

CHARACTERIZATION OF SILICONE TUBING_EFFECT OF PRESSURE AND IRRADIATION ON TUBING DIAMETER

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A Single-Use assembly or system consists of numerous flexible components connected together via heat seals, overmolds or mechanical fasteners. The integrity (e.g. leak assurance) of such a system is dependent on the internal surface being continuously sealed and free of disconnects between the various components. The diameter of the flexible tubing during manufacture of the assemblies and the tubing expansion at operational pressures are important characteristics to know. Understanding these factors can help in the design of assemblies that maintain their integrity throughout their use at operating conditions. The aim of the study was to characterize four different tubing types under various pressure conditions before and after gamma irradiation.

The inner lumen of the tubing was exposed to pressures up to one third of the measured burst pressure. An expansion in the internal tubing diameter of up to 15% was observed as the internal pressure increased. While irradiation of the tubing generally makes it stiffer and less likely to expand, this effect was minor. For all tubing durometers the difference in diameter expansion before and after irradiation was under 1% with the exception of the pump tubing where the difference was approximately 2%.