

CONTAINER FOR RETICLE

BACKGROUND OF INVENTION

1. FIELD OF INVENTION

The present invention relates to a container for a reticle and, more particularly, to a container including a cleansing element for absorbing, eliminating or absorbing hazardous substances that could otherwise damage a reticle disposed in the container.

2. RELATED PRIOR ART

The sizes of electronic products are getting smaller, the operative frequencies higher, and the performance better. Accordingly, the sizes of chips used in the electronic products are getting smaller, and the performance better. The wiring in the chips is getting finer to include more circuits and elements. The width of the wiring has been reduced to 90 to 45 nanometers from 0.25 micrometers. Photolithography is the key to the success in minimizing the width of the wiring and the making of wafers. In the photolithography, a scanner and reticles are used. The throughput would severely be affected should there be particles or moisture on the surfaces of the reticles or wafers. Therefore, the lithograph must be executed in a white room.

To further protect the reticles or wafers from the particles or moisture, there are used containers such as disclosed in US Patent Nos. 4532970 and 4534389.

It is however inevitable to use solvent during the washing, making, sputtering and/or photolithography of the reticles or wafers. The

1 containers also release hazardous substances. The hazardous substances
2 include sulfide such as SO_4^{2-} released from the containers, NH_4^+ left after
3 the lithograph or released from pattern materials of the reticles and
4 chemicals left after the washing of the reticles. When the reticles are
5 washed and stored for some time, there will be NH_4^+ and SO_4^{2-} for
6 example. When the reticles are later exposed to ultraviolet light in the
7 photolithography, the NH_4^+ will react with SO_4^{2-} , thus producing
8 $(\text{NH}_4)_2\text{SO}_4$.

9 The foregoing problems are often caused by inadequate air-tightness
10 of the containers. The particles and the moisture come into the
11 containers from the environment. The hazardous substances are
12 released from the containers or left after the making or washing of the
13 reticles or wafers. Therefore, the hazardous substances are attached to
14 the reticles or aluminum protective frames for the reticles. SO_4^{2-} is left
15 on the aluminum protective frames.

16 To improve the air-tightness, there is used a provided an internal
17 cover for such a container. The internal cover is made of stainless steel.
18 The internal cover is not only used to prevent static discharge but also
19 absorb sulfide released from plastic. Furthermore, air is dispersed from
20 the containers by introducing inert gas into the containers. However, the
21 air-tight containers are expensive for requiring exhausting design, precise
22 molding and complicated assembling. Moreover, the inert gas
23 eventually vents from the containers, and particles and moisture
24 eventually enters the containers.

25 The present invention is therefore intended to obviate or at least
26 alleviate the problems encountered in prior art.

1

2 **SUMMARY OF INVENTION**

3 It is the primary objective of the present invention to provide a
4 container for containing a reticle and for absorbing, eliminating or
5 absorbing hazardous substances that could otherwise damage the reticle.

6 To achieve the primary objective of the present invention, a container
7 includes a base for supporting a reticle, a covering device for covering the
8 flat object on the base and a cleansing element attached to the covering
9 device for absorbing, eliminating and neutralizing hazardous substances
10 in the space defined between the base and the cover.

11 Other objectives, advantages and features of the present invention
12 will become apparent from the following description referring to the
13 attached drawings.

14

15 **BRIEF DESCRIPTION OF DRAWINGS**

16 The present invention will be described via detailed illustration of the
17 preferred embodiment referring to the drawings.

18 Fig. 1 is a perspective view of a container according to the preferred
19 embodiment of the present invention.

20 Fig. 2 is an exploded view of the container shown in Fig. 1 and a
21 reticle.

22 Fig. 3 is a side view of the container shown in Fig. 1.

23 Fig. 4 is a cross-sectional partial view of the container shown in Fig.
24 3.

25 Fig. 5 is a cross-sectional view of the reticle and the container shown
26 in Fig. 3.

1

2 **DETAILED DESCRIPTION OF PREFERRED EMBODIMENT**

3 Referring to Figs. 1 and 2, a reticle 50 can be disposed in a container
4 according to the preferred embodiment of the present invention. The
5 container includes a base 10 and a covering device 2. The covering
6 device 2 is provided with an air inlet 3 and an air outlet 4.

7 The base 10 includes two recesses 11 in an edge thereof and two
8 other recesses 11 in an opposite edge thereof. Two lateral strips 12 are
9 attached to the base 10. Two tabs 13 are formed on each of the strips 12.
10 Two supporting elements 14 are attached to each of the lateral strips 12.
11 A middle strip 15 is attached to the base 10 between the lateral strips 12.
12 Two tabs 16 are formed on the middle strip 15.

