CLAIMS:

1. A method of forming an article, wherein the article is a hollow container, the method comprising:

(a) providing a mould having a first mould part and a second mould part, the first and second mould parts having respective first and second annular cavity-forming surfaces;

(b) closing the mould thereby defining an annular cavity between the first and second cavity-forming surfaces;

(c) injecting a molten plastic composition comprising a polymer and a physical blowing agent into the cavity, wherein the physical blowing agent is a gas dissolved in the polymer, the molten plastic composition being injected at an injection pressure, wherein during or after the injecting step (c), the injected plastic composition in contact with the first and second cavity-forming surfaces is cooled to form first and second solid skins respectively adjacent to and in contact with the first and second cavity-forming surfaces, whereby in at least one annular region of the annular cavity is respectively located at least one annular portion of the plastic composition in which portion at least some of the plastic composition between the first and second solid skins remains molten, wherein the thickness of the respective portion is constant within a tolerance of +/- 0.5% based on a nominal thickness of the respective portion, and wherein in the at least one portion the first and second solid skins are curved and parallel;

(d) opening the mould before the molten plastic composition between the first and second solid skins has solidified in the at least one portion, so as to expose the molten plastic composition of the respective portion to an external pressure lower than the injection pressure thereby allowing the molten plastic composition between the first and second solid skins of the respective portion to expand by foaming to form an expanded cellular foam as a result of the molten plastic composition beneath the first solid skin expanding outwardly away from the second solid skin which stretches the first solid skin in the respective portion, wherein the opening step comprises removing the first mould part so that the first solid skin is no longer in contact with the first cavity-forming surface; and

(e) cooling the expanded cellular foam to cause the molten plastic composition between the first and second solid skins of the respective portion to solidify and to form in the article at least one first wall part comprising a core layer of cellular foam between the first and second solid skins, wherein the hollow container has an annular sidewall, and the wall part is comprised in the annular sidewall and is both continuous and annular,

wherein after the cooling step (e) the length of the first solid skin in the respective portion has stretched, as compared to the first solid skin present prior to the opening step (d), by a stretch ratio of from 0.5 to up to 3%, wherein the stretch ratio is the ratio of the increase in the length of the first solid skin after cooling step (e) based on length of the first solid skin before the opening step (d).

2. The method of claim 1, wherein the thickness of the respective portion is constant within a tolerance of +/- 0.2% based on a nominal thickness of the respective portion.

3. The method of claim 2, wherein after the cooling step (e) the length of the first solid skin in the respective portion has stretched, as compared to the first solid skin present prior to the opening step (d), by a stretch ratio of from 2 to 3%, optionally from 2.25 to 2.75%, further optionally from 2.4 to 2.6%, yet further optionally about 2.5%.

4. The method of any one of claims 1 to 3, wherein prior to the opening step (d), the at least one portion has a thickness of from greater than 0.5 mm to up to 1 mm.

5. The method of any one of claims 1 to 4, wherein after the cooling step (e, the at least one wall part has a thickness of from 1 to 2 mm.

6. The method of any one of claims 1 to 5, wherein from the opening step (d) to the cooling step (e), the at least one first portion has increased in thickness by from 1 to 1.5 mm to form the at least one wall part.

7. The method of any one of claims 1 to 6, wherein the first and second mould parts are, respectively, outer and inner mould parts forming outer and inner surfaces of the hollow container.

8. The method of any one of claims 1 to 7, wherein after the cooling step (e), in the at least one wall part the first and second solid skins are curved and parallel.

9. The method of any one of claims 1 to 8, wherein the article is a hollow container having an annular sidewall and an integral base, wherein at least one region of at least one, or both, of the annular sidewall and the base is respectively comprised by the at least one wall part.

10. The method of claim 9, wherein the annular sidewall has an upper annular end remote from the base and a lower annular end adjacent to the base, the upper end has a larger circumference than the lower end, and the sidewall is curved in a longitudinal cross-section, wherein the stretch ratio is higher at the upper annular end than at the lower annular end.

