Selections of the standard and the titer in dependence from the bottle volume, the burette volume and the expected maximum DO concentration

1. There is a dependency in the needed concentration of the titer T_n from the used bottle volumes V_{bot}(ml), the expected DO concentration (ml/l NTP) and the burette volume $V_{Burette}$ (µl). You should use a concentration of the titer, so that with the largest bottle V_{botmax} and with the highest expected concentration DO_{max}, one single burette volume would be sufficient for the titration including a let say 10% reserve for the over-titration needed to find the end point. The calculation formula is:

$$T_n >= \frac{DO_{max} \times 4 \times V_{Botmax}}{0.9 \times V_{Burette} \times 22.39}$$

2. You should select the normality of the standard S_n and volume of the standard V_S (ml) product, so that you need one half to 90% of the burette volume for the standardisation of the titer. The calculation formula is:

$$\frac{T_n \times 0.5 \times V_{Burette}}{1000} <= S_n \times V_s <= \frac{T_n \times 0.9 \times V_{Burette}}{1000}$$

3. Example:

Burette volume 1000 µl, max bottle volume 150 ml and max DO concentration of 12 ml/l. The result for the titernormality is

$$T_n >= \frac{12 \times 4 \times 150}{0.9 \times 1000 \times 22.39} = 0.36$$

The result for the product of standard normality and standard volume is

$$0.18 = \frac{0.36 \times 0.5 \times 1000}{1000} <= S_n \times V_s <= \frac{0.36 \times 0.9 \times 1000}{1000} = 0.324$$

Suppose you use a calibrated pipette of volume V_S = 10 ml, then the normality S_n of your standard should be between 0.018 and 0.0324. Observe that the normality is molarity × 6 with KIO_3 and molarity × 12 with $KH(IO_3)_2$. Suppose you decide for a normality of 0.03, then you have to dissolve 1.0700 g KIO_3 or 0.9748 g $KH(IO_3)_2$ and make up to exactly 1000 ml by distilled water. For the titer (T_n = 0.36) you need 89.3457 g of $Na_2S_2O_3{\bullet}5H_2O$.

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