CLAIMS

1. A method for producing a solder connection between a plurality of components (12A, 12B) by heating and melting solder material (16) which is arranged between the components (12A, 12B) to be connected of a solder group (10), and/or for coating a component of a solder group (10) with solder material (16), in a process chamber (74) sealed off from its surroundings of a soldering apparatus (50, 150, 250) of a multichamber system for flow production having at least two chambers, in particular three chambers for preheating, connecting and cooling, wherein, on assembly of the components (12A, 12B) and of the solder material (16), the components (12A, 12B) to be connected are provisionally connected with a solid or pasty bonding material (18) to form a solder group (10), in which the components (12A, 12B) are fixed relative to one another in a joining position, then soldering proceeds in a soldering chamber, subsequently the solder group (10) is adjusted by exerting a pressure force on the solder group (10) relative to one another with regard to the spacing thereof, to which a stop apparatus is provided in a cooling chamber for providing mechanical alignment during solidification of a solder and comprises a base plate (66) and a pressure plate (64), between which the solder group (10) comprising the component(s) (12A, 12B) and the solder material (16) is received, and the spacing between the base plate (66) and the pressure plate (64) is limited to a minimum spacing, such that, once the solder material (16) has melted, the solder group (10) has a predetermined thickness.

2. A method according to claim 1, **characterised in that** the stop apparatus is arranged on the base plate (66) or the pressure plate (64).

3. A method according to claim 1 or 2, **characterised in that** the stop apparatus is adjusted such that the minimum spacing can be set.

4. A method according to one of the preceding claims, **characterised in that** the stop apparatus comprises a plurality of in particular length-adjustable stop elements, wherein each stop element has an adjusting device which interacts with a complementary adjusting device provided on the base plate (66) or the pressure plate (64) and the stop elements are arranged such that, on reaching the minimum spacing, they bear with a respective free end against a component (12A, 12B, 14) of the solder group (10), against a base frame (54) carrying one of the components (12A, 12B, 14) or against the base plate (66).

5. A method according to one of the preceding claims, **characterised in that** the base plate (66) and/or the pressure plate (64) are heated and/or cooled.

6. A method according to one of the preceding claims, **characterised in that** the soldering apparatus (50, 150, 250) has a carrier unit (52) on which the pressure plate (64) is directly or indirectly spring-supported or spring-mounted, and a spring force which the pressure plate (64) exerts on the solder group (10) is set by the base plate (66) being adjusted relative to the carrier unit (52).

7. A method according to one of the preceding claims, **characterised in that** the side of the pressure plate (64) associated with the base plate (66) is planar or has at least one projecting, in particular planar, step which is in contact with the solder group (10).

8. A method according to one of the preceding claims, **characterised in that** the bonding material (18) is selected such that it evaporates during production of the solder connection.

9. A method according to claim 8, **characterised in that,** at an evaporation pressure which is lower than atmospheric pressure, the evaporation temperature of the bonding material (18) is lower than the melting temperature of the solder material (16) at atmospheric pressure.

10. A method according to one of the preceding claims, **characterised in that** the solder group (10) is heated to an intermediate temperature which is lower than the melting temperature of the solder material (16) at atmospheric pressure, and in that the pressure in the process chamber (74) is reduced to a pressure below the evaporation pressure of the bonding material (18) at the intermediate temperature, such that the bonding material (18) evaporates.

11. A method according to claim 10, **characterised in that** the pressure in the process chamber (74) is initially reduced to a pressure above the evaporation pressure of the bonding material (18) at the intermediate temperature, such that the bonding material (18) does not yet evaporate, in that subsequently a cleaning agent, in particular methanoic acid, hydrogen or a plasma, is introduced into the process chamber (74) to clean the solder group (10), and in that subsequently the pressure in the process chamber (74) is reduced to a pressure below the evaporation pressure of the bonding material (18) at the intermediate temperature.

12. A method according to claim 10 or 11, **characterised in that** the intermediate temperature while the pressure in the process chamber (74) is being reduced to a pressure below the evaporation pressure of the bonding material (18) is maintained at a predetermined temperature value or within a predetermined temperature range at least until evaporation of the bonding material (18) is complete.

13. A method according to one of the preceding claims, **characterised in that** the bonding material (18) is arranged in the region of edges and/or corners and/or in the centre of the components to be connected (12A, 12B) and/or of the solder material.

14. A method according to one of the preceding claims, **characterised in that** the solder material (16) melts once the bonding material has evaporated (18)**.**

15. A method according to one of the preceding claims, **characterised in that** the bonding material (18) is liquid or pasty and in particular comprises a terpene alcohol, in particular isobornyl cyclohexanol**.**