CLAIMS:

1. A method of forming an article, the method comprising:

(a) providing a mould having an outer part and an inner part, the outer part having a first cavity-forming surface and the inner part having a second cavity-forming surface;

(b) closing the mould thereby defining a cavity between the first and second cavity-forming surfaces wherein, at at least one region of the cavity defining an annular cross-section of the cavity between outer and inner circumferential edges of the cavity, the first cavity-forming surface is such that a distance between the first cavity-forming surface and the second cavity-forming surface alternates between a first distance and a second distance around at least a portion of the circumference of the region, the first distance being greater than the second distance;

(c) injecting a molten plastic composition comprising a polymer and a blowing agent into the cavity;

(d) allowing the plastic composition to form, in the said at least one region, a first solid skin adjacent to and in contact with the first cavity-forming surface and having a first circumferential length, and a second solid skin adjacent to and in contact with the second cavity-forming surface and having a second circumferential length, wherein the plastic composition between the first and second solid skins remains molten, to form, respectively where the distance between the first cavity-forming surface and the second cavity-forming surface alternates between the first distance and second distance, alternating first and second thicknesses of the plastic composition, each first and second thickness comprising the first and second skins with molten plastic composition therebetween;

(e) opening the mould before the plastic composition between the first and second solid skins has solidified, thus allowing the plastic composition between the first and second solid skins, and the molten plastic composition at the alternating first and second thicknesses of the plastic composition, to expand by foaming, wherein said opening comprises removing the outer part of the mould so that the first solid skin is no longer in contact with the first cavity-forming surface, while maintaining the second solid skin in contact with the second cavity-forming surface.

2. The method of claim 1, wherein the second solid skin is maintained in contact with the second cavity-forming surface until expansion of the plastic composition between the first and second solid skins is complete.

3. The method of claim 1 or 2 wherein in step (e), the first circumferential length remains substantially constant as compared to the first circumferential length at the end of step (d).

4. The method of claim 3, wherein in step (e), the first circumferential length increases by up to 2 % as compared to the first circumferential length at the end of step (d).

5. The method of claim 1 or 2 wherein, in step (e), the first circumferential length increases by up to 20 % as compared to the first circumferential length at the end of step (d).

6. The method of claim 5, wherein, in step (e), the first circumferential length increases by 12 to 20 %, optionally 8 to 15 %, as compared to the first circumferential length at the end of step (d).

7. The method of claim 5, wherein, in step (e), the first circumferential length increases by up to 10 % as compared to the first circumferential length at the end of step (d).

8. The method of claim 7, wherein, in step (e), the first circumferential length increases by 3 to 10 % as compared to the first circumferential length at the end of step (d).

9. The method of claim 7, wherein, in step (e), the first circumferential length increases by up to 5 % as compared to the first circumferential length at the end of step (d).

10. The method of claim 9, wherein, in step (e), the first circumferential length increases by 1 to 5 % as compared to the first circumferential length at the end of step (d).

11. The method of any preceding claim, wherein in step (e), the second circumferential length remains substantially constant as compared to the second circumferential length at the end of step (d).

12. The method of claim 11, wherein in step (e), the second circumferential length increases by up to 2 % as compared to the second circumferential length at the end of step (d).

13. The method of any preceding claim, wherein the distance between the first cavity-forming surface and the second cavity-forming surface is measured perpendicular to a tangent to the second cavity-forming surface.

14. The method of any preceding claim, wherein the first surface comprises corrugations, the corrugations having peaks and troughs.

15. The method of claim 14, wherein the corrugations are in the form of a sinusoidal wave.

16. The method of claim 14 or 15, wherein the first distance is the distance between the second cavity forming surface and a lowest point of a trough, and the second distance is the distance between the second cavity-forming surface and a highest point of a peak.

17. The method of any preceding claim, wherein the second distance remains constant around the circumference of the region.

18. The method of any preceding claim, wherein the first distance remains constant around the circumference of the region.

19. The method of any one of claims 1 to 17, wherein the first distance varies around the circumference of the region.

20. The method of claim 19, wherein the first distance reaches a maximum value at every n^{th} trough around the circumference of the region, wherein n is at least 2 and is a whole number.