11. The method of any one of claims 1 to 10, wherein after injecting step (c) and before opening step (d), the plastic composition forms a moulded intermediate article within the cavity, and in an initial phase of the opening step (d) the removal of the first mould part so that the first solid skin is no longer in contact with the first cavity-forming surface exposes a first end part of the intermediate article whereas an opposite second end part of the intermediate article remains in contact with the first and second cavity-forming surfaces.

12. The method of claim 11, wherein after the start of the initial phase the first solid skin at the first end part of the intermediate article is exposed for a greater time period than the first solid skin at the second end part of the intermediate article whereby after the cooling step (e) the length of the first solid skin at the first end part of the final expanded and moulded article has stretched by a greater stretch ratio than the length of the first solid skin at the second end part of the final expanded and moulded article.

13. The method of claim 12, wherein the first end part of the intermediate article has a smaller wall thickness than the second end part of the intermediate article to at least partly compensate for the greater stretch ratio for the length of the first solid skin at the first end part of the intermediate article as compared to the second end part of the intermediate article.

14. The method of claim 13, wherein the wall thickness of the first end part of the intermediate article is from 5 to 15% smaller than the wall thickness of the second end part of the intermediate article.

15. The method of claim 13 or claim 15, wherein the first and second end parts of the intermediate article form respective first and second wall portions of the final expanded and moulded article and wherein the first and second wall portions have the same thickness within a tolerance of +/- 0.5% based on a nominal thickness of the respective wall portions.

16. The method of any one of claims 13 to 15, wherein the wall thickness of the intermediate article progressively tapers in increasing thickness in a direction from the first end part of the intermediate article to the second end part of the intermediate article.

17. The method of any one of claims 1 to 15, wherein the polymer is polypropylene.

18. The method of any one of claims 1 to 16, wherein the blowing agent is carbon dioxide.

19. The method of any one of claims 1 to 18, wherein during the injecting step (c) the injection pressure is at least 150 bar.

20. The method of any one of claims 1 to 19, wherein at the end of the injecting step (c) a packing pressure of at least 150 bar is applied to the plastic composition in the cavity.

21. The method of any one of claims 1 to 20, wherein during the opening step (d) the first solid skin is exposed to the atmosphere and the external pressure is atmospheric pressure.

22. The method of any one of claims 1 to 21, wherein the first and second mould parts are, respectively, outer and inner mould parts forming outer and inner surfaces of the article, and further comprising the step, before injecting step (b), of providing an in-mould label at least partly surrounding the cavity, the in-mould label being located adjacent to the first cavity-forming surface, and wherein after the opening step (d) the in-mould label restricts stretching of the first solid skin formed adjacent thereto.

23. The method of claim 22, wherein the in-mould label is annular and entirely surrounds the cavity.

24. The method of claim 23, wherein the in-mould label is composed of a length of a polymer layer which has opposed ends which are joined together at a seam to form an annular shape.

25. The method of any one of claims 1 to 24, further comprising the step, between opening step (d) and cooling step (e), of disposing the moulded article into a second mould having a third mould part, the third mould part having a moulding surface, wherein the first solid skin is in contact with the moulding surface, and wherein after the opening step (d) the moulding surface restricts stretching of the first solid skin in contact therewith.

26. The method of claim 25, wherein during the disposing step the moulding surface compresses the at least one wall part to reduce the thickness of the core layer of cellular foam between the first and second solid skins and shrink the length of the first solid skin in the at least one wall part.

27. The method of claim 25 or claim 26, wherein the third mould part is hollow and the moulding surface defines a hollow cavity with a tapered surface, and during the disposing step the moulding surface is progressively urged against the first solid skin.

28. The method of any one of claims 25 to 27, wherein the third mould part is at a lower temperature than the first mould part so that the first solid skin is cooled upon contact with the third mould part.

29. The method of any one of claims 1 to 28, wherein the first mould part is at a lower temperature than the second mould part.

30. The method of any one of claims 1 to 29, further comprising the step, prior to solidification of the foamed molten plastic composition between the first and second solid skins in the cooling step (e), of pressing an embossing tool against the first solid skin to impress an inwardly oriented image into the first solid skin by stretching the first solid skin inwardly against the expanded cellular foam.

31. The method of any one of claims 1 to 30, wherein the article is a cup, mug, bottle, basin, bowl, tray, container or vessel for containing a liquid of a food.