CLAIMS

1. A procedure for filling pharmaceutical containers (1) with at least one solid and sealing them under sterile conditions, comprising the steps of:

a) providing a pharmaceutical container (1) having walls and a bottom,

b) dispensing the solid into the pharmaceutical container (1) by means of a dispensing needle (4), gravimetrically checking the weight of solid dispensed into the container (1); and

c) sealing the pharmaceutical container with a stopper (6),

wherein~~characterised in that~~, in at least one of steps a), b) and c), or in a plurality thereof in any combination, the ~~static electric charges~~electrostatic charge on the inside walls of the container (1), on the solid dispensed inside the container, and/or on any parts in contact with the inside walls of the container ~~walls~~ or with the solid dispensed inside the container, ~~are~~is neutralised by means of an ioniser (2) to which an ionisation potential is applied such that the electrostatic charge inside the container (1) after each ionisation is less than 2000 volts~~.~~,

characterised in that

~~A procedure according to claim 1, wherein,~~

~~2.~~ between step b) and step c), an additional ~~static electric~~electrostatic charge ionisation is carried out inside the pharmaceutical container (1).

~~3.~~2. ~~A~~The procedure according to claim 1~~ or 2~~, wherein in step a) the ionisation is carried out with the pharmaceutical container (1) empty.

3. ~~A~~The procedure according to claim 1 or 2, wherein the ioniser(s) (2) are located on the outside of the pharmaceutical container (1).

4. The procedure according to any one of claims 1 to 3, wherein the ioniser(s) (2) are located ~~on the outside or~~ inside of the pharmaceutical container (1~~), in any combination.~~).

5. ~~A~~The procedure according to any one of claims 1 to 4, wherein, in step c), the ionisation is carried out before and/or during sealing

6. ~~A~~The procedure according to any one of the preceding claims, characterised in that the ~~static electrical charges are~~electrostatic charge is less than 1000 volts.

7. ~~A~~The procedure according to any one of the preceding claims, characterised in that the ~~static electrical charges are~~electrostatic charge is less than 500 volts.

8. ~~A~~The procedure according to any one of the preceding claims, characterised in that the ~~static electrical charges are~~electrostatic charge is less than 200 volts.

9. ~~A~~The procedure according to any one of the preceding claims, wherein step b) is carried out under vibration of the dispensing needle (4) to assist homogeneous dosing of the solid.

10. ~~A~~The procedure according to any one of the preceding claims, wherein step b) is repeated ~~a number of times~~more than once.

11. ~~A~~The procedure according to any one of the preceding claims wherein, in step b), the tip of the dispensing end of the dispensing needle (4) is at a height h of 1 to 3 mm above the surface of the solid deposited on the bottom of the container (1).

12. ~~A~~The procedure according to any one of the preceding claims, wherein, in step b), the container (1) is in a fixed position throughout the filling stage while the dispensing needle (4) is a movable element that moves upwards as the filling stage progresses in order to maintain the distance h between the dispensing end of the dispensing needle and the surface of the solid deposited on the bottom of the container (1).

13. ~~A~~The procedure according to any one of claims 1 to 11, wherein, in step b), the dispensing needle (4) is in a fixed position throughout the filling stage while the container (1) is a movable element that moves downwards as the filling step progresses in order to maintain the distance h between the dispensing end of the dispensing needle and the surface of the solid deposited on the bottom of the container (1).

14. ~~A~~The procedure according to any one of claims 1 to 11, wherein, in step b), both the dispensing needle (4) and the container (1) are movable elements that move synchronously with respect to each other during the filling stage in order to maintain the distance h between the

dispensing end of the dispensing needle (4) and the surface of the solid deposited on the bottom of the container (1).

15. ~~A~~The procedure according to any one of the preceding claims, wherein in step b), the container (1) is filled from the distal part with respect to the collar of the container when the container is a syringe or cartridge.

~~16. A procedure according to any one of the preceding claims 1 to 14, wherein in step b) the container (1) is filled from the distal part with respect to the nozzle of the container when the container is a syringe or cartridge.~~

~~17.~~16. ~~A~~The procedure according to any one of the preceding claims, wherein step c) is carried out under vacuum

~~18.~~17. ~~A~~The procedure according to any one of the preceding claims, wherein in at least one of steps a), b) and c) or in a plurality thereof in any combination, a sterile carrier gas stream such as N_2 or sterile compressed air is applied inside the pharmaceutical container (1).

~~19.~~18. ~~A~~The procedure according to any one of the preceding claims, wherein the ioniser (2) is selected from the group consisting of ring, rod, gun, curtain, blade, gun, needle or filter ionisers, and isolators with an ioniser on the top thereof.

~~20.~~19. ~~A~~The procedure according to any one of the preceding claims, wherein the dispensing needle (d) dispenses the solid contained in a hopper (c), and both the hopper (c) and the dispensing needle (d) are made of a non-conductive material.

~~21.~~20. ~~A~~The procedure according to any one of the preceding claims, wherein the pharmaceutical container (1) is inserted into a cylinder of an electrically conductive material that is grounded, to help dissipate the static charge of the pharmaceutical container.

~~22. A procedure according to any one of the preceding claims 1 to 20, wherein the pharmaceutical container (1) is inserted into a cylinder of an electrically non-conductive material to help dissipate the static charge of the pharmaceutical container.~~

~~23.~~21. ~~A~~The procedure according to any one of the preceding claims, wherein the pharmaceutical container (1) is made of an electrically non-conductive material.

~~24.~~22. ~~A~~The procedure according to any one of the preceding claims, wherein the pharmaceutical container (1) is selected from the group consisting of a male syringe, a female syringe, a needle syringe, a vial, a capsule, an ampoule, a single-dose device, a cartridge, an inhaler, a bottle, a blister pack, a sachet, a bag, a test tube, and an Eppendorf® tube.

