# Summary

        Blow molding is the principal method of making bottles and other hollow shapes in which the mouth is smaller than the body of the container. Blow molding is a two-step process. In the first step a parison or preform is created. Then, in the second step, that parison is expanded into a mold. The expansion is done by injecting air inside the hot parison, which forces it against the walls of the mold cavity.

        Two principal methods are used to form the parison, extrusion blow molding and injection blow molding. In extrusion blow molding, the parison is formed by forcing the plastic through an extrusion die. This process can be either continuous, in which case multiple molds are required, or intermittent. Intermittent extrusion blow molding uses an accumulator to build up the charge of material so that it can be pushed rapidly through the die to form the parison. Intermittent blow molding is used for large parts, in which the extruder is alternately stopped.

         The second principal method for forming the parison is injection molding. In this method the parison is simply injected around a core pin by a standard injection molding machine. The parison is then transferred to another machine where it is placed into a mold, heated, and blown into shape. A modification of the injection blow molding system uses a mechanical device to stretch the parison in the longitudinal direction so that biaxial orientation can be achieved. This process, called stretch blow molding, is how PET soft- drink bottles are produced.

        The process of blow molding can be somewhat complicated by problems related to both the formation of the parison and the later formation of the finished part. A troubleshooting guide should be consulted to assist in examining all of the possible causes of a particular defect.

## 13.9.1. Questions

1. What is the principal problem when forming a bottle using injection molding?
2. Why is continuous extrusion blow molding not recommended for large blow molded parts?
3. List three advantages of the moveable mold system versus the rotary system for continuous extrusion blow molding.
4. In a blow molded part, where are the thinnest sections likely to occur?
5. Why can blow molding molds be made out of aluminum, whereas injection molding molds are usually made out of tool steel?
6. What is the advantage of a programmable parison device?
7. What method is used in injection blow molding to achieve the type of part wall thickness control that can be obtained in programmable parisons?
8. Describe sliding/compression blow molding and indicate its advantage.
9. What factors are likely to determine the maximum size part that can be blow molded?
10. What key processing considerations must be met in order to use PET to make soft-drink bottles?
11. When making bottles by blow molding, you find that about every tenth bottle has a small hole in the wall. Indicate four possible causes for this defect, and explain what you would do to correct each possible problem.
12. Milk bottles are sometimes annealed after blow molding. Why is this done?
13. A resin supplier has suggested that a blow molder of polystyrene parts add 20% polyethylene to improve properties. What property differences would you expect? What processing differences would you expect?

## 13.9.2. References

Blow Molding of Thermoplastics, Hoechst Plastics, KV 202 e - 7076 (8355).

Brydson, J. A., Handbook for Plastics Processors, Oxford, UK: Heinemann Newnes, 1990.

Frados, Joel (ed.), Plastics Engineering Handbook (4th ed.), Florence, KY: International Thomson Publish-ing, 1994.

John, Frederick W.. "Blow-Molding Grown Up," Machine Design, April 2, 1970 , 89-95.

Lee, Norman C., Blow Molding Design Guide, Munich: Hanser Publishers, 1998.

Lee, Norman C. (ed.), Plastic Blow Molding Handbook, New York: Van Nostrand Reinhold, 1990.

Morton-Jones, D. H., Polymer Processing, London: Chapman and Hall Ltd, 1989.

Schwartz, Seymour S., and Sidney H. Gooding, Plastic Materials and Processes, New York: Van Nostrand Reinhold Company, 1982.

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