

## 290 N2H4 HYDRAZINE

0.02 - 2 ppm \ 180 Tests

*Dye Synthesis with 4-Dimethylaminobenzaldehyde*

- Fill 16mmØ tube with a fully extended syringe (3.2ml) of sample
- Add 3 drops of **N<sub>2</sub>H<sub>4</sub>-1** and mix
- Add 3 drops of **N<sub>2</sub>H<sub>4</sub>-2** and mix
- Set aside for 5'
- Switch on the Photometer 660
- Enter **290** and press **[E]** for 290 N2H4
- Set filter as indicated to 470nm and press **[E]**
- Insert tube with plain water and press **[B]**
- Insert tube with prepared sample and press **[M]**
- Record as ppm (mg/l) Hydrazine N<sub>2</sub>H<sub>4</sub>

An addition of antioxidants to the water of steam boilers and -turbines is necessary to counteract the substantially increased corrosion-potential of dissolved oxygen at the temperatures and pressures of operation. Since its first use in Leverkusen in 1943/44, the optimum agent from the standpoint of chemistry is hydrazine H<sub>2</sub>-N-N-H<sub>2</sub>, a colourless, alkaline liquid with a typical amine odour, available as a 24% aqueous solution. Disadvantages are its toxicity and suspected carcinogenic character. Advantages are a residue-free reaction with oxygen according to  $N_2H_4 + O_2 \rightarrow H_2O + N_2$ . In practice a small amount (<0,03ppm) of oxygen remains which causes a passivating layer on the steel surface of grey-black Magnetite (Fe<sub>3</sub>O<sub>4</sub>) with ceramic properties. Commercial hydrazine preparations are available with additives to increase the reactivity, marketed under such names as Levoxin® (Bayer), Amerzine™ (Ashland) or Elimin-Ox™ (Nalco). Since 1947 the standard method for the determination of the hydrazine level has been that of Pesez & Petit, in which 4-dimethylaminobenzaldehyde forms a yellow dye with hydrazine. In this, the two H-atoms at each end of the hydrazine molecule are replaced by 4-diaminobenzo (DAB)-units. This results in a resonating DAB-CH=N-N=CH-DAB structure. Typical hydrazine levels are 1ppm for boiler-feed water at the upstart, with an operating level of 0.1ppm. For central heating circuits this is 5-15ppm, followed by 0.5-1ppm. For steam-heating systems: 0.2-1ppm in the condensate. For maintenance conservation: 15-300ppm.

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