

## 200 Cu COPPER

0.2 - 8 ppm \ 120 Tests

*Colour Complex with Cuprizone*

- Fill 16mmØ with a fully extended syringe (3.2ml) of sample
- Add 3 drops of **Cu-1** and mix
- Add 3 drops of **Cu-2** and mix
- Add 3 drops of **Cu-3** and mix
- Set aside for 3'
- Switch on the Photometer 660
- enter **200** and press **E** for 200 Cu
- Set filter as indicated to 578nm and press **E**
- Insert tube with plain water and press **B**
- Insert tube with prepared sample and press **M**
- Record as Copper ppm (mg/l)

Copper is endowed with several selective and sensitive reactions for extractive colorimetry, while those in the aqueous medium are essentially restricted to that with Cuprizone introduced by Nilsson in 1950. An interesting observation is that many complexes of  $\text{Cu}^{2+}$  are of a similar royal blue tint with  $\lambda_{\text{MAX}} \sim 600\text{nm}$  in spite of considerable differences in intensity. Cuprammonium  $[\text{Cu}(\text{NH}_3)_4(\text{H}_2\text{O})_2]^{2+}$  is the most familiar of these, formed under alkaline conditions with ammonia. This is produced on the addition of reagent Cu-1 and Cu-2, invisible on account of its weak colour in the ppm range. The colour appears after adding Cuprizone (Bis-cyclohexanone-oxalyldihydrazone), reagent Cu-3, where two bidentate ligands presumably replace the four monodentate ones of ammonia rather than those of water at a greater distance. A relatively low toxicity permits the use of copper for pots, containers and piping in connection with food, in breweries and for drinking water. 1ppm is a typical value from such a distribution system, this being several times as much in recent installations. Such water is of danger to infants, especially if soft and of acid reaction. Copper, together with silver and zinc is considerably more toxic to lower forms of life such as fungus and algae. Common uses are the control of algae in swimming pools with copper sulfate, or this thickened with slaked lime as Bordeaux Mixture for spraying vines. Effluents from alkaline plating baths contain non-reactive  $\text{Na}_2\text{Cu}(\text{CN})_3$  for which a prior destruction with one drop of formalin per 3.2ml sample has been recommended.

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