Claims

1. Clamping device for an EUV inner pod (EIP), the EIP (100) comprising two or more components for containing an EUV reticle, wherein the clamping device (200)
    comprises a single one-piece clamping element configured to:
    provide the functions of immobilizing the two or more components (110, 120) of the EIP (100) relative to one another and immobilizing the reticle therein; and
    to only partially cover the EIP (100),
    the one-piece clamping element comprising an upper portion (210) and at least one U-shaped profile (215) integrally formed at the edge of the upper portion (210) biased towards a closed position and configured to be elastically bent into an open position; wherein the clamping device (200) is configured to be attachable to an EIP (100), when the U-shaped profile (215) is in the open position and to immobilize the EIP components (110, 120) and the reticle relative to one another, when the U-shaped profile (215) is in the closed position.

2. Clamping device (200) according to claim 1, further configured to act upon one or more retainers (114) of the EIP (100), the retainer(s) (114) being configured to immobilize the reticle therein, when acted upon from outside the EIP (100), to immobilize the reticle within the EIP (100).

3. Clamping device (200) according to claim 1 or 2, comprising at least 75 %, 80 %, 90 %, 95 % or 99 % of metallic materials with respect to its mass and/or volume.

4. Clamping device according to claim 1, comprising two U-shaped profiles (215), arranged on opposite edges of the upper portion (210).

5. Clamping device (200) according to any one of the preceding claims, comprising actuators (214) configured to act upon at least one retainer (114), when the clamping device (200) is attached to the EIP (100).

6. Clamping device (200) according to any one of the preceding claims having an envelope volume of less than 130 %, 120 %, 110 %, 105 % or less than 100 % of an envelope volume of an EIP (100) to which the clamping device (200) is attachable.

7. Clamping device (200) according to any one of the preceding claims further comprising a logging element (218) comprising one or more components including
    an information carrying element configured for identification of the clamping device (200), and/or
    a temperature sensor, and/or
    a humidity sensor and/or,
    a pressure sensor and/or,
    a concentration sensor, configured to detect or measure a concentration of one or more chemical substances in an atmosphere surrounding the clamping device (200), and/or
    an acceleration sensor,
    wherein the logging element is configured to store and/or make available information generated using the one or more components of the logging element (218).

8. Storage system (300) comprising a clamping device (200) according to any one of the preceding claims and an EUV inner pod (EIP) (100), wherein the EIP (100)
    is configured to accommodate an EUV reticle; and

comprises two or more components (110, 120) and one or more retainers (114) configured to immobilize the reticle when acted upon from outside the EIP (100); and

wherein the clamping device (200) is attachable to the EIP (100) to immobilize the two or more components (110, 120) relative to one another and act upon the retainer(s) (114).

9. Storage system (300) according to claim 8 having an envelope volume of less than 130 %, 120 %, 110 % or 105 % of an envelope volume of the EIP (100).

10. Method of operating an EUV reticle stocker (700), comprising storing (400) EUV reticles in the reticle stocker and retrieving (410) reticles from the reticle stocker (700), wherein

the reticle is contained within an EIP (100) comprising two or more components (110, 120),

the storing (400) comprises moving (404) the EIP (100) containing a reticle to a storage position (742) within the EUV reticle stocker (700); and

the retrieving (410) comprises removing (411) an EIP (100) containing a reticle from its storage position (742); and wherein

the EIP components (110, 120) and the reticle are immobilized relative to one another when moved to or from the storage position and when in the storage position, by a clamping device (200) according to any one of claims 1 to 7; the method further comprising

supplying a purge gas to each storage position (742) containing an EIP (100).

11. Method according to claim 10, wherein the storing (400), before the step of moving (404) to a storage position (742), further comprises the steps of:

receiving (401), from outside the stocker (700), a double pod comprising an EUV outer pod (EOP) (150) and an EIP (100) containing an EUV reticle, wherein the EIP (100) is entirely contained within the EOP (150);

opening (402) the EOP; and

attaching (403) a clamping device (200) to the EIP (100) to immobilize EIP components (110, 120) relative to one another and to act upon one or more retainers (114) comprised in the EIP (100) to immobilize the reticle relative to the EIP (100) to provide a storage system (300).