~~25.~~23. ~~A~~The procedure according to any one of the preceding claims, wherein the pharmaceutical container (1) is made of glass, glass, metal such as steel or titanium suitable for drug delivery, or plastic-type materials.

~~26.~~24. ~~A~~The procedure according to claim 25, wherein the plastic type materials are selected from polyolefins, cyclopolyolefins, polypropylene, polybutadiene, polyethylene, polyetheretheretherketone, polystyrene, polyvinyl chloride, polyacrylonitrile, polyamides, polyesters such as poly(ethylene terephthalate), polycarbonate, acrylic polymers such as poly(methyl methacrylate), polyacrylonitrile, thermoplastic resins such as polyacetals and polyhaloethylenes, polyurethanes, formaldehyde resins such as phenol resin and urea resin, phenoplasts, aminoplasts, thioplasts, duroplastic resins such as unsaturated polyesters and polyurethanes, polyvinylene silicones, cellulose derivatives, polycarbonates, and combinations thereof.

~~27.~~25. ~~A~~The procedure according to any one of the preceding claims, wherein the pharmaceutical container (1) has a diameter of between 9 and 80 mm.

~~28.~~26. ~~A~~The procedure according to any one of the preceding claims, wherein the dispensing needle (4) is provided with a containment element to prevent the powder from being dispersed above the level of the dispensing tip or end of the dispensing needle during filling.

~~29.~~27. ~~A~~The procedure according to any one of the preceding claims, wherein the solid product to be dispensed into the container (1) has the following particle size distribution:

- no more than 10% of the total particle volume less than or equal to 20 microns,
- no more than 10% of the total particulate volume greater than or equal to 230 microns or less

than or equal to 140 microns,
- a d0.5 value in the range 60-180 microns,

where d0.5 indicates the mean value of the particle size that divides the population into exactly two equal halves, with 50% of the distribution being above this value and 50% below.

~~30.~~28. ~~A~~The procedure according to any one of the preceding claims 1 to 28, wherein the solid product to be dispensed into the container (1) has the following particle size distribution:

- no more than 10% of the total particle volume less than or equal to 20 microns,
- no more than 10% of the total particle volume greater than or equal to 325 microns or less than or equal to 245 microns,
- a d0.5 value in the range 100-155 microns.

~~31.~~29. ~~A~~The procedure according to any one of the preceding claims, wherein the solid product to be dispensed into the container (1) is selected from the group consisting of risperidone, paliperidone, fentanyl, olanzapine, letrozole, aripiprazole, anastrozole, asenapine, brexiprazole, cariprazine, clozapine, iloperidone, lurasidone, quetiapine, ziprasidone, including any derivative, metabolite or salt thereof, alone or in combination.

~~32.~~30. ~~A~~The procedure according to any one of the preceding claims, wherein the solid product to be dispensed into the container (1) is selected from the group consisting of biocompatible polymers of the type polylactic acid, (PLA), polyglycolic acid (PGA) and their copolymers polylactic-co-glycolic acid (PLGA) including any derivatives or copolymers, alone or in combination.

~~33.~~31. ~~A~~The procedure according to any one of the preceding claims, characterised in that it is carried out in an aseptic environment in an area with unidirectional air flow.

~~34.~~32. ~~A~~The procedure according to any one of the preceding claims, characterised in that it is carried out in an isolator.

~~35.~~33. ~~A~~The procedure according to any one of the preceding claims characterised in that prior to step b) a sterilisation of the isolator is carried out with nebulised or vaporised hydrogen peroxide

or a mixture of hydrogen peroxide and peracetic acid.

~~36.~~34. ~~A~~The procedure according to any one of the preceding claims that is implemented in computer executable software.

~~37. A container (1) containing a solid product, wherein the solid product has been dispensed into the container (1) using the method described in any one of claims 1 to 36 above.~~

~~38. A container (1) containing a solid product according to claim 37, wherein the solid product has the following particle size distribution:~~

~~- no more than 10% of the total particle volume less than or equal to 20 microns,~~
~~- no more than 10% of the total particulate volume greater than or equal to 230 microns or less than or equal to 140 microns,~~
~~- a d0.5 value in the range 60-160 microns,~~

~~where d0.5 indicates the mean value of the particle size that divides the population into exactly two equal halves, with 50% of the distribution being above this value and 50% below.~~

~~39. A container (1) containing a solid product according to claim 37, wherein the solid product has the following particle size distribution:~~

~~- no more than 10% of the total particle volume less than or equal to 20 microns,~~
~~- no more than 10% of the total particle volume greater than or equal to 325 microns or less than or equal to 245 microns,~~
~~- a d0.5 value in the range 100-155 microns.~~

~~40. A container (1) comprising a solid product according to any one of claims 37 to 39, wherein the solid product is a medicinal product.~~

~~41. A container (1) comprising a solid product according to claim 40, wherein the medicinal product is selected from the group consisting of risperidone, paliperidone, fentanyl, olanzapine, letrozole, aripiprazole, anastrozole, asenapine, brexiprazole, cariprazine, clozapine, iloperidone, lurasidone, quetiapine, ziprasidone,~~

~~including any derivatives, metabolites or salts thereof, alone or in combination.~~

~~42. A container (1) comprising a solid product according to any one of claims 37 to 39, wherein the solid product is a biocompatible polymer.~~

~~43. A container (1) containing a solid product according to claim 42, wherein the biocompatible polymer is selected from the group consisting of biocompatible polymers of the type polylactic acid (PLA), polyglycolic acid (PGA), and their copolymers polylactic co glycolic acid (PLGA), including any derivatives or copolymers thereof, alone or in combination.~~