

... to determine the volume of water in a closed system.

smaller volume dye dilution larger volume

When rhodamine dye is exposed to light of a specific wavelength, it fluoresces or “glows” with light of a different, specific wavelength. The intensity of the response is directly proportional to dye concentration and may be measured precisely with a precision fluorometer. Thus an accurately-weighed quantity of dye, when mixed in a unknown volume of water, yields a measurable concentration which is inversely proportional to the volume of water.

$$\frac{\text{amount of dye added to the system (micrograms)}}{\text{increase in dye concentration (micrograms / liter)}} = \text{volume of dilution (liters)}$$

A bottle containing 400,000 micrograms of dye is supplied. This amount, diluted in 1000 gallons of water yields a concentration of about 100 micrograms / liter (very light pink in color).

... the usual alternative – calculating pipe and component volumes