21. The method of claim 20, wherein the first distance reaches a minimum value at each trough or pair of troughs which are midway between adjacent n^{th} troughs around the circumference of the region.

22. The method of claim 20 or 21, wherein n is from 2 to 20, optionally from 2 to 10, further optionally from 2 to 5, further optionally from 3 to 4.

23. The method of any preceding claim, wherein the molten plastic composition further comprises a filler.

24. The method of claim 23, wherein the filler comprises calcium carbonate or chalk.

25. The method of any preceding claim, wherein the article is a cup or container.

26. The method of any preceding claim, wherein step (e) further comprises, after removal of the outer part of the mould, inserting the article into a second mould before expansion of the plastic composition between the first and second skins is complete, and retaining the article in the second mould until the plastic composition between the first and second skins has solidified,
wherein, when expansion of the plastic composition between the first and second skins is complete, the first solid skin of the article is in contact with a surface of the second mould.

27. The method of claim 26 wherein the surface of the second mould comprises a three-dimensional pattern which is imparted to the first skin.

28. The method of claim 26 or 27, further comprising, prior to inserting the article into the second mould, covering at least part of the surface of the second mould with a film sheet;
wherein, when expansion of the plastic composition between the first and second skins is complete, at least part of the first solid skin of the article is in contact with the film sheet.

29. The method of claim 28, wherein said film sheet covers an entire circumference of at least part of the surface of the second mould.

30. The method of claim 28 or 29 wherein the film sheet is a polypropylene film sheet.

31. The method of claim 30 wherein the polypropylene is oriented or biaxially oriented polypropylene.

32. The method of any one of claims 28 to 31 wherein the film sheet is a foamed film sheet.

33. The method of any preceding claim, wherein the polymer comprises a polyolefin or blend of a plurality of polyolefins, optionally polyethylene or polypropylene; or a polyester, optionally polyethylene terephthalate or polybutylene terephthalate; or polylactic acid.

34. The method of claim 33, wherein polymer comprises polypropylene having a Melt Flow Index of from 10 to 120.

35. The method of any preceding claim, wherein the blowing agent is a chemical blowing agent.

36. The method of any one of claims 1 to 34, wherein the blowing agent is a gas dissolved in the molten plastic composition, optionally wherein the gas comprises carbon dioxide or nitrogen, optionally wherein the gas further comprises a perfume composition.

37. The method of claim 1 forming an article, wherein in step (b) each first portion is disposed between a pair of second portions of the circumference of the region, in which second portions a distance between the first cavity-forming surface and the second cavity-forming surface is a third distance which is less than the second distance; step (d) also allows the plastic composition between the first and second solid skins to solidify in said second portions while the plastic composition between the first and second solid skins remains molten in said at least one first portion; and in step (e) the mould is opened before the plastic composition between the first and second solid skins in said at least one first portion has solidified, thus allowing the plastic composition between the first and second solid skins in said at least one first portion to expand by foaming.

38. The method of claim 37, wherein the second solid skin is maintained in contact with the second cavity-forming surface until expansion of the plastic composition between the first and second solid skins in said at least one first portion is complete.

39. The method of claim 37 or 38, wherein in step (e), the first circumferential length remains substantially constant as compared to the first circumferential length at the end of step (d).

40. The method of claim 39, wherein in step (e), the first circumferential length increases by up to 2 % as compared to the first circumferential length at the end of step (d).

41. The method of claim 37 or 38, wherein, in step (e), the first circumferential length increases by up to 20 % as compared to the first circumferential length at the end of step (d).

42. The method of claim 41, wherein, in step (e), the first circumferential length increases by 12 to 20 %, optionally 8 to 15 %, as compared to the first circumferential length at the end of step (d).

43. The method of claim 41, wherein, in step (e), the first circumferential length increases by up to 10 % as compared to the first circumferential length at the end of step (d).

44. The method of claim 43, wherein, in step (e), the first circumferential length increases by 3 to 10 % as compared to the first circumferential length at the end of step (d).

45. The method of claim 43, wherein, in step (e), the first circumferential length increases by up to 5 % as compared to the first circumferential length at the end of step (d).

