



Figure 19-7 Example of a fill weight control chart.

containers (Fig. 19-8). For vial openings, the closure must fit snugly, not “pop out.” Often, filling efficiencies are dependent more on the stoppering process than on the actual filling process, as there are tendencies for rubber closures to slip or pop off the openings of vials. For syringes and cartridges, the placement of the rubber plunger is dictated by the desired position of the plunger within the barrel of the syringe or cartridge to deliver the claimed volume of product.

The closing of primary containers will affect the final integrity of the container/closure interface. For syringes and cartridges, no further sealing is done although units are either placed in secondary packaging for unit dosing or part of a tray system, for example, Hypak™ (Becton-Dickinson). For vials and bottles, aluminum seals (Fig. 19-9) are crimped around the rubber closure and top of the container. Seal force integrity is measured by a torque-testing device.



Figure 19-8 Rubber closure hoppers. *Source:* Courtesy of Baxter Healthcare Corporation.