

PRACTICAL CONDITIONS FOR THE USE OF A FIRST ORDER CHLORINE DECAY MODEL IN WATER SUPPLY

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ABSTRACT: The maintenance of a residual quantity of a disinfectant such as chlorine throughout the system, in order to ensure the safety of distributed water is current practice in many countries. Chlorine added at the water treatment plant decays as it travels to the consumer tap, due to reactions in the bulk of the flow and at pipe walls. The classic kinetic model used to describe chlorine bulk reactions in most water quality modelling software packages is a first order decay model. In practice, other models provide considerably better fits in laboratory decay tests. Therefore, when the first order model is preferred to other models for simulation purposes, it is important to evaluate the magnitude of the associated errors. This paper discusses practical conditions for the application of first order/parallel first order models, based on the study of the influence of several water quality parameters (temperature, initial chlorine dosage, organic matter and iron content) on chlorine decay. Laboratory decay tests were carried out using groundwater and the performance of five kinetic models for describing bulk decay has also been assessed.