Claims

1. A method for producing at least one structure (13, 15) by means of laser action on at least one wall element (11) of a container wall of a plastic container product (1) that is preferably produced by means of a blow-molding, filling and sealing process, characterized in that the respective structure (13, 15), be introduced as a linear depression (17, 37) in one wall element (11) by means of the laser action, taking into account at least the
   - laser power,
   - exposure time of the laser,
   - type of plastic material and
   - type of structure that is desired,

   in such a way that this depression is bordered by a projection (27, 39) along the edge following the linear depression (17, 37), said projection being produced under the influence of the inherent material tension of the plastic material.

2. The method according to claim 1, characterized in that both the structure (13, 15) produced in the one respective wall element (11) as well at least the directly adjacent wall elements (43) are formed as a container wall (29), which is closed off to the outside environment, extends continuously, and is formed such that it is intrinsically homogeneous and bubble-free.

3. The method according to claim 1 or 2, characterized in that during the laser action, the respective wall element (11) of the container wall (29) is still heated from the preceding molding process, in particular blow molding processes.

4. The method according to one of the preceding claims, characterized in that the linear depressions (17, 37) are merged at connection

points such as joints (B) or intersection points (C), which are externally bordered by the projection (27) along the edge up to the cross-over point (41) of the respective depression (17, 37).

5. The method according to one of the preceding claims, characterized in that the laser intensity is reduced when the marking speed is reduced or wall elements (11) are irradiated for a second time.

6. The method according to one of the preceding claims, characterized in that at least two linear depressions (17, 37) be disposed, at least in part, parallel to one another in the region of joints (B) and/or intersection points (C), said depressions bordering a further projection (39) therebetween, which is disposed on the same level or on a level that differs from that of the levels of the other projections (27).

7. The method according to one of the preceding claims, characterized in that an additional structure (33, 35) is introduced in the wall element (31) of this container wall (29) opposite the wall element (11) of the container wall (29) having the structure (13, 15) and facing the inside of the container, which additional structure follows the one structure (13, 15) in such way that a projection (33) is applied or introduced respectively at the location of a corresponding depression (17), and a depression (35) is applied or introduced respectively at the location of the respective projection (27).

8. The method according to one of the preceding claims, characterized in that the respective structure (13, 15) is produced by a CO_2 laser.

9. The method according to one of the preceding claims, characterized in that the respective structure (13, 15) is introduced by means of laser action in plastic container products (1) made out of a polyolefin.

10. A product, in particular in the form of a container such as an ampule, preferably produced according to a method pursuant to the contents of claims 1 to 9, having at least one structure, characterized in that the structure at least in part comprises a linear depression (17, 37) introduced in the wall element (11) of the product, which linear depression is bordered by a projection (27, 39) on at least one of its edges, preferably on adjacent opposite edges, and at least in part following the course of the depression (17, 37).

Claims

1. A method for producing at least one structure, comprising the steps of:
forming a plastic container product having a container wall with at least one wall element; and
introducing a structure in the wall element as a first linear depression by action of a laser taking into account power and exposure time of the laser, plastic material of the wall element and type of structure to be formed such that the first linear depression is bordered by a projection along an edge following the first linear depression with the projection being produced under influence of inherent material tension of the plastic material.

2. A method according to claim 1 wherein the container product is formed by a blow-molding, filling and sealing process.

3. A method according to claim 1 wherein the structure, the wall element and adjacent wall elements form the container wall, the container wall being closed off relative to an outside environment, extending continuously and being formed intrinsically homogeneous and bubble-free.

4. A method according to claim 1 wherein during the action of the laser, the wall element is still heated from a preceding molding process.

5. A method according to claim 1 wherein the structure includes a second liner depression formed similarly to the first linear depression and merged at an intersection point with the first linear depression, the intersection point being externally bordered by a projection along an edge of the intersection point of the first and second linear depressions.

6. A method according to claim 1 wherein intensity of the laser is reduced when marking speed of the laser is reduced.

7. A method according to claim 1 wherein the wall element is irradiated by the laser a second time when intensity of the laser is reduced.

8. A method according to claim 1 wherein a second liner depression with a projection on an edge thereof is formed in the wall element by the action of the laser and is disposed, at least in part, parallel to the first linear depression in a region of an intersection point of the first and second liner depression, the first and second linear depressions bordering a projection between the first and second linear depressions and disposed on at least one of a same level or different level from levels of the projections of the first and second linear depressions.

9. A method according to claim 1 wherein an additional structure is introduced into the wall element opposite the first linear depression and facing an inside of the container by the action of the laser, the additional structure following the first linear depression such that a projection is introduced at a location corresponding to the first linear depression and such that a depression is introduced at a location of the projection along the edge of the first linear depression.

10. A method according to claim 1 wherein the laser is a C02 laser.

11. A method according to claim 1 wherein the plastic material comprises a polyolefin.