



Fig. 36.6 • Glass vial with aluminium crimp seal and cap in place.

product. The rubber septum is self-sealing to a high degree and so more than one withdrawal can be made from a vial. However, only a limited number of punctures can be made through the rubber closure before it will lose its integrity as a seal. Products packaged in vials for multiple use will therefore incorporate a preservative to prevent any microorganisms accidentally introduced into the product during use from proliferating.

The glass is inert and does not interact with the drug and the use of synthetic rubber closures reduces the likelihood of the drug or other excipients reacting with or being adsorbed into the rubber on storage. Synthetic rubber is also latex-free, which is important as sensitization to latex is an increasing problem for healthcare workers. The main disadvantage is that puncturing the rubber closure can cause large rubber particles to be introduced into the drug product.

Infusion bags and bottles

Large volume parenteral products are packaged in glass bottles, collapsible plastic bags and semi-rigid plastic bottles, though the use of glass bottles for large volume parenterals is becoming much less



Fig. 36.7 • Collapsible infusion bag.

commonplace. These products range in size from 100 mL up to 1000 mL, though larger sizes (e.g. 3000 mL) can be used, particularly for parenteral nutrition products.

Collapsible bag presentations are the most common form of container (see Fig. 36.7). They are manufactured from PVC or more increasingly polyolefin plastic. Collapsible bags usually have an additive port to allow other injectable drugs to be added to the infusion fluid. The main advantage of collapsible bags is that they collapse under atmospheric pressure as the contents are removed from them, therefore they do not require an air inlet system to equilibrate air pressure between the outside and inside of the container, as do rigid glass bottles. The main disadvantage of PVC bags is that drugs may become adsorbed onto the plastic (e.g. insulin) or react with the plastic (e.g. etoposide). Additionally, components can leach out of the plastic such as monomers and phthalate plasticizers which may be toxic in long-term exposure. Polyolefin is much less reactive and is now replacing PVC for this reason in infusion bags.