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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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Standard for construction and acceptance of micro-assembling production line process equipment installation engineering

微组装生产线工艺设备安装工程施工及验收标准

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1 General provisions

1.0.1 The document was drawn up to regulate the construction and the quality acceptance of installation works for micro-assembling production line process equipment, to secure the installation quality and the reliable running of that equipment, and to advance equipment installation technology in this field.

1.0.2 It applies to the construction, debugging, commissioning and acceptance of installation works for micro-assembling production line process equipment in new, rebuilt and extended projects.

1.0.3 Apart from this standard, the construction and acceptance of installation works for micro-assembling production line process equipment shall also comply with the relevant provisions of the national standards currently in force.

2 Terms

2.0.1 micro-assembling - technology in which the various miniature components, integrated circuit chips and chip components that make up an electronic circuit are assembled on a high-density multilayer interconnection substrate by surface mounting and interconnection processes, forming an advanced microelectronic assembly.

2.0.2 multilayer substrate - substrate carrying embedded conductor layers, used to realise complex interconnection circuits.

2.0.3 thick film - film layer deposited on a substrate by a screen printing process and fused into its final form after firing at a maximum temperature of about 850 °C.

2.0.4 co-fired ceramic - composite ceramic material with a range of properties, obtained by making ceramic powder into green sheets of accurate thickness and high density, forming the circuits on multiple layers of green sheets and then firing and fusing them together; it is divided into low temperature co-fired ceramic and high temperature co-fired ceramic. (Clause revised in the 2024 partial revision; formerly 2.0.4 low temperature co-fired ceramic

multilayer substrate.)

2.0.4A low temperature co-fired ceramic (LTCC) - rigid multilayer interconnection ceramic part obtained by stacking in order unfired flexible green ceramic sheets that carry printed thick film conductor and resistor patterns on the surface and metallised interlayer interconnection vias, pressing them into an integral structure while heating, and then co-firing the green sheets together with the thick film electronic pastes in an air atmosphere at a temperature of 800 °C to 950 °C.

2.0.4B high temperature co-fired ceramic (HTCC) - rigid multilayer interconnection ceramic part obtained by stacking in order unfired flexible green ceramic sheets that carry printed thick film conductor and resistor patterns on the surface and metallised interlayer interconnection vias, pressing them into an integral structure while heating, and then co-firing the green sheets together with the thick film electronic pastes in a hydrogen or hydrogen-nitrogen mixed atmosphere at a temperature of 1500 °C to 1850 °C.

2.0.5 thin film - conductive, resistive or dielectric material layer formed on a co-fired ceramic substrate by vacuum evaporation, sputtering, chemical vapour deposition or similar methods, its thickness usually being less than 1 micrometre. (Clause revised in the 2024 partial revision; formerly 2.0.5 thin film multilayer substrate.)

2.0.6 green tape - strip-shaped flexible thin ceramic material made by a tape casting process, uniform in texture, smooth on the surface and of a certain strength.

2.0.7 packaging - microelectronic process technology for interconnecting, protecting and dissipating the heat of electronic devices (microcircuits or assemblies); it falls mainly into three types, plastic packaging, ceramic packaging and metal packaging.

2.0.8 process inspection - process of measuring and inspecting the shape, dimensions and position of a product and its mechanical, physical and chemical characteristics with metering or testing tools, instruments or equipment and comparing them against its technical requirements; it is the inspection technique by which, during production, the conformity of a process step or of the finished state of a product with what the design and process documents lay down is evaluated.

3.1 Construction conditions

3.1.1 Before micro-assembling equipment is installed, the clean plant shall satisfy the following provisions: (1) it shall have passed as-built acceptance in the empty state, and the air cleaning and conditioning system shall have run continuously and normally for 24 h or more; (2) the temperature should be 20 °C to 26 °C; (3) the relative humidity should be 30 % to 70 %; (4) the bearing capacity of the floor shall meet the load requirements of the equipment; (5) the clear height shall meet the installation requirements of the equipment; (6) the personnel purification facilities at the entrance of the plant shall already be in service; (7) an opening for moving equipment in shall be available; (8) the fire-fighting