

140 Cl₂ CHLORINE

0.1 - 3 ppm \ 360 Tests

DPD-Semiquinone + Potassium Iodide

- Switch on the Photometer 660
- Enter **140** and press **E** for 140 Cl₂
- Set filter as indicated to **525nm** and press **E**
- Insert 16mmØ tube with plain water and press **B**
- Fill second tube to about three-quarters with sample
- Add 1 drop of **Cl₂-2** (DPD) and mix
- Insert and press **M** to record free Chlorine as ppm (mg/l)
- Fill about half of this into a third tube
- Add 1 drop of **Cl₂-2** (KI) and mix
- Insert and press **M** to record total Chlorine as ppm (mg/l)

Free chlorine as hypochlorite maintains the dominant role as a water disinfectant with an occasional substitution by ozone and more recently chlorine dioxide, due to their inability in giving chlorinated organics. A redox-indicator well suited for colorimetry was found to be N,N-dimethyl-p-phenylenediamine as used in 1936 by *Haase & Gad* and known since 1875 to produce an oxidation product called "Wurster's Red". *Byers & Mellon* recognized in 1939 that it was possible to differentiate between hypochlorite and bound chlorine because of the slower reaction of the latter. *Palin* mentions the suitability of the analog diethyl-compound in 1944, while employing this more stable and common derivative in "DPD"-tablets not until later. It is commonly not recognized that the pink *Semiquinone* reaction product is only a transient stage in the oxidation of DPD, to lose its colour again by further oxidation to the *Holoquinone*. This limits the safe range to around 3ppm. All colours are inherently unstable and should be measured immediately. Bound chlorine consists mainly of monochloramine with a reduced though more persistent disinfection capacity. Prescribed values for swimming-pools largely depend on their frequentation and temperature. Typical are values such as 0.3-0.6ppm for private and 0.6-1.2ppm for public pools at a pH of 7.0-7.3. There are occasional reports of heavily frequented pools exhibiting unsatisfactory bacterial counts even at levels above 2ppm free chlorine, which endorses the fact that all measurements must be considered in the light of incoming contamination and time needed for sterilization.

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