Plastic materials are often used in experimental and sampling equipment. Plastics are not gas tight, since gases are able to diffuse through the walls of tubing and containers made of plastic. Methods for calculating the significance of gas diffusion through the walls of containers and the walls of tubings for both turbulent and laminar flow conditions is presented. A more complex model for diffusion under laminar flow conditions is developed. A comprehensive review on gas diffusion coefficients for the main gases (O2, N2, CO2, CH4 etc.) and for a long range of plastic materials is also presented. Calculations show that diffusion of oxygen through plastic tubing and reactors into anoxic water can be a serious problem for a series of plastic materials. Comparison of the method for turbulent and laminar flow in tubings shows that the difference is insignificant for most cases. Calculations show also that the use of silicone rubber in experimental and sampling equipment to be used for anoxic water is, for most cases, prohibited by oxygen diffusion.