

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**
(PCT Rule 43*bis*.1)

To:

see form PCT/ISA/220

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/EP2018/070653

International filing date (day/month/year)
31.07.2018

Priority date (day/month/year)
28.08.2017

International Patent Classification (IPC) or both national classification and IPC
INV. G03F7/20

Applicant
ASML HOLDING N.V.

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

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Date of completion of this opinion

see form
PCT/ISA/210

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Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - the international application in the language in which it was filed.
 - a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. forming part of the international application as filed:
 - in the form of an Annex C/ST.25 text file.
 - on paper or in the form of an image file.
 - b. furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. furnished subsequent to the international filing date for the purposes of international search only:
 - in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>5-7, 10, 13-15, 17-23, 25</u>
	No: Claims	<u>1-4, 8, 9, 11, 12, 16, 24</u>
Inventive step (IS)	Yes: Claims	<u>10</u>
	No: Claims	<u>1-9, 11-25</u>
Industrial applicability (IA)	Yes: Claims	<u>1-25</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following documents:

D1 US 2014/268074 A1 (CHIEN SHANG-CHIEH [TW] ET AL) 18 September 2014 (2014-09-18)

1 The present application does not meet the criteria of Article 33(2) PCT, because the subject-matter of claims 1 and 16 is not new.

1.1 Independent claim 1:

1.1.1 D1 discloses in paragraphs 37-49 and figures 5, 7A-8B an apparatus comprising a substrate (42) configured to be supported by a first support structure (30, 68), the substrate comprising at least one electrode configured to generate an electrostatic field (paragraph 37 and figure 5: the electrostatic force derives from a field that is intrinsically created by an electrode) between the at least one electrode and a confronting surface of a second support structure (the target 34 may be the mask stage 16) when the first support structure brings the surface of the substrate into spaced-apart apposition with the confronting surface of the second support structure (paragraph 37 and figure 5: "the cleaning structure 42 approaches close to the targeted object 34") and the at least one electrode is electrically connected to a voltage supply (paragraph 37 and figure 5: "conductive component coupled to a power source").

1.1.2 D2 discloses in column 11, lines 9-35, a cleaning member ("moveable member, such as a substrate, robot blade 17 (see Figure 1) or a remover attached to the blade) that is placed in proximity of a substrate chuck to remove particles therefrom. As this member is charged, it is considered connected electrically to a voltage source. This embodiment is prejudicial to novelty of claim 1.

1.2 Independent claim 16:

D1 discloses in the same passages a lithographic apparatus (paragraph 41) comprising

a chamber (paragraph 42 and figure 8B disclose a reticle storage chamber 56, but it is implicit that the reticle stage is also in a chamber in a lithography apparatus);

a positioning device configured and arranged to move an object placed on the

positioning device into and out of the chamber (use of a handler: paragraph 46);
a support structure positioned within the chamber (stage 16);
a substrate (cleaning structure) placed on the positioning device and arranged such that the positioning device can move the substrate along a path including a first position in which the substrate is outside of the chamber (stored in chamber 56) and a second position in which a surface of the substrate is positioned adjacent a surface of the support structure (paragraph 46: "the cleaning structure 28 is moved close to the mask stage 16"), the substrate including at least one electrode; and
a voltage supply arranged to supply voltage to the at least one electrode when the substrate is in the second position (it is implicit that the cleaning made at distance is the electrostatic cleaning of figure 5).

- 2 Dependent claims 2-10, 12-15, 17-25 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and/or inventive step:
- 2.1 Claim 2: It is trivial to adapt the apparatus of D1 to cleaning a wafer stage. See D2.
- 2.2 Claim 3: See D1 paragraph 46 for example.
- 2.3 Claim 4: The apparatus of D1 cleans the electrostatic chuck 16 which supports an ESC (paragraph 49).
- 2.4 Claims 5-7, 17-20: D1 is silent as to the voltage supply. However, it is known to use batteries and switches to power electrostatic cleaning devices, as shown by D3 (pages 5, 6 and 11), and it is considered trivial to implement such sources in the apparatus of D1. Further, the use of a voltage converter is considered obvious when the voltage of the battery does not match the required electrical field.
- 2.5 Claims 8, 9, 24: D1 figure 5 and paragraph 67: the cleaning plate has the same shape as a mask and is therefore planar and has the same size as the cleaned area. In D2, the members shown are planar.
- 2.6 Claims 11, 12: In D1, the material is conductive. Having layer of semiconductor or dielectric on the substrate is considered a mere design option. D2 disclose the use of a dielectric coating to prevent charge transfer from the contaminants (column 9, lines 37-46), and also the use of a

substrate as cleaning element (column 11), which is implicitly a semiconductor wafer. D5 discloses in paragraphs 39-43 a plurality of materials used for an electrostatic getter reticle.

- 2.7 Claims 13-15, 21-23: It is considered obvious to add a sticking material on the surface of the cleaning substrate in order to prevent unwanted release of the contaminants. The polymers recited in claim 15 are well known possibilities. D5 discloses an adhesion layer comprising polyimide or other polymers (paragraph 44).
- 2.8 Claim 25: Protrusions formed on a cleaning substrate and that come in contact with the object to be cleaned are known (see D3, paragraphs 19, 22, 65) to maintain distance when desired or prevent sticking, It is considered obvious to apply such known protrusions to the cleaning device of D1.
- 3 **Positive opinion:** The combination of the features of dependent claim 10 is neither known from, nor rendered obvious by, the available prior art. The electrostatic cleaning substrates found in the prior art do not disclose a non-planar surface complementary to the chuck surface. The problem to be solved is to have a comparable gap between the two surfaces at all the positions. A complementary cleaning substrate is known from D3, paragraphs 13, 15, 24, 78, 86, but this document does not solve the problem posed because the cleaning substrate in this document contacts the chuck. As obtaining a constant gap is not the object of D3, the skilled person would not combine its teachings with those of D1 or D2, and the subject-matter of claim 10 is considered inventive.

Re Item VII

Certain defects in the international application

- 1 The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).
- 2 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in D1-D4 is not mentioned in the description, nor are these documents identified therein.