13 The covering device 2 includes an external cover 20, an internal
14 cover 30 detachably attached to the external cover 20 and an intermediate
15 cover 35 located between the external cover 20 and the internal cover 30.
16 The external cover 20 is made of plastic for example. The air inlet 3 and
17 the air outlet 4 are defined in the external cover 20. The external cover
18 20 includes four buckles 21 corresponding to the recesses 11. Four
19 cylinders 23 are formed on the external cover 20.

20 The internal cover 30 is made of metal for example and used as a
21 shield against static discharge. The internal cover 30 includes a deep
22 cavity 32 defined therein, apertures 33 in communication with the deep
23 cavity 32, a shallow cavity 31 around the deep cavity 32 and cylinders 34
24 formed thereon within the shallow cavity 31. The cylinders 34 are
25 located corresponding to the cylinders 24.

26 The intermediate cover 35 includes four apertures 36 defined therein

1 corresponding to the cylinders 34.

2 A cleansing element 60 is used to absorb, eliminate or neutralize
3 substances as discussed in the ***RELATED PRIOR ART***. The cleansing
4 element 60 is disposed in the deep cavity 32. The intermediate cover 35
5 is disposed in the shallow cavity 31 while the cylinders 34 are inserted
6 through the apertures 36. Thus, the cleansing element 60 is covered by
7 the intermediate cover 35.

8 Referring to Figs. 3 and 4, fasteners such as threaded bolts 25 are
9 driven in the cylinders 34 through the apertures 35, the cylinders 23 and
10 the countersink holes 23. Thus, the handle 22, the external cover 20, the
11 intermediate cover 35 and the internal cover 30 are joined together.

12 Two pressing elements 40 and two pressing elements 45 are attached
13 to an internal side of the internal cover 30.

14 Referring to Fig. 5, the reticle 50 is located on the base 10. The
15 buckles 21 are inserted in the recesses 11 to make sure that the external
16 cover 20 is firmly attached to the base 10. The reticle 50 is retained in
17 position by the supporting elements 14, the tabs 13 and 16 and the
18 pressing elements 40 and 45.

19 In use, the hazardous substances travel into the space between the
20 external cover 20 and the internal cover 30 from the space between the
21 internal cover 30 and the base 10 through the apertures 33. Clean air is
22 introduced into the container through the air inlet 3. Some of the
23 hazardous substances are mixed in the air. The air is vented from the
24 container through the air outlet 4. Thus, there is circulation of air. The
25 circulation of air not only removes the hazardous substances from the
26 container but also helps the hazardous substances leave the space between

1 the internal cover 30 and the base 10. Some others of the hazardous
2 substances are absorbed, eliminated or neutralized by the cleansing
3 element 60.

4 The present invention has been described via the detailed illustration
5 of the preferred embodiment. Those skilled in the art can derive
6 variations from the preferred embodiment without departing from the
7 scope of the present invention. Therefore, the preferred embodiment
8 shall not limit the scope of the present invention defined in the claims.

9
10

1 **CLAIMS**

2 1. A container comprising:

3 a base for supporting a flat object;

4 a covering device for covering the flat object on the base; and

5 a cleansing element attached to the covering device for absorbing,

6 eliminating and neutralizing hazardous substances in the space

7 defined between the base and the cover.

8 2. The container according to claim 1, wherein the covering device

9 comprises:

10 an internal cover for covering the flat object on the base and

11 supporting the cleansing element, wherein the internal cover

12 comprises apertures which the hazardous substances reach the

13 cleansing element from the space; and

14 an external cover for covering the internal cover on the base.

15 3. The container according to claim 2, wherein the external cover

16 comprises buckles formed thereon, and the base comprises recesses

17 for receiving the buckles, thus retaining the external cover on the

18 base.

19 4. The container according to claim 2 comprising a handle attached to

20 the external cover.

21 5. The container according to claim 2, wherein the internal cover

22 comprises a cavity for receiving the cleansing element.

23 6. The container according to claim 5 comprising an intermediate cover

24 for covering the cleansing element in the cavity, wherein the cavity is

25 in communication with the apertures.

26 7. The container according to claim 6, wherein the intermediate cover

1 comprises apertures defined therein, and the internal cover comprises
2 cylinders inserted in the apertures of the intermediate cover so that the
3 intermediate cover is precisely positioned on the internal cover.

4 8. The container according to claim 7 comprising a handle comprising
5 countersink holes defined therein and fasteners driven in the cylinders
6 through the countersink holes, wherein the external cover comprises
7 cylinders for receiving the fasteners.

8 9. The container according to claim 2 comprising pressing elements
9 attached to the internal cover to press and keep the flat object in
10 position.

11

12