12. Method according to claim 10 or 11, wherein receiving (401) a double pod comprises

accepting the double pod at an outwardly facing side of an entrance terminal comprising an airlock (710),

opening a first shutter of the airlock (710),

moving the double pod into the airlock (710),

closing the first shutter,

decontaminating an inner volume of the airlock (710),

opening a second shutter of the airlock (710),

moving the double pod through the second shutter to an inwardly facing side of the entrance terminal, and

closing the second shutter.

13. Method according to any one of claims 10 to 12, wherein opening (402) an EOP (150) comprises

unlocking the EOP (150),

removing the EOP (150) from around the EIP (100), and

storing the EOP (150) in an EOP buffer stock (750).

14. Method according to claim 13, wherein the EOP buffer stock (750) is arranged as an integral component of the stocker (700) or wherein the EOP buffer stock (750) is arranged separated and/or spaced from the stocker (700).

15. Method according to any one of claims 10 to 14, wherein the retrieving (410) after the step of removing (411) from the storage position (742) further comprises the steps of:
    detaching (412) the clamping device (200) from the EIP (100);
    assembling (413) an EOP (150) around the EIP (100) to immobilize the EIP components (110, 120) and the reticle contained within the EIP (100) relative to one another, forming a double pod; and
    delivering (414) the double pod to outside the stocker (700).

16. Stocker (700) for storing at least one EUV reticle, wherein each of the at least one reticle is stored in one respective EUV inner pod (EIP) (100), wherein the EIP (100) comprises two or more EIP components (110, 120) which are immobilized relative to one another by a clamping device (200) according to any one of claims 1 to 7, wherein the EIP (100) comprises one or more retainers (114) configured to immobilize the reticle stored inside the EIP (100) relative to the EIP (100), when acted upon from outside the EIP (100), wherein the clamping device (200) acts upon the retainer(s) (114) to immobilize the reticle stored within the EIP (100), the stocker (700) comprising:
    a loading port comprising an airlock (710) and an assembler (720);
    a storage unit (740) configured to store in respective storage positions (742) EIPs (100) each immobilized by one clamping device (200) and each containing one reticle;
    a handler (730) configured to move the clamped EIP (100) containing the reticle to and from a respective storage position (742) within the storage unit (740) of the stocker (700); and
    a purge gas supply unit (760) configured to supply a purge gas to the storage unit (740)

    wherein:
    the airlock (710) is configured to receive a double pod comprising an EUV outer pod (EOP) (150) and an EIP (100) containing a reticle from outside the stocker (700), wherein the EOP (150) acts upon the retainer(s) (114); and
    the assembler (720) is configured to open the EOP (150) without causing movement of EIP components (110, 120) and the reticle relative to one another; to attach said clamping device (200) to and remove the clamping device (200) from said EIP (100) without causing movement of the EIP components (110, 120) and the reticle relative to one another; and to assemble an EOP (150) around the unclamped EIP (100).

17. Stocker (700) according to claim 16, wherein the handler (730) comprises a two-pronged fork configured to be pushed into a storage system (300) according to claim 8 or 9 without mechanically contacting the EIP (100).

18. Stocker according to claim 16 or 17, wherein the purge gas supply unit (760) is configured to supply a purge gas, particularly in an amount corresponding to a flow rate in the range of 0.2 L/min/reticle to 1 L/min/reticle and/or corresponding to an amount in the range of 1 L/min/reticle to 20 L/min/reticle, particularly in the range of 2 L/min/reticle to 10 L/min/reticle.

19. Stocker (700) according to any of claims 16 to 18, further comprising an EOP buffer stock (750), configured to store a number of EOPs (150) in a controlled atmosphere, particularly provided by the purge gas supply unit (760), with an EOP handler configured to place an EOP (150) into and retrieve an EOP (150) from the EOP buffer stock (750).

20. Stocker system comprising a stocker (700) according to any one of claims 16 to 18 and an EOP buffer stock (750), configured to store a number of EOPs (150) in a controlled atmosphere, particularly provided by the purge gas supply unit (760), with an EOP handler, configured to place an EOP (150) into and retrieve an EOP (150) from the EOP buffer stock (750), wherein the EOP buffer stock (750) is arranged separated and/or spaced from the stocker (700).