المدرسة الوطنية العليا للري

المكتبة

المستودع الرقمي للمدرسة العليا للري

The title (العنوان):

Computer-assisted program for water Calco-Carbonic
equilibrium computation

Abstract : The risk of scaling or corrosion of pipes and household appliances has attracted special interest from the part of drinking water supply systems designers. To address these deficiencies, the Calco-Carbonic balance in water must be accurately maintained and evaluated using either the graphic methods, appreciation indexes, or computer programs. In this work, we developed a computer-assisted software for the computation of the Calco-Carbonic equilibrium of water based on Legrand Poirier's model. This software program, established in FORTRAN GNU with a graphical interface written with python using pyQt library pyqt5, provides two practical functions: evaluation of water Calco-Carbonic equilibrium numerically and graphically, and computation of the reagent rate required to make water neither aggressive nor encrusting. The program validation was carried out by comparing our results with those of the case considered by Legrand et al. (1981). In addition, the implementation of the program with two cases of water coming from reverse osmosis desalination plants of brackish water in the Sahara region and seawater in the Tipaza province shows for both stations, the technique of remineralization by carbonation is the best. Moreover, the results allowed us to choose between two remineralisations techniques among the eight techniques allowed applied in the case of brackish water desalination. It consists in adding lime and CO_2 or infiltration on an uncalcined dolomite bed. In the case of seawater, we applied the same carbonation remineralisation technique where the final Ca^{2+} value was set at 8 °F (80 mg/l$CaCO_3$). These techniques ensured a quality of produced water that complies with drinking water standards.

KEYWORDS : Calco-Carbonic ; Scaling ; Corrosion

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