46. The method of claim 45 wherein, in step (e), the first circumferential length increases by 1 to 5 % as compared to the first circumferential length at the end of step (d).

47. The method of any one of claims 37 to 46, wherein in step (e), the second circumferential length remains substantially constant as compared to the second circumferential length at the end of step (d).

48. The method of claim 47, wherein in step (e), the second circumferential length increases by up to 2 % as compared to the second circumferential length at the end of step (d).

49. The method of any one of claims 37 to 48, wherein the distance between the first cavity-forming surface and the second cavity-forming surface is measured perpendicular to a tangent to the second cavity-forming surface.

50. The method of any one of claims 37 to 49, wherein around said least one first portion of the circumference of the region, the first surface comprises corrugations, the corrugations having peaks and troughs.

51. The method of claim 50, wherein the corrugations are in the form of a sinusoidal wave.

52. The method of claim 50 or 51, wherein the first distance is the distance between the second cavity forming surface and a lowest point of a trough, and the second distance is the distance between the second cavity-forming surface and a highest point of a peak.

53. The method of any one of claims 37 to 52 wherein the second distance remains constant around the circumference of the region.

54. The method of any one of claims 37 to 53, wherein the first distance remains constant around the circumference of the region.

55. The method of any one of claims 37 to 53, wherein the first distance varies around the circumference of the region.

56. The method of claim 55, wherein each first portion comprises n troughs at which the first distance is at the maximum value, wherein n is at least 1 and is a whole number, optionally wherein n is from 1 to 20, optionally from 1 to 10, further optionally from 1 to 5.

57. The method of claim 55 or 56, wherein in said at least one first portion, the first distance is at a maximum value at each trough which is adjacent to a second portion.

58. The method of claim 57, wherein n is at least 2 and is a whole number, optionally wherein n is from 2 to 20, optionally from 2 to 10, further optionally from 2 to 5.

59. The method of any one of claims 56 to 58, wherein the first distance reaches a minimum value at each trough or pair of troughs which are midway between adjacent troughs at which the first distance is at the maximum value.

60. The method of any one of claims 37 to 59, wherein the molten plastic composition further comprises a filler.

61. The method of claim 60, wherein the filler comprises chalk or calcium carbonate.

62. The method of any one of claims 37 to 61, wherein the article is a cup or container.

63. The method of any one of claims 37 to 62, wherein step (e) further comprises, after removal of the outer part of the mould, inserting the article into a second mould before expansion of the plastic composition between the first and second skins in the at least one first portion is complete, and retaining the article in the second mould until the plastic composition between the first and second skins has solidified in said at least one first portion, wherein, when expansion of the plastic composition between the first and second skins in said at least one first portion is complete, the first solid skin of the article is in contact with a surface of the second mould in said at least one first portion.

64. The method of claim 63 wherein the surface of the second mould comprises a three-dimensional pattern which is imparted to the first skin.

65. The method of claim 63 or 64, further comprising, prior to inserting the article into the second mould, covering at least part of the surface of the second mould with a film sheet,

wherein, when expansion of the plastic composition between the first and second skins is complete, at least part of the first solid skin of the article is in contact with the film sheet in said at least one first portion.

66. The method of claim 65, wherein said film sheet covers an entire circumference of at least part of the surface of the second mould.

67. The method of claim 65 or 66 wherein the film sheet is a polypropylene film sheet.

68. The method of claim 67 wherein the polypropylene is oriented or biaxially oriented polypropylene.

69. The method of any one of claims 65 to 68 wherein the film sheet is a foamed film sheet.

70. The method of any one of claims 37 to 69, wherein the polymer comprises a polyolefin or blend of a plurality of polyolefins, optionally polyethylene or polypropylene; or a polyester, optionally polyethylene terephthalate or polybutylene terephthalate; or polylactic acid.

71. The method of claim 70, wherein polymer comprises polypropylene having a Melt Flow Index of from 10 to 120.

72. The method of any one of claims 37 to 71, wherein the blowing agent is a chemical blowing agent.

73. The method of any one of claims 37 to 71, wherein the blowing agent is a gas dissolved in the molten plastic composition, optionally wherein the gas comprises carbon dioxide or nitrogen, optionally wherein the gas further comprises a perfume composition.