

HISTORIES OF GUIDELINE DEVELOPMENT FOR THE FOURTH EDITION

12. Chemical fact sheets

12.1 Chemical contaminants in drinking-water

Hardness

History of guideline development

The 1959 and 1963 WHO *International Standards for Drinking-water* did not refer to hardness. The 1971 International Standards stated that the maximum permissible level of hardness in drinking-water was 10 mEq/l (500 mg calcium carbonate per litre), based on the acceptability of water for domestic use. In the first edition of the *Guidelines for Drinking-water Quality*, published in 1984, it was concluded that there was no firm evidence that drinking hard water causes any adverse effects on human health and that no recommendation on the restriction of municipal water softening or on the maintenance of a minimum residual calcium or magnesium level was warranted. A guideline value of 500 mg/l (as calcium carbonate) was established for hardness, based on taste and household use considerations. No health-based guideline value for hardness was proposed in the 1993 Guidelines, although hardness above approximately 200 mg/l may cause scale deposition in the distribution system. Public acceptability of the degree of hardness may vary considerably from one community to another, depending on local conditions, and the taste of water with hardness in excess of 500 mg/l is tolerated by consumers in some instances. This assessment was brought forward to the third edition of the Guidelines, published in 2004, and to the fourth edition of the Guidelines, published in 2011. The background document on hardness was revised for the fourth edition to expand on the potential for drinking-water to contribute to calcium and magnesium intake, which could be important for those who are marginal for these minerals.