

Corrosion behaviour of two different brasses in soft and hard waters of different pH

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Brasses are widely used in drinking water for valves and fittings. Good machinability of brasses is achieved by adding lead (Pb) in brass in amounts up to 2.5 mass %. However, in many types of waters commonly used α - β brasses dezincify. In this process, Pb migrates into water. In Europe, the concentration of lead in drinking water is restricted by the Drinking Water Directive and is limited to 10 $\mu\text{g/L}$. However, dezincification of small components of drinking water installations can rise its concentration above the allowed value.

In the present study, two types of brasses were tested: the first type with the composition approved by 4 MS initiative (4 EU member initiative on approval and harmonization of tests for the hygienic suitability of products in contact with drinking water), and the second with a composition which is not approved. Both of materials were exposed to three different types of synthetic waters that differ in pH, alkalinity and chloride concentration. During the 10 month exposure, electrochemical impedance spectroscopy measurements were conducted regularly – at the beginning every week, later on once a month. At the same time, visual inspection of exposed surfaces was regularly performed. In this study, the correlation between Pb and the amount of Zn and Cu, which were analysed each month, are sought. The results of electrochemical characterization are correlated to microstructural characterization and the releases of Cu, Zn and Pb.