CLAIMS

1. A method for printing solder onto a wafer (101) comprising the steps of:
depositing solder paste (102) onto the wafer (101), by a wafer solder printer (1);
applying an inline reflow process to the deposited solder paste (102) to form solder bumps (104) on the wafer (101), by an inline reflow means (2); and
cleaning the reflowed solder bumps (104), by a de-fluxing means (3);
each step having its parameters optimized by means of a staging process control;
wherein the wafer (101) is loaded into the de-fluxing means (3) at predetermined intervals during cleaning.

2. The method according to claim 1, further including a step of inspecting the solder bumps (104).

3. The method according to claim 1 or claim 2, further comprising the steps of:
kneading the solder paste (102) onto a stencil (103) until the solder paste (102) reaches a desired viscosity prior to the commencement of the printing process;
depositing the solder paste (102) into the apertures of the stencil 103 uniformly across the wafer101;
heating the wafer 101 at a predetermined rate to ensure that no defects such as components cracking or the solder paste 102 splattering during the reflow process to enable each solder bump 104 to possess a bump height of 45µm to 55µm, diameter ranging from 90µm to 110µm, and a maximum co-planarity of 10µm;
controlling oxygen levels in the inline reflow process to operate at a minimum of 75 parts per million for a complete reflow cycle;
wherein the cleaning process includes a wash fixture turning speed of 60 to 80 RPM for 3 to 5 seconds, temperatures ranging from substantially 50°C to 120°C, a wash cycle of at least substantially 25 to 60 cycles, a chemical concentration of substantially 13% to 20%; and a reservoir stirring time of substantially 800 to

1000 seconds with pre-heat temperature to promote chemical reaction in the reservoir and cleaning effectiveness on the wafer 101; said steps being such that the staging process control is employed to achieve a target yield of 99% to 99.5% within a maximum operating time of 7 hours.

4. The method according to any one of the preceding claims, wherein the wafer solder printer (1) deposits the solder paste (102) at speed in the range of 30mm/s to 40mm/s.

5. The method according to any one of the preceding claims, wherein the wafer solder printer (1) uses a squeegee (105) for applying pressure in the range of 6N to 8N onto the deposited solder paste (102).

6. The method according to any one of the preceding claims, wherein the de-fluxing means (3) operates at a temperature in the range of 50°C to 120°C.

7. The method according to any one of the preceding claims, wherein the solder bumps (104) are inspected using a three-dimensional (3D) automated optical inspection (AOI) means (4) and by X-ray means (5).

8. A system for printing solder onto a wafer (101) comprising:
a wafer solder printer (1) for depositing solder paste (102) onto a wafer (101);
an inline reflow means (2) for applying an inline reflow process to the deposited solder paste (102) to form solder bumps (104) on the wafer (101); and
a de-fluxing means (3) for cleaning the solder bumps (104);
wherein the system executes a method according to any one of claims 1 to 7, with parameters that are optimized by means of a staging process control, and the wafer is loaded into the de-fluxing means (3) at predetermined intervals during cleaning.

9. The system according to claim 8, the staging process control is employed to achieve a target yield of 99% to 99.5% within a maximum operating time of substantially 7 hours.

10. The system according to claim 8 or claim 9, wherein the solder bumps (104) are inspected by means of a three-dimensional (3D) automated optical inspection (AOI) means (4) and by X-ray means (5).