

## 180 Cr CHROMIUM

0.05 – 3 ppm \ 180 Tests

*Diphenylcarbazide*

- Fill 16mmØ tube with a fully extended syringe (3.2ml) of sample
- Add 2 drops of **Cr-1** and mix
- Add 2 drops of **Cr-2** and mix
- Set aside for 3'
- Switch on the Photometer 660
- Enter **180** and press **E** for 180 Cr
- Set filter as indicated to 546nm and press **E**
- Insert tube with plain water and press **B**
- Insert tube with prepared sample and press **M**
- Record as ppm (mg/l) Cr<sup>6+</sup> 1ppm Cr<sup>6+</sup>≡ 2.23ppm Chromate CrO<sub>4</sub><sup>2-</sup>

Since the first description of the fairly selective red-violet reaction-product of chromium with diphenylcarbazide (Reagent Cr-2) by *Cazeneuve* in 1900 there has been is no definite proof of its nature in spite of many qualified attempts from 1950 onwards towards its establishment. These refer to the formation of colour complexes as well as oxidation products together with combinations of these. The reactivity is restricted to hexavalent chromium in form of chromate, acidified to ~pH 2 by Reagent Cr-1, containing fluoride to mask iron. The around 100-times less toxic trivalent chromium is rarely of interest, being convertible to the hexavalent form by shaking with black manganese dioxide. Chromate in water is a classical example of pollution by industrial effluents and the basis of the film "Erin Brockovich". The maximum values of 0.58ppm reached in an inland area of Southern California and its assumed effects on local inhabitants resulted in a substantial award, against the argument that the Cr<sup>6+</sup> would rapidly be reduced to Cr<sup>3+</sup> in the digestive track. More serious were effects concerning earlier reports from Japan, where solid chromate wastes were disposed of by incorporation during road construction, subsequently being leached to colour the local water a visible yellow. The human body contains ~ 6mg Cr<sup>3+</sup> at a daily intake of 0,06-0,6mg of which 98% are disposed of within 24h with urine. There are a number of products available for Cr<sup>3+</sup>-insufficiency. Cr<sup>3+</sup> hydrolyzes and precipitates easily. The low tolerance-value of 0,05ppm Cr in water has primarily an indicator function.

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