

A requirement exists for weightless determination of urine "specific gravity" (density).

The scale has obvious resolution and accuracy for the task but some method of providing reproducible volumes must be produced. Theoretical accuracy compared to requirements assuming perfect volume reproducibility.

Normal range of S.G.

1.005

or 5 to 25 X  $10^{-3}$

1.025

The mass scale has a resolution of  $10^{-4}$  at say 1 KG but its performance below this is problematical. Assume worst case of 100 cc urine in 1 KG total mass or  $10^{-3}$  resolution which is equivalent to  $\pm .5 \times 10^{-3}$  S.G.

The flask at (R) was constructed to provide constant volumes. A stream of fluid is allowed to flow through stopcock  $S_1$ , fill the bottle and out  $S_2$ .

At this point  $S_1$  and  $S_2$  are closed, trapping the fluid.