and Hand-Delivery Address: Knobbe, Martens, Olson & Bear, LLP 2040 Main Street, 14th Floor Irvine, CA 92614 Telephone: (858)707-4000 Facsimile: (858)707-4001

D. Service Information (37 C.F.R. §42.8(b)(4))

Service information for lead and back-up counsel is provided above. ASM also consents to service by email at BoxASM@knobbe.com.

E. Grounds For Standing

ASM certifies that the '396 patent is available for IPR and that ASM is not barred or estopped from requesting IPR of the challenged claims. *See* Exs. 1011, 1012.

VIII. CONCLUSION

ASM requests institution on Claims 1–10 and ultimately a judgment cancelling the claims as unpatentable.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: November 30, 2018

By: /Kerry Taylor/
Kerry Taylor (Reg. No. 43,947)
Adeel S. Akhtar (Reg. No. 41,394)
Nathanael R. Luman (Reg. No. 63,160)
Bridget A. Smith (Reg. No. 63,574)
Attorneys for Petitioner ASM IP Holding B.V.

CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. §42.24(d), the undersigned certifies that foregoing
**PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO.
7,808,396**, exclusive of the parts exempted as provided in 37 C.F.R. §42.24(a),
contains 13,998 words and therefore complies with the type-volume limitations of
37 C.F.R. §42.24(a).

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: November 30, 2018

By: /Kerry Taylor/
Kerry Taylor (Reg. No. 43,947)
Adeel S. Akhtar (Reg. No. 41,394)
Nathanael R. Luman (Reg. No. 63,160)
Bridget A. Smith (Reg. No. 63,574)
Attorneys for Petitioner ASM IP Holding B.V.

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing **PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 7,808,396** and **EXHIBITS 1001-1024** are being served on November 30, 2018, via Priority Mail Express on counsel of record for U.S. Patent No. 7,808,396 as addressed below:

OLIFF PLC
P.O. Box 320850
Alexandria, VA 22320-4850

Dated: November 30, 2018

By: /Kerry Taylor/
Kerry Taylor (Reg. No. 43,947)
Adeel S. Akhtar (Reg. No. 41,394)
Nathanael R. Luman (Reg. No. 63,160)
Bridget A. Smith (Reg. No. 63,574)
Attorneys for Petitioner ASM IP Holding B.V.